SOLLI ENGINEERING

October 18, 2023

Planning and Zoning Department
Town of Monroe
7 Fan Hill Road
Monroe, CT 06468
(203) 452-2809

RE: Excavation/Filling Permit Application
64 Cambridge Drive & 4 Independence Drive
Monroe, Connecticut 06468
Project Number: 1903601

Dear Commission Members,

On behalf of the Applicants, Astro Land Holdings, LLC, and Spacely Land Holdings, LLC, please find enclosed an application for an Excavation/Filling Permit for the proposed restoration activities located at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut. The application seeks re-approval for the identical excavation and fill permit previously granted by this Commission on January 20, 2022 (the "original" permit). The first approval was overturned on appeal on the grounds that the waivers that were part of the original permit were invalid because a Planning and Zoning Commission does not have the power to grant waivers of zoning regulations under Connecticut law. Connecticut law generally provides that only a Zoning Board of Appeals has the power to grant waivers or variances from the zoning regulations. On July 18, 2023, the Monroe Zoning Board of Appeals granted variances of the applicable zoning regulations for which waivers were previously granted in connection with the original permit.

In short, this application is being submitted to replace a previously approved Excavation/Filling Permit (EFP-2021- 03, File #107) as variances have been secured (ZBA 2023-04, File #1417) in lieu of the previously granted waivers included in the original application.

As the Commission may recall, the project entails earthwork, drainage, remediation and upland enhancement activities in order to restore previous watershed drainage patterns to the eastern wetlands system.

We request all records from EFP-2021-03, File #107 and ZBA 2023-04, File #1417 be included as part of the record for this application.

Please review the attached items and requisite fees provided herein. If you have any comments or questions, please provide them at your earliest convenience. We look forward to working with you on this application.

Respectfully,
Solli Engineering, LLC



Kevin Solli, P.E.
Principal

CC: Stephen Finn (Esq.)
Arnold Karp
Paul Stone

Enclosures:

- Excavation/Filling Permit Application
- Project Narrative
- Bond Estimate Form
- Abutters List
- Plan Set
- Engineering Report
- DPH & Aquarion Notification
- WSP Hydrogeologic Investigation
- WSP Subsurface and Stockpile Investigation

EXCAVATION / FILLING PERMIT
APPLICATION

TOWN OF MONROE
PLANNING & ZONING DEPARTMENT
7 Fan Hill Road, Monroe, CT 06468
Tel. (203) 452-2812

FOR OFFICE USE:
EFP – _____
File Number – _____

Project Name: Proposed Site Restoration

Street Address: 64 Cambridge Drive & 4 Independence Drive

Zoning District: Industrial District 2 (I-2)

Lot Acreage: 71.90 (Total) **Assessor Map Number:** 94 **Lot Number:** 15/00 & 15/28

Brief Description and Purpose/Reasons for Excavation / Filling:
The project proposes earthwork activities in order to fill the northern portion of the site to an elevation of approximatly 461+/- and install an impervious liner below finished grade in order restore the former watershed drainage patterns. There are also two two wetland remediation areas and an abudant planting and landscape plan proposed for the site to enhance upland areas.

Also attach detailed Project Narrative as required in the Zoning Regulations

❖ ***TAKE NOTE: It is the applicant's responsibility to provide all the information the Commission will need in order to process the application and make a fair determination of the issues. If an applicant fails to supply timely or sufficient information, it may result in delay, denial of the application, or both. Applicants are highly recommended to be represented by qualified representatives and to consult the Town of Monroe Plan of Conservation and Development, as well as the detailed application requirements and standards set forth in the Town of Monroe Subdivision, Zoning and Inland Wetlands Regulations.***

- **Pre-Submission Conference** – Contact the Planning and Zoning Administrator (203-452-2812) to schedule one or more preliminary pre-submission conferences with staff (***this is highly recommended***).

- **Formal Application Submission** – Provide **eleven (11) paper application sets** (***plans folded and materials collated into individual sets***) **and one (1) pdf CD** including the following materials: (a) signed application form; (b) supporting application narrative; (c) supporting investigative and impact analyses reports; (d) 100-foot abutters list; and (e) complete set of Site Plans. The application submission will be reviewed by the **Commission** and the Town's **Application Review Team (ART)** consisting of Department Staff from Planning and Zoning, Engineering, Wetlands, Fire Marshal, Police (traffic authority), Health and Building.

- **Sealed and Certified Plans** – All required A-2 and T-2 Surveys, Site Plans, Architectural Plans and supporting analyses Reports as prepared by consultant engineers, surveyors, landscape architects, architects, etc. must be current and include an original seal and live signature certification.

- **Project Timeline** – Following official receipt of an application, a **Project Timeline** listing milestone dates and actions to be followed during the review will be emailed to the applicant's Primary Project Contact.

Application No. _____ **File No.** _____

APPLICATION FEE

Excavation / Filling Permit Base Fee: $675.00 minimum or $100 per acre (whichever is greater).....$ 3,970**
Connecticut State Surcharge..... $ 60.00

Payable to the Town of Monroe **TOTAL APPLICATION FEE:** **$** 4,030 *

Include driver's license number and telephone number on fees paid with a personal check.

**Calculated from total acreage of proposed fill (See Figure 7 in Engineering Report)

APPLICATION INFORMATION

1. **Where is the property deed found in the Monroe Land Records?**

   a) Date: 05/13/2019 Volume: 2038 Page: 0049/0051

2. **What is the origin of the application property (i.e., when and how was the current property created?) List recorded maps of previous subdivision, resubdivision and lot line adjustments involving the property:**

   64 Cambridge Drive & 4 Independence Drive were created as the result of the subdivision and subsequent creation of the Pepper Street Business Park. Please refer to the "Property Survey of 64 Cambridge Drive & 4 Independence Drive; Monroe, Connecticut" Dated April 6, 2020, By Accurate Land Surveying; and the project narrative included as a part of this application for information regarding recorded surveys and map references.

3. **Supporting Maps and Project Narrative:** **Refer to Zoning Regulations §6.4**

   - **Attach all required Maps, Reports and Project Narratives as required by the Zoning Regulations.**

PRIMARY PROJECT CONTACT

4. **Primary Contact Name:** Kevin Solli, P.E.
   Business Address: 501 Main Street, Suite 2A , Monroe, Connecticut
   Phn/Cell: 203-880-5455 Email: Kevin@sollillc.com

   The Primary Project Contact will be sent all correspondence (primarily via email) during the course of the project review and is responsible for distributing to the other project representatives.

PROJECT TEAM INFORMATION

5. **Owner's Name:** Astro Land Holdings, LLC & Spacely Land Holdings, LLC
   Address: 16 Cross Street, New Canaan, Connecticut
   Phn/Cell: 203-972-3366 Email: akarp@karpassociates.com

6. **Applicant's name:** Astro Land Holdings, LLC & Spacely Land Holdings, LLC
   Address: 16 Cross Street, New Canaan, Connecticut
   Phn/Cell: 203-972-3366 Email: akarp@karpassociates.com
   Interest in property: ■ Owner □ Contract Vendee □ Tenant □ Other _____

7. **Application Professionals** ***Name*** ***Phone/Cell*** ***Email***
   Surveyor: Bryan Nesteriak 203-881-8145 bn@bbengrs.com
   Engineer: Kevin Solli, P.E. 203-880-5455 kevin@sollillc.com
   Landscape Architect: Mary Blackburn, P.L.A. 203-880-5455 mary@sollillc.com
   Architect: _____
   Other: William Kenny Professional Wetland & Soil Scientist 203-366-0588 wkenny@wkassociates.net

Application No. _____ **File No.** _____

8. Is the property located within a flood plain?

■ No □ Yes If "yes" □ 100-year □ 500-Year **Contact Flood Plain Administrator at 203-452-2812.**

9. Is the property located within 500 feet of a town boundary?

■ No □ Yes **Abutting town(s):** _____ _____ _____

10. Is the property subject to an existing conservation or preservation restriction (i.e., Conservation Easement)?

■ No

□ Yes **Provide a notarized statement pursuant to CT Public Act 05-124 indicating:**

- **The proposed application involves only interior building alterations; OR**
- **Written notice of such application has been sent by certified mail, return receipt requested, not later than sixty (60) days prior to the filing of the application to the party holding the conservation or preservation Restriction; OR**
- **In lieu of notice, provide a letter from the holder or holder's authorized agent, verifying that the application is in compliance with the terms of the restriction.**

11. Is the property located within a public water supply watershed?

□ No

■ Yes Name of watershed: GREATER BRIDGEPORT SYSTEM (WEST PEQUONNOCK DIVERSION)

NOTE: Within seven (7) days of application submission, the applicant is required to also send a copy of the application to the Aquarion Water Company of Connecticut, 714 Black Rock Road, Easton, CT 06612, and to the Connecticut Commissioner of Public Health, 410 Capitol Avenue, Hartford, CT 06106; and provide evidence documenting same to the Planning and Zoning Department.

12. Are there inland wetlands, watercourses, lakes or ponds or other water related resources on or within 100 feet of the property; and/or is there a named watercourse within 150 feet of the property?

Attach Soil Scientist inspection report/verification and delineation report and survey map.

□ No ■ Yes Area of property regulated 37.44 (ac) 52 (% of property)

Contact the Inland Wetlands Department 203-452-2809 prior to proceeding with this application.

13. Previous or Current Wetland Permits or Violations for Property (list Wetland File #s and dates):

IWC Permit IWC-2015-19 file #974,Notice of Potential Violation – IWV-2014-04(Resolved),Notice of Violation – IWV-2014-04 & IWV 2014-05 - Recently Approved IWC 2021-06R

14. Describe topographic conditions and assess to what extent slopes 15% and greater may limit development potential or which otherwise require specialized engineering to support future development?

14.94 ac (25% and greater) 5.36 ac (15-15%) 5.26 ac (10-15%) 46.34 ac (0-10%)

Attach a separate narrative with a Slopes Map showing the location and acreage of sloped areas:

15. Are any waivers of the Zoning Regulations application requirements requested?

■ No □ Yes **Attached a separate written request and rational in support thereto.**

Application No. _____ **File No.** _____

16. Quantify the proposed disturbance, excavation and/or filling activity:

Total area proposed to be disturbed: 39.7 (acres) 1,729,345 (square feet)

- □ Cubic yards of Excavation 162,730 (cubic yards)
- □ Cubic yards of Fill 653,127 (cubic yards)
- □ Cubic yards of Export (removal from site) _____ (cubic yards)
- □ Cubic yards of Import (brought onto the site) 490,397 (cubic yards)

17. Export / Import activities: **Attach supporting reports and plans.**

Origin of imported fill material: Commercially available material from local sources (Must conform with material acceptance procedure)

Fill material content and condition: See attached material acceptance procedure

Destination of exported material: N/A

Truck transport route within Town: Route 25 (Main Street) to Pepper Street

18. Topsoil

- ■ Topsoil will be scraped and stockpiled with erosion controls onsite prior to grading
- ■ Topsoil will be brought in for final site restoration/stabilization: 32,025 (cubic yards)

19. Describe method(s) of earth movement and site stabilization:

Contractor to use bulldozers, excavators, and loaders to remove material from site under direct supervision of a professional engineer.

20. Will Storm Water Detention and/or Retention be needed for this proposal?

□ No **Provide reasons - attach additional sheets as necessary:**

■ Yes **Provide list of provisions - attach stormwater report or additional sheets as necessary:**

The project proposes the construction of three stormwater basins for future site development. Please see the Engineering Report for more information.

21. Have Storm Water Quality Control measures been included in this proposal?

□ No **Provide reasons - attach additional sheets as necessary:**

■ Yes **Provide list of measures - attach stormwater report or additional sheets as necessary:**

Vegetated water quality swales, level spreaders, stormwater basins and filter strips have been proposed. Please see the Engineering Report for more information.

22. Have Low Impact Development (LID) measures been considered as additional features for this proposal?

□ No **Provide reasons – attach stormwater report or additional sheets as necessary:**

■ Yes **Provide list of LID measures - attach stormwater report or additional sheets as necessary:**

The Low Impact Design measures include the use of vegetated water quality swales, limiting land disturbance activities, vegetated buffers across various areas of the site, the limited use of storm sewers and the use of filter strips. Please refer to the Engineering Report for more information.

of the property or premises and am aware of and understand the Zoning, Subdivision and Inland Wetlands Regulations pertinent to the application and affirm that the statements and information provided are accurate and true. Further, all the undersigned hereby authorizes the Town of Monroe and its agents, to access the premises for the purpose of application investigation, site review, inspection of improvements or construction, and enforcement of the Town's Regulations and Ordinances, and the General Statutes of the State of Connecticut, as may be applicable.

All the undersigned warrant the truth of all statements contained herein and in all supporting documents according to the best of their knowledge and belief. Further, all the undersigned understand and agree that the Planning and Zoning Commission and/or its Staff/Consultants may request additional information and it is the applicant's/owner's responsibility to provide this information in a timely fashion and to the Commission's satisfaction. If the information provided is incomplete or inaccurate, the Commission may deny the application or request an extension to be granted by the applicant/owner in order to act within applicable legal time limits.

This agreement shall be binding on all heirs, executors, administrators, successors and assigns of all undersigned.

APPLICANT(S) – (Both Applicant and Owner Notarized Signatures are required)

ASTRO LAND HOLDINGS LLC — Arnold M Karp, member — 10-17-23

Applicant Name Printed | **Authorized Signature** | **Date**

SPACELY LAND HOLDINGS LLC — Arnold M Karp, member — 10-17-23

Additional Applicant | **Authorized Signature** | **Date**

(Provide additional sheets as needed)

Subscribed and sworn to by Arnold M. Karp *on this day of* 17th, 2023, *before me:*

M. Calascione

Notary Public, Justice of the Peace, Commissioner of the Superior Court

MICHELLE S. CALASCIONE
NOTARY PUBLIC
MY COMMISSION EXPIRES SEPT. 30, 2028

Please note the following: This application must include the owner's signature and notarization or a written, notarized consent to submit this application, signed and dated by the owner.

OWNER(S) – (Both Applicant and Owner Notarized Signatures are required)

ASTRO LAND HOLDINGS LLC & SPACELY LAND HOLDINGS LLC

Owner Business Name

ARNOLD M. KARP, managing member — Arnold M Karp — 10-17-23

Authorized Member Name Printed | **Authorized Signature** | **Date**

Subscribed and sworn to by Arnold M. Karp *on this day of* 17th, 2023, *before me:*

M. Calascione

Notary Public, Justice of the Peace, Commissioner of the Superior Court

MICHELLE S. CALASCIONE
NOTARY PUBLIC
MY COMMISSION EXPIRES SEPT. 30, 2028

SOLLI ENGINEERING

Properties within 100 feet of 64 Cambridge Drive & 4 Independence Drive

7 Independence Drive
Landtrust Development LLC
Warren Cartmel Member
160 Judd Road
Easton, CT 06612
094/015/27

35 Cambridge Drive
Kalboys LLC
Showky Kaldawy – MGR
99 Staples Road
Easton, CT 06612
094/015/11

34 Enterprise Drive
JRD Properties – Monroe LLC
John R Dufour – MGR
146 Huntingdon Avenue
Waterbury, CT 06708
104/002/10

512 Pepper Street
New England Materials LLC
Kimball Group, LLC Member
262 Westport Road
Easton, CT 06612
094/015/RD

211 Garder Road
Town of Monroe (Public Works)
7 Fan Hill Road
Monroe, CT 06468
105/002/00

500 Pepper Street
Maybrook Properties LLC
c/o Duane Carrubba – MGR
70 Research Drive
Milford, CT 06460
094/015/01

157 Garder Road
State of Connecticut
79 Elm Street
Hartford, CT 06106
105/001/02

74 Enterprise Drive
74 Enterprise Drive LLC
26 Arrowhead Drive
Monroe, CT 06468
094/015/13

155 Garder Road
Aquarion Water Co of Connecticut
c/o Tax Dept
600 Lindley Street
Bridgeport, CT 06606
105/001/00

98 Enterprise Drive
Enterprise Drive LLC
Guido Picarazzi MBR MGR
225 Knowlton Street
Bridgeport, CT 06608
094/015/15

159 Garder Road
State of Connecticut
79 Elm Street
Hartford, CT 06106
105/001/01

50 Cambridge Drive
Cambridge Drive RE LLC
50 Cambridge Drive
Monroe, CT 06468
094/015/04

36 Timothy Hill Road
Thomas + Stella Maganas Family TRT
c/o Metropoulos Peter – TRSTEE
535 14th Street
Manhattan Beach, CA 90266
114/006/00

124 Enterprise Drive
M & J Videira LLC
Jack J Videira MBR
330 Dekalb Avenue
Bridgeport, CT 06607
094/015/17

5 Independence Drive
N & J Construction LLC
Bernard Braholli
PO Box 347
Newtown, CT 06470
094/015/26

143 Enterprise Drive
Yankocy Properties LLC
Fred Yankocy MBR
143 Enterprise Drive
Monroe, CT 06468
094/015/20

127 Enterprise Drive
TPG LLC
Todd P Gay MGR MBR
2 Bridge End Farm Lane
Sandy Hook, CT 06482
094/015/18

1 Independence Drive
Brit Car LLC
David R Colon MGR Member
1 Independence Drive
Monroe, CT 06468
094/015/19

PROJECT NARRATIVE:
EXCAVATION/FILLING PERMIT APPLICATION
64 Cambridge Drive & 4 Independence Drive – Monroe, Connecticut

This Excavation/Filling Permit application is for the proposed restoration activities to fill the northern portion of the project site, enhanced site improvements, and restoration of 64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut. The project site consists of two parcels; 64 Cambridge Drive totals 50.544 acres and is owned by Astro Land Holdings, LLC, and 4 Independence Drive totals 21.346 acres and is owned by Spacely Land Holdings, LLC. The two properties subject to this application were acquired in May of 2019, and a Lot Line Revision was recently filed as part of an Inland Wetlands Commission Approval. The subject site is zoned Industrial District 2 (I-2) and have received various approvals from the Monroe Planning & Zoning and Inland Wetlands Commission over the past several years. The following summarizes the proposed site improvements, restoration activities and remediation associated with this application.

Current Application:

The current application put forth before the commission is an Excavation/ Filling Permit Application following the recent Inland Wetlands Commission approval of application IWC-2021-06R for the subject properties.

The site is currently accessed via Cambridge Drive, with a gravel drive extending into the property to an existing scale house and associated temporary construction trailers and buildings. There are wetlands on the southern, western and eastern edges of the project site, with four vernal pools also present among those wetlands. The on-site wetlands surround the majority of the active limit of disturbance and were flagged in February and April of 2020 by William Kenny Associates, LLC. The upland review area for each site is shown on the plans and includes 100 feet from the edge of flagged wetlands and 500 feet from the edge of vernal pools. Vernal pool number one is in the southwestern corner of the site, near the proposed work for the Section Four Resubdivision (SUB-2015-02). The other three vernal pools are located at a higher elevation in the northeast corner of the site. Please refer to the Wetlands & Vernal Pools Assessment Report included as a part of this application for more information.

The project has been under construction in accordance with Special Exception Permit (SEP) #1430A, approved in March of 2006. In addition to the SEP, a resubdivision for Section Four of the Pepper Street Business Park (SUB-2015-02) was approved by the commission in 2016 and is currently under construction. SUB-2015-02 consisted of the construction of a cul-de-sac at the end of Cambridge Drive, the extension of a paved site access drive onto the current project site and the construction of utility, drainage and landscape restoration features. The project currently being proposed involves the extension of the Section Four Resbudivision paved site access drive by 435 LF to better access the site. Three stormwater basins are being proposed onsite in addition to the existing Town of Monroe stormwater detention basin. These stormwater basins have been designed to handle stormwater runoff associated with future site development.

There will be two future development pads established across the project site, one at an approximate elevation of 430.00 +/- in the southern portion of the site and the other at elevations 461.00 +/- in the northern portion of the site. The material will be imported in accordance with the material acceptance procedure and processed in the southern portion of the site before being placed in the hole in the northern portion of the site. The stormwater basins and sediment traps will be constructed in the beginning of construction. The project also features significant upland enhancement, plantings and remediation work to be completed within the eastern vernal pool envelope. Throughout

the duration of the project, the existing Town of Monroe Detention basin will be protected and maintained. Please refer to the Plan Set & Engineering Report for more information regarding the various construction operations.

The project proposes to restore existing watershed patterns similar to that of which was previously approved. There are also various low impact development features across the site, including vegetated and rip rap drainage swales, which will further enhance stormwater quality. The use of vegetated water quality swales will slow stormwater runoff, filter it, remove suspended solids and promote infiltration. The onsite stormwater basins reduce the peak stormwater runoff rates and outlet to level spreaders, further slowing the peak stormwater runoff rates and aiding with stormwater attenuation. The site is currently comprised of mostly barren soil and the disturbed areas are to be planted with a specified seed mix, which will help stabilize the soil, reduce erosion and reduce the peak discharge rate. Please refer to the Engineering Report included in this application for more information.

The proposed landscape design consists of large areas of seeding for site stabilization and naturalization with additional areas of native tree and shrub plantings along the wetland edges. Though not required, but to further improve the wetland ecology in the area, the applicant also proposes the creation of 1,215 square feet of wetland area on 64 Cambridge Drive to restore a portion of the property that was impacted as part of work associated with an approval granted for the neighboring property at 36 Timothy Hill Road (Which is not, and has never been, owned by the applicant or any predecessors in title). This application also proposes 1,409 SF of wetland remediation area in the southeast corner of the site abutting the Aquarion property. As the project proceeds and the operations shift towards the northern portion of the property, completed areas will be seeded and stabilized. Throughout the duration of the project various plantings will occur, as described in the planting schedules on the landscape plans within the plan set. For more detail on the plantings within the regulated area refer to the Proposed Site Improvements Within Regulated Area section of the Engineering Report.

The project entails the extension of the previously approved Section 4 Resubdivision site access drive and associated grading and drainage in addition to earthwork activities to restore the previous watershed drainage patterns. The project proposes the construction of the access drive, grading and drainage activities, landscaping and mitigation within the upland review area. The proposed grading improvements include approximately 490,397 CY of imported material, all of which will conform to the CT DEEP definition of “clean fill” as outlined in the Material Acceptance Procedure. This will consist of approximately 27,380 dump trucks of material being imported into the site when converting the total fill cubic yardage into tons and dividing it by 24 tons per truck. The estimated timeline to project completion is 5 years or less depending on availability of material. Assuming 250 working days in a calendar year means there will be average of 22 trucks per day (2-3 per hour) bringing material into the site throughout the project duration. Throughout the duration of project, a variety of equipment will be used, including several excavators, loaders, site trucks, bull dozers, rollers and other heavy construction equipment. The quantity of such will be determined by demand of incoming material.

A lot line revision has been previously filed as part of the Inland Wetlands Commission’s most recent approval, and the plans have been updated to reflect the new lot lines/

This project, including the filling and restoration of various areas across the project site, the restoration of the vernal pools and the enhancement of wetlands across the site will be a positive addition to the Town of Monroe.

Agency Approvals

The following agency permits and approvals are anticipated to implement the proposed action:

- ~~Town of Monroe Inland Wetlands Permit -~~ Completed
- Town of Monroe Excavation/Filling Permit Approval
- CT DEEP General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities
- CT DEEP General Permit for the Discharge of Stormwater Associated with Industrial Activity

Conformance with Town of Monroe Zoning Regulations

The activities proposed under this application is in full conformance with the requirements stipulated in the Town of Monroe Zoning Regulations as demonstrated below:

§6.4.4 Excavation/Filling Permit Application Procedure
Application for a permit to excavate or remove any of said earth materials shall be made to the Commission by the property owner or his authorized agent on forms provided by the Commission. The application shall be accompanied by a fee and by a plan of operation prepared by a Connecticut licensed land surveyor and/or professional engineer, which plan of operation shall include the following maps, plans and specifications, except as may be waived consistent with the standards and procedures as set forth in §7.3.2 of these Regulations:

A. A locus plan, at a scale of one (1) inch equals one-hundred (100) feet, showing all roads within a one (1) mile radius of the site; all zoning districts and the Town Line, if within five-hundred (500) feet of the subject parcel; erosion and sediment control plan; storm water quality and quantity control plan; restoration/reclamation plan, which may include a potential future site development plan.

The locus plan is shown on Sheet 1.40 "500 ft Radius & Area Map" and is shown at a scale of 1" = 200' due to the size of the project site. Erosion and Sediment Control Plans are shown on the 2.3 series drawings. Storm water quality and quantity control plans are included in the 2.2 series drawings. Restoration plans are shown on the 2.6 series drawings. Site plans are included with the 2.1 series drawings.

B. Location and limits of the premises and names of abutting property owners as listed on current town tax assessment records.

Location and limits of property lines and names of abutting property owners are shown on the Property Survey (Sheets 1 of 2 and 2 of 2) as well as the 500' Radius & Area Map (Sheet 1.40).

C. Boundary survey and site topographic plans certified as Class A-2 and T-2 or a better or equal accuracy transit survey, with grading plan showing existing contours in the area to be excavated and proposed contours at two (2) foot intervals for the area after operations. Such plans shall include the area to be excavated, as well as surrounding area, if owned by the applicant, within one-hundred (100) feet of the excavation, and shall be drawn at a scale not to exceed one inch equals fifty (50) feet. Also included shall be north-south and east-west traverse cross-section drawings at equal intervals from the outside extremities. The distance between the traverse cross sections shall be provided in accordance with the following schedule within areas of excavation and deposition of material:

(1) Sites less than five (5) acres shall provide sections fifty (50) feet apart along with intermittent cross sections at points of vertical or horizontal changes in topography.

(Not applicable)

(2) Sites greater than five (5) acres but less than twenty (20) acres shall provide sections one-hundred (100) feet apart.

(Not applicable)

(3) All sites shall provide intermittent cross sections at points of vertical or horizontal changes in topography.

The total site area is approximately 71.9 acres. Cross sections at intervals of 250 feet have been provided on the 2.8 series drawings at a scale 1" = 40' horizontal and vertical.

D. An estimate of the amount of material to be excavated or removed.

Estimates of the proposed quantities of excavation and fill materials are listed on the 2.2 series drawings. The project proposes an overall cut of 161,210 CY, an overall fill of 659,460 CY and a net cut/fill of 493,250 CY of fill during the duration of the project.

E. Existing and proposed drainage of the site, together with drainage easements and flowage rights.

The existing and proposed drainage is shown on the 2.2 series and the Drainage Area Map drawings (DA-1 & DA-2) found in the Engineering Report.

F. An estimate of the number and types of trucks and other machinery to be used on the site, hours of operation and the locations and types of any buildings to be erected.

An estimate of the number and types of trucks and other machinery to be used on the site and the hours of operation are provided in this Project Narrative. No buildings are proposed to be erected as part of this application.

G. Proposed truck access and egress to and from the site upon any road within the bounds of the Town of Monroe.

The proposed truck access and egress to and from the site is shown on the 2.1, and 2.3 series drawings.

H. Details of final grading and planting of the site to prevent erosion of the site at the conclusion of operations or at such earlier times as may be required by the Commission.

Details of the final grading is shown on the 2.2 series drawings. Details of the final planting is shown on the 2.6 series drawings.

I. Existing ponds and watercourses on or adjacent to the premises.

The existing ponds and watercourses are shown on the Property Survey (Sheets 1 of 2 and 2 of 2).
J. The location of wooded areas, all rock outcrops and existing and proposed buildings and structures.

The locations of wooded areas, all rock outcrops and existing and proposed buildings and structures are shown on the Property Survey and the 2.1, 2.2, 2.3, 2.5, 2.6 and 2.7 series drawings.

K. All dimensions to the hundredth of a foot and all bearings or angles on all property lines, easements and rights-of-way.

The required property line, easement and rights-of-way dimensions are shown on the Property Survey (Sheets 1 of 2 and 2 of 2).

L. Title, date, scale and North point.

The title, date, scale and north arrow are shown on all the plan sheets.

M. Dewatering facilities.

Proposed dewatering facilities are shown on the 2.3 series drawings. The dewatering notes are included on Sheet 2.41.

N. Approval of the governing wetlands authority, if applicable (also see §6.4.3 of these Regulations).

An application to the Town of Monroe Inland Wetlands Commission was made and the approval of the application will be provided when granted.

O. Anti-tracking measures and vehicle inspection and cleaning areas.

Anti-tracking measures are shown on the 2.3 series drawings.

P. Water and dust controls.

Water and dust controls are specified on Sheet 2.41.

Q. Such additional information as the Commission shall deem necessary in order to decide upon the application.

All required material has been provided and additional material as needed will be provided to the Commission upon request.

§7.2 General Criteria and Standards for Application Review

The following criteria and standards shall be used by the Commission in reviewing all applications. In doing so, the Commission may require the submission of alternative design and layout proposals to ensure the creation of well designed, functional and attractive development. The intent is to ensure that the development and use of land does not have an adverse effect on the environment, adjacent lands and land uses, or on the historic and cultural character of the community, among other factors. These Regulations are designed to:

A. *Protect the community from traffic congestion and conflicts, noise, lighting, odor and other forms of pollution;*
B. *Avoid inappropriate site and building design, including "strip" commercial development, flooding, and excessive soil erosion; and*
C. *Ensure that proposed uses will be in harmony with the appropriate and orderly development of the Zoning District in which such is proposed, and that its impacts can be mitigated by compliance with reasonable conditions.*

The proposed application will protect the community from traffic congestion and conflicts, as demonstrated in the Traffic Memorandum included as a part of this application. The proposed application is also in conformance with all noise regulations.

§7.2.1 General Criteria

The criteria below are intended to establish a framework within which the designer of the site development will utilize creativity, invention and innovation to provide a sensible and sustainable plan compatible with the Town's planning goals and objectives, as expressed in the its Plan of Conservation and Development, while recognizing and thereby protecting the Town's rural, historic, cultural, natural and scenic landscapes and qualities.

The proposed application conforms to items A through J as specified in §7.2.1 of the Town of Monroe Zoning Regulations. Due to the project design and location within Town, the project will conform and be in harmony with the orderly development of the Town.

§7.2.2 Ecological Considerations

The proposed application is designed to conform with items A through C as specified in §7.2.2 of the Town of Monroe Zoning Regulations. The proposed application features the restoration of pre-existing wetland watershed areas, the protection of the existing wetlands with adequate soil erosion and sediment control measures and the limited increase in the limit of disturbance as compared to existing site conditions. There will be no solid or liquid waste, toxic or hazardous substances, or chemicals handled, stored or disposed of on site.

§7.2.3 Landscape and Lighting

The proposed application is designed to conform with items A through K as specified in §7.2.3 of the Town of Monroe Zoning Regulations. The proposed application features various remediation areas and buffer enhancements. The vernal pool envelope along the eastern portion of the property is proposed to be planted with significant vegetation and trees throughout. The landscaping is designed to provide shade, visual interest and vertical relief. The landscaping has been designed to not create a hazardous condition and the existing vegetation along the edges of the limit of disturbance will provide sufficient screening from construction activities to adjoining properties. The grades along the proposed road are less than 5%.

§7.2.4 Relationship of Proposed Structures to Environment

The proposed application is designed to conform with items A through G as specified in §7.2.4 of the Town of Monroe Zoning Regulations. The project site is surrounded by significant existing vegetation and tree coverage on the eastern and western sides with Independence Drive to the north and Cambridge Drive to the south. This existing vegetation and tree coverage are to remain and will shield the project site from the surrounding environment. An existing berm will be maintained along Independence Drive to shield the project site from the north. The proposed entrance drive consists of a width of 32 feet.

§7.2.5 Scenic, Historic, Archaeological and Landmark Sites

(Not applicable)

§7.2.6 Buildings and Structures

(Not applicable)

§7.2.7 Stormwater Management

The proposed application is designed to conform with items A through B as specified in §7.2.7 of the Town of Monroe Zoning Regulations. The project incorporates various low-impact development measures and stormwater features that will attenuate the peak discharge rate of runoff and enhance the water quality of the stormwater runoff associated with the project site. For more information please refer to the Engineering Report included as part of this application.

§7.2.8 Traffic, Circulation, Parking and Pedestrian Safety

The proposed application is designed to conform with items A through F as specified in §7.2.8 of the Town of Monroe Zoning Regulations. As detailed in Traffic Memorandum included herein, the development will not cause adverse traffic impacts to the abutting roads, nearby entrances on adjacent properties or on the road network serving the surrounding area. Both proposed entrances for the project are located on cul-de-sacs in the Pepper Street Business Park, which was designed to accommodate various truck traffic. The proposed 32-foot-wide access drive will provide sufficient access for emergency vehicles.

§7.2.9 Utility Services

(Not applicable)

§7.2.10 Waste Disposal

(Not applicable)

§7.2.11 Noise

The proposed application is designed to conform with items A through B as specified in §7.2.11 of the Town of Monroe Zoning Regulations.

§7.2.12 Outdoor Signage

(Not applicable)

§7.3.1 General Requirements for All Applications

A. *All applications and accompanying maps, plans, documents, reports and data shall be in writing and in a quantity as required by the Planning and Zoning Department. Said applications shall include all the information required by the Commission and as specified in the application form and these Regulations.*

   All required material has been provided and additional material as needed will be provided to the Commission upon request.

B. *All maps, plans, documents, reports and data as may be submitted with an application shall be current (completed within the previous six (6) months) and include an original (live) signature and embossed or wet stamp seal certification by the individual State of Connecticut licensed professional(s) responsible for their preparation. If multiple professionals are responsible for their preparation, each shall include appropriate certification.*

All required material has been completed within the previous six (6) months and signed and sealed by the required professional.

C. The maps and plans required by these Regulations shall be coordinated into individual collated, bound and folded sets of uniform size not to exceed 24" x 36" drawn at a maximum scale of one inch equals forty (40) feet, unless otherwise authorized by the Commission, and numbered in sequence (X of a total of Y sheets). The cover sheet shall include a prominent listing of the project name and a list of all included sheets by title, origination date and common revision date, as well as a location map showing the subject lot, surrounding lots, named streets and the zoning classifications of the shown area drawn at a scale of one (1) inch = eight-hundred (800) feet.

The maps and plans, including the cover sheet, have been coordinated and created as required.

D. Each plan sheet shall include a coordinated Title Block

A coordinated Title Block has been included on each plan sheet.

E. The plans shall include the following minimum information consistent with all applicable requirements and standards of these Regulations:

(1) EXISTING CONDITIONS SURVEY (A-2 and T-2, or equivalent)

An existing conditions survey has been provided as a part of this application.

(2) Site Plan

A Site Plan has been included as a part of this application (See Sheets 2.10 & 2.11)

(3) Grading / Utility / Stormwater Plan

Grading and Stormwater Plans have been provided (See Sheets 2.20 through 2.23). There are no utilities proposed as part of this application.

(4) Erosion and Sedimentation Control

Erosion & Sedimentation Control Plans have been provided as a part of this application. (See Sheets 2.30 through 2.33).

(5) Lighting

No lighting is proposed as part of this application.

(6) Signs

(Not applicable)

(7) Landscaping

Landscaping Plans have been included as a part of this application (See Sheets 2.60 through 2.64).

(8) Architectural Floor Plans and Elevations

(Not applicable)

(9) OTHER DATA INFORMATION

(a) Cut and Fill Analysis including an estimate of the quality, volume and consistency of materials to be imported or removed from the subject property. Drainage calculations shall address runoff entering the site for a fully developed watershed and for the site itself after proposed development.

A cut and fill analysis and drainage calculations have been provided within the Engineering Report.

(b) Boring information, soil descriptions, and water depth records and bearing capacities.

The required information has been included within the Engineering Report in addition to the submitted Plan Set.

(c) For non-residential uses, the proposed number of employees for which the buildings are designed.

(Not applicable)

(d) Traffic analysis and details of proposed traffic and safety measures, including pavement and lane markings, directional signage, sight distance information and any associated clearing or improvements relating thereto.

A traffic analysis has been included as a part of this submission package.

(e) Provisions for handicap accessible parking and access, pursuant to all applicable Federal, State and local law and regulations.

(Not applicable)

(f) Where lands proposed to be developed involve the subdivision of land, a plan of subdivision shall be prepared in conformance with the Monroe Subdivision Regulations, approved by the Commission, recorded on the Monroe Land Records, and authorized for construction prior to issuance of a related Zoning Permit.

(Not Applicable)

(g) Where public improvements are proposed, same shall conform to all applicable Federal, State and local standards and requirements in addition to these Regulations. All roads and improvements intended to be dedicated to or accepted by the Town of Monroe for public use shall conform to all Town rules and Regulations and standard specifications in effect at the time of approval.

(Not Applicable)

(h) Bond estimate including item descriptions, units, quantities, cost per unit, ten percent (10%) contingency, and totals for all public work improvements and site stabilization and restoration measures,

including siltation and erosion control, antitracking pads, topsoil and turf reestablishment, plantings for erosion control, drainage and runoff management, invasive plant removal and measures to prevent dumping.

A bond estimate form has been provided.

Conformity with 2010 Plan of Conservation & Development

This application is consistent with the requirements set forth in the 2010 Monroe Plan of Conservation and Development:

- Recommendations – Chapter 7.5 "Build Infrastructure to Increase Competitiveness with Surrounding Communities: Prepare for new development with outreach program and, in particular, energize area around Victorinox Swiss Army facility, Pepper Street Industrial Park, and within commercial and potential Village District areas along the corridor."

  This application proposes infill development for a large tract of land within the Pepper Street Industrial Park creating the opportunity for future economic development and local employment opportunities.

- Natural Resources and Habitat – Chapter 8.1 "Wetlands function as natural storage basins for floodwaters and aid in groundwater recharge. Groundwater is replenished from rain that percolates through the soil into the ground, and from recharge areas, such as wetlands. This function is particularly important, as approximately 40% of Monroe is supplied by on-site individual wells. Wetlands also serve as a natural filtration system that assists in purifying surface water prior to entering the aquifer. Other functions of Monroe's various wetlands are their importance for wildlife habitat and their contribution to the Town's natural and scenic beauty."

  This Site Development and Restoration Plan proposes to address, and remedy wetland violations carried out by the past owner by restoring previous watershed patterns and proposing a robust planting plan focused on the upland review area.

- Recommendations – Chapter 12.8 "Establish regulations requiring undisturbed buffers and setbacks along river and stream edges and wetlands."

  Re-establishment of the wetland edges within buffer areas is a key component of the proposed Restoration Plan. Wetland markers would designate the upland review area to limit future encroachment.

- Future Land Use Plan – Chapter 13.2 "Industrial Areas…The Town's focus should be on assisting industrial property owners to lease their sites to ''clean'' and desirable businesses, and to provide water and sewer utilities if needed."

  The property was recently purchased. The new owner intends to work with the town to resolve outstanding matters from the previous owner and is focused on progressing with site restoration and development of the site with a more desirable business. Water and other utilities are proposed to be extended into the site from the street.

TOWN OF MONROE

Issued: 10-9-07

BOND ESTIMATE FORM (Private Site Development)

☐ PLANNING & ZONING COMMISSION
MEETING DATE _____

APPLICANT: Spacely Land Holdings LLC & Astro Land Holdings LLC
ENGINEER: Solli Engineering, LLC
TEL.: 203-880-5455

*APPLICATION NO: _____
*FILE NO: _____
DATE: October 06, 2021

PROJECT NAME: Proposed Site Restoration

PROJECT LOCATION: 64 Cambridge Drive & 4 Independence Drive

*BOND RECOMMENDATION

NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	COST	Comments by Town	
						Unit Price*	Cost*
1.	Anti-tracking Pad, CB Protection and Misc. Sedimentation and Erosion Control Measures	L.S.	0**				
2.	Silt Fence or Hay Bales	L.F.	0**				
3.	Topsoil, Seed, Fertilizing, and Mulching (entire disturbed area)	S.F.	599,270	$0.30	$179,781		
4.	Landscaping (extent to provide for restoration and aesthetic considerations)	AC	13.75	$1,500	$20,625		
5.	Grading (for site restoration that will provide safe and stable conditions)	DAYS	0**				
6.	Truck Washing Station	EACH	0**				
7.	Sedimentation Basins (Temporary During Construction)	EACH	0**				
8.	Crushed Stone Filter Dams + Maintenance	L.S.	0**				
9.	Diversion Ditches + Maintenance	L.S.	0**				
	** Item omitted due to inclusion in Bond Estimate submitted as part of Inland Wetlands Application						
	(+) 10% for Contingencies				$20,041		
	* To be filled in by the Town			Total Cost =	$220,447	*	

Submitted by: Chris Pawlowski

Approved by: _____

Total costs as determined by the Town Engineer represent adjusted values assuming a Municipal bid arrangement with inflation, noting that the terms of the bond may be in effect for up to 10 or more years (statutory time allowance for performance of

SOLLI ENGINEERING

October 18, 2023

Commissioner Dr. Manisha Juthani
Department of Public Health
410 Capitol Avenue
Hartford, CT 06134

RE: 64 Cambridge Drive & 4 Independence Drive
Monroe, Connecticut 06468
Excavation/Filling Permit Application Submission
Project Number: 1903601

Dear Commissioner Dr. Manisha Juthani:

Please accept the following "notice" as required pursuant to CGS §8-3i and 22a-354c in regard to our submission of an Excavation/Filling Permit Application to the Town of Monroe pertaining to work to be done within the Greater Bridgeport System (West Pequonnock Diversion) watershed area.

The proposed application involves the following activities:

> The project entails earthwork, drainage, remediation and upland enhancement activities in order to restore previous watershed drainage patterns to the eastern wetlands system.

Copies of the Survey, Plan Sheets 2.10 – 2.33, and the Application are attached for your review. Please feel free to reach out with any questions or comments you may have regarding the property and the proposed site restoration work.

Thank you for your consideration in this matter.

Respectfully,

Solli Engineering, LLC

Chris Pawlowski

Chris Pawlowski, P.E.
Assistant Project Manager

Solli Engineering, LLC ♦ 501 Main Street ♦ Monroe, CT 06468 ♦ (203) 880-5455 (Phone) ♦ 203-880-9695 (Fax)

SOLLI ENGINEERING

October 18, 2023

Joseph T. Welsh
Manager, Environmental Protection
Aquarion Water Company
714 Black Rock Road
Easton, CT 06612
(203) 445-7457

RE: 64 Cambridge Drive & 4 Independence Drive
Monroe, Connecticut 06468
Excavation/Filling Permit Application Submission
Project Number 1903601

Dear Mr. Welsh:

Please accept the following "notice" as required pursuant to CGS §8-3i and 22a-354c in regard to our submission of an Excavation/Filling Permit Application to the Town of Monroe pertaining to work to be done within the Greater Bridgeport System (West Pequonnock Diversion) watershed area.

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Copies of the Survey, Plan Sheets 2.10 – 2.33 and the Application are attached for your review. Please feel free to reach out with any questions or comments you may have regarding the property and the proposed site restoration work.

Thank you for your consideration in this matter.

Respectfully,

Solli Engineering, LLC

Chris Pawlowski

Chris Pawlowski, P.E.
Assistant Project Manager

ENGINEERING REPORT

For The Proposed:

Proposed Site Restoration

Located At:
64 Cambridge Drive & 4 Independence Drive
Monroe, Connecticut 06468

Prepared On:
May 5, 2021
Revised On:
June 2, 2021
October 6, 2021

Prepared By:

SOLLI ENGINEERING

501 Main Street
Monroe, Connecticut 06468
T: (203) 880-5455 F: (203) 880-9695

Prepared For:

Astro Land Holdings LLC & Spacely Land Holdings LLC



Kevin M. Solli
CT PE #25759

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EXECUTIVE SUMMARY

Solli Engineering has prepared this Engineering Report to provide an analysis of the stormwater drainage, soil erosion and sediment control measures, and restoration to existing uplands associated with the proposed site improvements located at 64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut. The developed area of the project consists of approximately 39.09± acres of the total site's 71.90± acres. The design is intended to be in compliance with all applicable Town of Monroe codes and regulations as well as all other applicable state and federal requirements and regulations.

The site, consisting of 64 Cambridge Drive and 4 Independence Drive, totals approximately 71.90± acres, and is accessed via Cambridge Drive, providing access to the project site from Pepper Street. 64 Cambridge Drive totals 50.544 acres and is owned by Astro Land Holdings, LLC, and 4 Independence Drive totals 21.352 acres and is owned by Spacely Land Holdings, LLC.

The proposed development consists of the construction of a ±425 LF driveway with associated drainage facilities. The proposed driveway will be accessed from Cambridge Drive.

The proposed development will result in an increase in impervious area of approximately 0.32 acres compared to pre-existing (Former) site conditions. The project includes the construction of three stormwater basins located in the southeastern corner of the property, to the northwest of the proposed driveway, and to the east of the proposed driveway. The stormwater basins serve to improve water quality, attenuate peak runoff from the proposed development and provide the adequate sediment storage during construction of the proposed development. The proposed improvements and stormwater measures will result in improved water quality and the restoration of watersheds to the pre-existing condition of the property, prior to any site disturbance on the site.

The project proposes to import 490,397 cubic yards of material to the northern portion of the property and restore watersheds to the wetland system along the easterly property boundary. The applicant has developed a comprehensive Material Acceptance Procedure that has been implemented on the property. This procedure establishes a strict regimen of inspection, screening and testing requirements which is to be undertaken for any material proposed to be placed on the property. The procedure establishes that only materials which meet the definition of "Clean Fill" in accordance with Section 22a-201-1 of the Connecticut General Statutes and the Regulations of Connecticut State Agencies and the Connecticut Department of Energy and Environmental Protection (CTDEEP) requirements.

The stormwater quality measures were designed in accordance with the "2004 Connecticut Stormwater Quality Manual," published by The Connecticut Department of Environmental Protection. The stormwater quality measures provided as part of the proposed development will result in a significant enhancement to the stormwater discharge from the site.

The proposed plans for soil erosion and sediment control have been developed in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, prepared by the Connecticut Council on Soil and Water Conservation in cooperation with the Connecticut Department of Environmental Protection. The soil erosion and sediment control measures proposed as part of this project include geotextile silt fences, temporary sediment traps/basins, temporary diversion swales, construction entrances, dust control measures, riprap stabilization, and inlet protection for existing and proposed drainage features.

INTRODUCTION

Solli Engineering has prepared this Engineering Report to provide an analysis of the stormwater management, soil erosion and sediment control measures, and restoration to existing uplands associated with the proposed site improvements, located at 64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut. The design is intended to be in compliance with all applicable Town of Monroe codes and regulations as well as all other applicable state and federal requirements and regulations.

PROJECT DESCRIPTION

FORMER CONDITIONS

Prior to site disturbance following a 2005 Monroe Planning & Zoning approval, the existing site consisted of undisturbed woods. The terrain consisted of a large ridgeline splitting north to south down the center of the property, which directed stormwater flow east and west from the top of the ridgeline to wetlands on both the eastern and western edges of the property. The only site access occurred from Cambridge Drive, which was under construction just prior to the 2005 approval. The property sloped upward from the southern entrance to the northern portion, resulting in an 80 to 100-foot increase in elevation.

EXISTING CONDITIONS

The site is located at 64 Cambridge Drive & 4 Independence Drive in Monroe, Connecticut. The overall site totals approximately 71.90 acres and is zoned Industrial District 2 (I-2). The site is bound by industrial uses to the west, woods to the east, Independence Drive to the north, and Cambridge Drive to the south. The site is accessed via Cambridge Drive, providing access to the project site from Pepper Street.

Four wetland areas exist on site, and are located in the west, southeast, and northeast portions of the site. The wetlands were delineated by certified soil scientists from William Kenny Associates LLC on February 12th, 2020 and in April 2020. A portion of the proposed development is located within the upland review area. There are three vernal pools located in the northeast corner of the 64 Cambridge Drive parcel. Theses vernal pools are part of a larger network of vernal pools located to the north and east of the property. There is also one vernal pool located in the south west corner of the site.

The site was previously approved for an industrial development of two buildings totaling 175,000 square-feet. The site has been disturbed by site construction associated with that project, while a portion of the property has been over excavated towards Independence Drive. There is currently a temporary scale house with an associated truck weight scale, a temporary construction trailer and an accessory metal building structure and wooden building structure on-site. There is a small area for parking, which is utilized by current employees of the site. The existing buildings are temporary in nature.

The existing on-site drainage patterns are split into two relatively large areas. The southern portion of the site drains south to a series of sediment basins and traps located along the western and southern wetlands. The northern portion of the site generally drains toward a large low-lying area in the northern portion of the site. Water is dewatered from the low-lying area as necessary to a filter bag to the west before discharging into the existing wetlands on site to the west. An existing Town of Monroe municipal basin exists in the northwest corner of the site within the property of 4 Independence Drive. This municipal basin handles stormwater runoff from Enterprise and Independence Drive before discharging through an outlet control structure to the wetlands along the western edge of the site.

According to FEMA, the project site is not located within a 100-year flood zone or 500-year flood zone; refer to Figure 2, FEMA Flood Map, in Appendix A for more details. The project site is located within the Upper West Branch of the West Pequonnock Diversion public water supply watershed in accordance with the Connecticut Department of Public Health (CT DPH) requirements; Refer to Figure 4, Public Watershed Map, in Appendix A for more details.

PROPOSED CONDITIONS

The project proposes the construction of a ±425 linear-foot driveway with associated drainage facilities to be accessed from Cambridge Drive as well as earthwork activities to restore previous watershed drainage patterns.

The project proposes to prepare the southerly pad on the property by clearing existing stockpiles of materials and bringing it to an approximate elevation of 430.00'±, and for the northerly portion of the property to be filled to an approximate elevation of 461.00'± in order to restore former watershed patterns to the existing wetland system. During construction, the temporary scale and associated trailer will be maintained in their current location, to monitor the intake of clean fill to be deposited on the property. Material processing will take place in the southerly portion of the property. The proposed stormwater basins will be constructed and will be utilized as sediment basins until final grading and stabilization is complete.

In addition to implementing the remediation planting areas previously approved as part of IWC-2015-19, the Overall Landscape Plan consists of large areas of seeding for site stabilization and naturalization with additional areas of native tree and shrub plantings along the wetland edges. For more detail on the plantings within the regulated area refer to the Proposed Filling And/or Excavation Activity Within Regulated Area section at the end of this report.

The proposed development results in an increase in impervious area of approximately 0.32± acres when compared to pre-existing (Former) conditions. Three stormwater basins, located in the southeastern corner of the property, to the north of the proposed building, and to the southeast of the proposed building will serve to improve water quality and attenuate peak runoff generated by the proposed development. The detention basin has been designed using a conservative analysis, as no infiltration rate has been incorporated into the sizing calculations. In comparison to former conditions, the project will result in a net increase of 0.32 acres of impervious area, not including a 0.70 acre increase in impervious area as a result of the Section 4 Resubdivision work currently under construction. The former conditions of undisturbed woods throughout the property will remain outside of the limit of disturbance, while within the limit of disturbance the property will be seeded for site stabilization, with native plantings along the wetland edges. The former watersheds associated with previously approved conditions will also be restored as a result of the imported fill. Site access will occur from Independence Drive and Cambridge Drive, in comparison to access only from Cambridge Drive in the former condition.

STORMWATER MANAGEMENT

The stormwater management plan and design for the project is intended to be in compliance with the Town of Monroe Subdivision of Land Regulations Article III, Section 111-302, Town of Monroe MS4 Stormwater Management Plan, 2004 Connecticut Stormwater Quality Manual and the CT DOT 2000 Drainage Manual, while taking prevailing site conditions and practical considerations into account.

METHODOLOGY

Stormwater runoff analysis, for both existing and proposed conditions, was performed using the software package HydroCAD. This software uses a computer implementation of the SCS – Synthetic Unit Hydrograph methodology to

compute volumes and rates of runoff. The watershed area, rainfall depths and intensity, curve number and time of concentration are factors that influence the computed results.

Rainfall depths for this property were used for calculating the volumes and rates of runoff for this particular project. The depths were taken from the NOAA Atlas 14 documents (Latitude: 41.3481°, Longitude: -73.2522°) and are listed in Table 1 below.

Table 1: Rainfall Data

Return Period	24-hr Rainfall Depth (in)
2-year	3.59
5-year	4.68
10-year	5.58
25-year	6.82
50-year	7.73
100-year	8.73

HydroCAD automatically computes the rainfall intensity from its own IDF curves when the rainfall intensity data is provided. Table 2 shows the data that was used to generate the IDF curves. This information was taken from the NOAA Atlas 14 documents (Latitude: 41.3481°, Longitude: -73.2522°) and are listed in Table 2 below.

Table 2: IDF Table

Intermediate Intensity Values (in/hr.)				
Return Period	**5-Minute**	**15-Minute**	**30-Minute**	**60-Minute**
2-yr	5.12	2.84	1.97	1.26
5-yr	6.34	3.52	2.44	1.56
10-yr	7.34	4.08	2.82	1.80
25-yr	8.72	4.85	3.35	2.14
50-yr	9.77	5.43	3.76	2.40
100-yr	10.90	6.03	4.17	2.66

SCS uses the runoff curve number (CN) method to estimate runoff from storm rainfall. The major factors that determine CN are the watershed's soil and cover conditions, cover type, treatment and hydrologic condition. The higher percentage of impervious cover within a watershed will result in a higher curve number. A composite curve number was calculated for each analyzed watershed.

The time of concentration is the time it takes for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. The time of concentration is calculated by adding the travel times of sheet flow, shallow concentrated flow and open channel flow, or some combination of these depending on the watershed and its features.

EXISTING HYDROLOGY

Slopes on site range from approximately 1 percent to 100 percent, with a high elevation of approximately 514 feet at the top of the ridge located towards the center of the property and a low elevation of approximately 403 feet at the discharge point of the western wetland area. According to the NRCS Soil Survey Geographic database for the State of Connecticut, most of the property is comprised of Canton and Charlton soils and Charlton-Chatfield complex. The rest of the property consists of wetland soils including Leicester fine sandy loam and Sutton fine sandy loam. The soils within the proposed project area have a hydrologic soil group rating of B and D. A breakdown of all the soils,

located within the property limits, as well as the NRCS Soil Survey Map for the site can be found in Appendix A, Figure 3.

Approximately 81.53 acres were analyzed for stormwater management purposes. The analysis for existing drainage was performed in regard to pre-existing site conditions, prior to construction operations. Based on existing drainage patterns, the area was divided into five contributing drainage areas, labeled Existing Drainage Area 1a (E-1a), Existing Drainage Area 1b (E-1b), Existing Drainage Area 2 (E-2), Existing Drainage Area 3 (E-3), and Existing Drainage Area 4 (E-4). The approximate location and delineation of these drainage areas can be seen on Sheet DA-1, Existing Drainage Area Map, found in Appendix B.

E-1 has a total contributing area of approximately 57.63 acres. This area encompasses the western portion of the site, which discharges into the existing wetland that extends for the majority of the western property edge. E-1 was divided into two separate areas, E-1a and E-1b, for the purposes of comparing proposed conditions. Both areas discharge into the Upper West Branch of the Pequonnock River through a series of channels (R1 and R2) in the wetland area. Runoff from E-1a travels overland and directly into the wetlands towards the Upper West Branch of the Pequonnock River. Onsite runoff from E-1b travels overland before entering the detention basin (Pond-1b) located in the northwest corner of the site. Offsite runoff includes several developments from Enterprise Drive and Independence Drive, which travels overland and through a connected stormwater drainage system to the Town of Monroe Municipal Basin. The existing outlet control structure is a modified concrete catch basin with a V-notch weir with bottom elevation 441.60 and TF of 446.40. Stormwater exits the basin through the outlet control structure and discharges into the wetlands.

E-2 has a contributing area of approximately 14.56 acres. This area is comprised of the northeast portion of the site. Runoff from this area travels north overland and discharges into the Great Pine Swamp, located to the north of Independence Drive.

E-3 has a contributing area of approximately 3.77 acres. This area is located in the southeast corner of the site. Runoff from this area travels southeast overland and discharges into the wetlands located in the southeast corner of the site.

E-4 has a contributing area of approximately 5.57 acres. This area is located in the southeast corner of the site. Runoff from this area travels southeast overland and discharges into the wetland area located to the east of the site access on Cambridge Drive.

Characteristics of these drainage areas are summarized in Table 3. A map depicting existing drainage areas and their characteristics, entitled “Existing Drainage Area Map (DA-1)”, can be found in Appendix B.

Table 3: Existing Drainage Area Characteristics

Drainage Area	Area (Acres)	Curve Number (CN)	Time of Concentration (Minutes)
E-1a	39.76	71	30.60
E-1b	17.87	71	16.00
E-2	14.56	69	90.60
E-3	3.77	66	21.30
E-4	5.57	72	31.20

Existing peak flows and volumes of runoff for all analyzed storm-events are summarized in Table 4. Calculations for the existing hydrology can be found in Appendix B.

Table 4: Existing Peak Flows

Drainage Area	Peak Flow (cfs)					
	2-yr	**5-yr**	**10-yr**	**25-yr**	**50-yr**	**100-yr**
E-1a	34.44	60.28	83.71	117.77	144.01	172.85
E-1b	23.31	40.17	55.38	77.39	94.29	112.82
E-2	4.94	9.01	12.80	18.42	22.78	27.62
E-3	2.90	5.60	8.12	11.86	14.79	18.05
E-4	5.08	8.75	12.05	16.82	20.49	24.52
Pond 1b	7.89	13.99	17.45	21.58	24.33	27.04
R1	7.80	13.92	17.41	21.55	24.30	27.02
R-2	29.60	55.05	76.72	106.97	129.63	154.25

PROPOSED HYROLOGY & HYDRAULICS

The design intent of the proposed development conditions from a stormwater perspective is to restore existing former watershed patterns to existing on site wetlands. This includes the rehydrating of the eastern vernal pools and the reestablishment of the eastern vernal pool envelope. The proposed development conditions within the 81.53 acres analyzed consist of drainage areas that are of similar patterns to existing contributing areas. Based on the proposed drainage patterns, the 81.53-acre area was divided into nine (9) contributing drainage areas, labeled Proposed Drainage Area 1a (P-1a), Proposed Drainage Area 1b (P-1b), Proposed Drainage Area 1c (P-1c), Proposed Drainage Area 1d (P-1d), Proposed Drainage Area 1e (P-1e), Proposed Drainage Area 1f (P-1f), Proposed Drainage Area 2 (P-2), Proposed Drainage Area 3 (P-3) and Proposed Drainage Area 4 (P-4). The approximate location and delineation of these drainage areas can be seen on Sheet DA-2, Proposed Drainage Area Map, found in Appendix B.

P-1 encompasses the western portion of the site, which discharges into the existing wetland that extends for most of the western property edge. P-1 was divided into six separate areas, P-1a, P-1b, P-1c, P-1d, P-1e, and P-1f. P-1a discharges directly into the wetlands along the western half of the site, while the other five areas discharge into separate stormwater basins before entering the wetlands.

P-1a has a contributing area of approximately 22.93 acres. This area encompasses the wetland area on the western edge of the site, as well as some of the area from the upper pad in the north half of the site. Runoff from P-1a travels south overland and through a series of channels into the Upper West Branch of the Pequonnock River.

P-1b has a contributing drainage area of approximately 16.12 acres. Onsite runoff from P-1b travels overland before entering the Town of Monroe Municipal Basin (Pond 1b) located in the northwest corner of the site. Offsite runoff includes several developments from Enterprise Drive and Independence Drive, which travels overland and through a connected stormwater drainage system to the detention basin. The outlet control structure is proposed to be protected and maintained as part of this project. Stormwater exits the basin through the outlet control structure and discharges into the wetlands.

P-1c has a contributing area of approximately 10.48 acres. Runoff from P-1c travels southwest overland, entering into a detention basin (Pond 1c) located to the north of the site driveway. The outlet control structure is a modified concrete catch basin with a 6” orifice at 409.00, a 2’ x 0.5’ rectangular weir at 411.30, and top of frame at 413.00. Stormwater exits the basin through the outlet control structure and discharges into the wetlands. A grass-lined swale has been proposed to treat the water quality volume for this basin. To prevent the possibility of a decoy vernal pool, the basin was designed with a low-flow orifice at the bottom of the basin.

P-1d has a contributing area of approximately 14.20 acres. Runoff from P-1d travels southwest overland, entering a detention basin (Pond 1d) located to the east of the proposed site driveway. The outlet control structure is a modified concrete catch basin with a 2" orifice at 408.00, a 4" orifice at 410.00, a 1' x 2' rectangular weir at 412.00, and top of frame at 415.00. Stormwater exits the basin through the outlet control structure and discharges into the wetlands. In accordance with the 2004 Connecticut Stormwater Quality Manual, a hydrodynamic separator has been proposed to treat the water quality volume for this basin. To prevent the possibility of a decoy vernal pool, the basin was designed with a low-flow orifice at the bottom of the basin.

P-1e has a contributing area of approximately 1.06± acres. Runoff from this area travels west overland into a detention basin (Pond 1e) and eventually into the onsite wetlands. The basin discharges, through an outlet spillway weir approximately 20 feet wide.

P-1f has a contributing area of approximately 0.62 acres. Runoff from this area travels south overland and discharges into a water quality basin (WQB-1). From the water quality basin, water flows into a double catch basin and then through a hydrodynamic separator before entering Pond 1d.

P-2 has a contributing area of approximately 9.72 acres. This area is comprised of the northeast portion of the site. Runoff from this area travels north overland and discharges into the Great Pine Swamp, located to the north of Independence Drive.

P-3 has a contributing area of approximately 3.03 acres. This area is in the southeast corner of the site. Runoff from this area travels southeast overland, entering a detention basin (Pond 3) located near the southeast property corner. The outlet control structure is a modified concrete catch basin with a 9" orifice at 423.00, a 2.0' x 0.5' rectangular weir at 425.00 and top of frame at 427.00. Stormwater exits the basin through the outlet control structure and discharges into the wetlands located in the southeast corner of the site. A grass-lined swale has been proposed to treat the water quality volume for this basin. To prevent the possibility of a decoy vernal pool, the basin was designed with a low-flow orifice at the bottom of the basin.

P-4 has a contributing area of approximately 3.37 acres. This area is in the southeast corner of the site. Runoff from this area travels southeast overland and discharges into the wetland area located to the east of the site access on Cambridge Drive.

Characteristics of these drainage areas are summarized in Table 7. A map depicting proposed drainage areas can be found in Appendix B.

Table 7: Proposed Drainage Area Characteristics

Drainage Area	Area (Acres)	Curve Number (CN)	Time of Concentration (Minutes)
P-1a	22.93	74	38.60
P-1b	16.12	76	23.30
P-1c	10.48	80	48.80
P-1d	14.20	80	55.80
P-1e	1.06	92	9.20
P-1f	0.62	87	15.60
P-2	9.72	75	81.00
P-3	3.03	80	25.20
P-4	3.37	76	36.50

Proposed peak flows and volumes for all analyzed storms are summarized in Table 8. Calculations for the proposed hydrology can be found in Appendix B.

Table 8: Proposed Peak Flows

Drainage Area	Peak Flow (cfs)					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
P-1a	20.30	33.89	46.01	63.42	76.72	91.25
P-1b	22.43	36.16	48.22	65.36	78.35	92.48
P-1c	10.76	16.61	21.66	28.75	34.08	39.84
P-1d	13.24	20.45	26.66	35.39	41.96	49.06
P-1e	4.25	5.76	7.00	8.69	9.94	11.29
P-1f	1.73	2.46	3.07	3.90	4.52	5.18
P-2	5.27	8.70	11.76	16.14	19.49	23.14
P-3	4.89	7.51	9.76	12.91	15.27	17.83
P-4	3.48	5.64	7.55	10.26	12.32	14.56
Pond 1b	9.46	14.79	17.87	21.65	24.17	26.68
Pond 1c	5.91	12.36	17.77	25.56	31.26	33.74
Pond 1d	0.83	3.11	5.58	8.47	11.90	17.71
Pond 1e	0.05	0.36	1.74	5.34	7.73	9.72
Pond 3	1.96	2.61	4.15	7.29	9.70	12.37
WQB-1	0.46	2.46	3.07	3.88	4.49	5.16
R-1	9.40	14.75	17.84	21.63	24.15	26.65
R-2	23.36	40.02	53.19	71.27	84.71	99.20
R-3	29.54	52.33	71.43	98.99	119.32	141.12
R-4	29.35	52.32	71.45	98.96	119.18	141.08

Each stormwater basin was designed in order to attenuate for the 100-year storm in the drainage area.

Pond 1b is the existing Town of Monroe Municipal Basin which is proposed to be protected and maintained with the proposed development. The basin has a capacity of 141,234 cubic feet and its outlet control structure is a modified concrete catch basin with a V-notch weir with bottom elevation 441.60 and TF of 446.40.

Pond 1c is an existing sediment basin located to the north of the proposed office building which is proposed to be expanded in order to attenuate for the 100-year storm in drainage area P-1c. The basin has a storage capacity of 41,305 cubic feet and the outlet control structure is a modified concrete catch basin with a 6” orifice at 409.00, a 2’ x 0.5’ rectangular weir at 411.30, and top of frame at 413.00. The basin also has a 20’ wide emergency spillway at 414.00. Stormwater Test Pit #2 was dug in the middle of the proposed basin. The soil in the test pit was observed to be olive-brown, coarse sandy loam from 0”-72”. The test pit showed evidence of mottles at 32” and possible ledge at 72”.

Pond 1d is located to the east of the proposed office building and is proposed to attenuate for the 100-year storm in drainage area P-1d. The basin has a storage capacity of 174,187 cubic feet and the outlet control structure is a modified concrete catch basin with a 2” orifice at 408.00, a 4” orifice at 410.00, a 1’ x 2’ rectangular weir at 412.00, and top of frame of 415.00. The basin also has a 35’ wide emergency spillway at 416.00. Stormwater Test Pit #1 was dug in the middle of the proposed basin. The soil in the test pit was observed to be miscellaneous fill from 0”-48”. The test pit also has ledge at 48”.

Pond 1e is located to the west of the site access drive and was approved as part of the Section 4 General Permit application. The basin has a storage capacity of 9,417 cubic feet and a 20’ wide spillway at 406.35. This area has been designed with similar drainage patterns as previously approved and will not have any effect on the basin as previously designed.

Pond 3 is located in the southeast corner of the property and is designed to attenuate for the 100-year storm in drainage area P-3. The basin has a storage capacity of 27,991 cf and the outlet control structure is a modified concrete catch basin with a 9" orifice at 423.00, a 2.0' x 0.5' rectangular weir at 425.00 and TF of 427.00. The basin also has a 25' wide emergency spillway at 427.50. Stormwater Test Pit #3 was dug in the middle of the proposed basin. The soil in the test pit was observed to be topsoil from 0" - 16", Miscellaneous sediment/silt from 16"-36", Yellow-brown fine sandy loam from 36"-48"and Olive brown coarse sandy loam, little silt, from 48"-110" with ledge at 110".

Water Quality Basin 1 (WQB-1) is located in the south of the property near the southwest corner of Pond 1-d. with a required water quality volume on-site of 864 cf, , WQB-1 was sized to provide a storage of 2561 cf with a 18' wide spillway at elevation 412.00. The water quality basin outlets into a double catch basin, which then flows into a hydrodynamic separator before entering Pond 1d.

There are also two grass-lined swales proposed as water quality measure. One swale is proposed up-gradient of Pond 1c and the other is proposed up-gradient of Pond 1d. The swales both feature a 2' depth with a longitudinal slope of 2%.

CONSTRUCTION HYROLOGY & HYDRAULICS

A stormwater analysis was performed to model conditions during construction. During this analysis, the disturbed areas were modeled as dirt and the orifices on the outlet control structures within the proposed basins were modeled as plugged. The intent of this analysis is to demonstrate the reduction in peak flows as well as sufficient capacity of within the basins to hold back stormwater as they served as sedimentation basins. The peak flows are summarized below:

Table 9: Construction Peak Flow Comparison Table

Drainage Area	Peak Flow (cfs)					
	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
E-1* | **P-1****	29.60 | **22.66**	55.05 | **43.33**	76.72 | **58.99**	106.97 **| 78.94**	129.63 | **96.85**	154.25 | **114.96**
E-2 | **P-2*****	4.94 | **5.27**	9.01 | **8.70**	12.80 | **11.76**	18.42 | **16.14**	22.78 | **19.49**	27.62 | **23.14**
E-3 | **P-3********	2.90 | **2.64**	5.60 | **5.24**	8.12 | **7.98**	11.86 | **11.82**	14.79 | **13.65**	18.05 | **14.55**
E-4 | **P-4**	5.08 | **3.48**	8.75 | **5.64**	12.05 | **7.55**	16.82 | **10.26**	20.49 | **12.32**	24.52 | **14.56**

*E-1 is the peak flow of R-2, which includes the peak flows from E-1a & R-1.
**P-1 is the peak flow of R-4, which includes the peak flows from R-3 & Pond 1e.
***P-2 drains to the Great Pine Swamp, which acts as a stormwater basin to attenuate peak runoff rates.
****P-3 is comprised of the peak flow from Pond 3

WATERSHED COMPARISON

As previously mentioned, the design intent of the overall project from a stormwater perspective was to reestablish former watershed patterns to existing onsite wetlands. In the former condition, the western wetlands had a contributing watershed area of 31.77± acres, while the eastern wetlands had a contributing watershed area of 9.71± acres. In the previously approved Planning & Zoning Application, the western wetlands had an increase in contributing watershed area to a total of 39.17± acres, while the eastern wetlands had a decrease in contributing watershed area to a total of 5.05± acres. In the existing conditions the western wetland has decreased in contributing watershed area to a total of 18.90± acres, while the eastern wetland has decreased in contributing watershed area to a total of 2.17± acres. In the

proposed condition the western wetland contributing watershed area will be restored to the former size, with a total contributing watershed area of 38.94± acres. The eastern wetland contributing watershed area will also be restored, with a total contributing watershed area of 5.05± acres. The proposed condition will restore the vernal pool envelope and rehydrate both the eastern and western wetlands as a result in the increase in contributing watershed areas. For more information please refer to the Watershed Area Maps in Appendix F (WS1 – WS4).

STORMWATER CONCLUSION

The proposed development results in an increase in impervious area of approximately 0.32± acres when compared to pre-development (former) conditions. The project includes the construction of three stormwater detention basins for the attenuation of peak runoff. The stormwater management system serves to treat and detain the increase in runoff by the proposed development. The stormwater detention basins have also been designed in anticipation of increased site disturbance and stormwater runoff as the result of future development.

Table 10: Peak Flow Comparison Table

Drainage Area	Peak Flow (cfs)					
	2-yr	**5-yr**	**10-yr**	**25-yr**	**50-yr**	**100-yr**
E-1* | **P-1****	29.60 | **29.13**	55.05 | **51.95**	76.72 | **71.14**	106.97 | **98.62**	129.63 | **118.69**	154.25 | **140.76**
E-2 | **P-2*****	4.94 | **5.27**	9.01 | **8.70**	12.80 | **11.76**	18.42 | **16.14**	22.78 | **19.49**	27.62 | **23.14**
E-3 | **P-3********	2.90 | **1.96**	5.60 | **2.61**	8.12 | **4.15**	11.86 | **7.29**	14.79 | **9.70**	18.05 | **12.37**
E-4 | **P-4**	5.08 | **3.48**	8.75 | **5.64**	12.05 | **7.55**	16.82 | **10.26**	20.49 | **12.32**	24.52 | **14.56**

*E-1 is the peak flow of R-2, which includes the peak flows from E-1a & R-1.
**P-1 is the peak flow of R-4, which includes the peak flows from R-3 & Pond 1e.
***P-2 drains to the Great Pine Swamp, which acts as a stormwater basin to attenuate peak runoff rates.
****P-3 is comprised of the peak flow from Pond 3.

The project is designed to comply with the Town of Monroe's MS4 Stormwater Management Plan. For new development and redevelopment of sites with less than forty percent of directly connected impervious area (DCIA), the water quality volume for the site is to be retained. The water quality volume for the site has been retained within the proposed basins. A maintenance plan has also been included in this report for the proposed stormwater systems. This plan provides an outline for items such as snow management, inspection of stormwater systems and sediment removal from stormwater basins. The project site will also be subject to a Connecticut Department of Energy and Environmental Protection (CT DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities. Low impact development measures required as a part of the MS4 Stormwater Management Plan, such as vegetated water quality swales and the minimizing of land disturbance, have been implemented.

SOIL EROSION AND SEDIMENT CONTROL

The proposed plans for soil erosion and sediment control prepared for this project have been developed in accordance with the Town of Monroe Zoning Regulations, Article 6.5, adopted September 19, 2013, effective date October 1, 2013, as well as the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, prepared by the Connecticut Council on Soil and Water Conservation in cooperation with the Connecticut Department of Environmental Protection.

The soil erosion and sediment control measures that will be proposed as part of this project include geotextile silt fences, temporary sediment traps/basins, temporary diversion swales, construction entrances, dust control measures, riprap stabilization, and inlet protection for existing and proposed drainage features.

The construction phase will consist of two sediment basins and eight sediment traps. Sediment Basin #1 and Sediment Trap #1, located east and north of the existing scale house, will handle most of the sediment generated from the southern half of the site. Sediment Basin #1 was designed with a capacity of 141,391 cubic feet which exceeds the required storage of 21,744 cubic feet. The bottom elevation of the trap is 408, with a primary spillway at an elevation of 416 and a grate top outlet structure with a top of frame of 415. Sediment Trap #1 was designed with a capacity of 30,785 cubic feet; which exceeds the required storage of 15,336 cubic feet. This basin is designed with a bottom elevation of 409 with a primary spillway elevation of 414 and a grate top outlet structure with a top of frame of 413. In addition to the two basins in the southern half of the site a sediment trap south of the existing scale house was designed to accommodate sediment generated in this portion of the site. The sediment trap was designed with a capacity of 4,327 cubic feet which exceeds the required storage of 4,293 cubic feet. Near the southeast property corner, Sediment Trap #3 was designed to accommodate sediment generated in that portion of the site. Sediment Trap #3 was designed with a capacity of 23,880 cubic feet, which exceeds the required storage of 10,638 cubic feet. This trap will have an outlet structure with a rectangular weir at an elevation of 425.60 and a grate top at 427.00. The rectangular weir will not be active during this phase. Most of the sediment generated along the eastern property line within the lower pad will be captured by one of three sediment traps. Sediment Trap #4 is designed with a capacity of 18,225 cubic feet which exceeds the required storage of 14,074 cubic feet. Sediment Trap #5 is designed with a capacity of 13,991 cubic feet which exceeds the required storage of 12,312 cubic feet. The western sediment trap, Sediment Trap #6 is designed with a capacity of 16,141 cubic feet which exceeds the required storage of 15,390 cubic feet. The sediment generated in the upper pad area will be captured by two sediment traps. Sediment Trap #7 is designed with a capacity of 10,070 which exceeds the required storage of 10,044 cubic feet. Sediment Trap #8 is designed with a capacity of 10,599 which exceeds the required storage of 8,235 cubic feet.

For more detail regarding layout and design of the soil erosion and sediment control measure implemented as part of this project see Sheet 2.31, Soil Erosion & Sediment Control Plan and Sheet 2.41, Sediment Erosion & Sediment Control Details.

EARTHWORK ANALYSIS & MATERIAL INTAKE PROTOCOL

OVERALL EARTHWORK ANALYSIS

The project proposes an overall cut of 162,730 CY, an overall fill of 653,127 CY and a net cut/fill of 490,397 CY of fill during the duration of the project. A majority of the filling operation is to occur in the northern portion of the site in order to raise the area to an elevation of 461.00' ±. This will restore former watershed patterns as previously discussed. Filling operations along the eastern limit of disturbance will facilitate the restoration of the vernal pool envelope by providing a gradual slope within the area. The southern portion of the site is to be graded as a future development pad, with a slight increase in elevation. The overall cut for the project is necessary to construct the stormwater basins, create an access drive from Independence Drive and decrease steep slopes along the limits of disturbance. All imported material will be subject to the material intake protocol, discussed below.

The existing scale house and associated temporary construction trailers and buildings are to remain while grading and earthwork operations commence. The area of lower elevation in the northern portion of the site will be raised to a pad elevation of 430.00' ±, with the fill being brought in and placed according to the material intake protocol guidelines.

Temporary material bins will be constructed in the existing pad towards the southeastern portion of the project site to handle incoming material.

MATERIAL INTAKE PROTOCOL

A material intake procedure has been created for the import of all fill material and in cooperation with the Connecticut Department of Environmental Protection's Solid Waste Management Regulations.

The purpose of this intake protocol is to ensure that all materials received on site meet the requirements for clean fill. As defined by the Solid Waste Management Regulations, clean fill means:

> (1) natural soil (2) rock, stone, sand, gravel, brick, ceramics, clean concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard and (3) polluted soil as defined in subdivision (45) of subsection (a) of section 22a-133k-1 of the Regulations of Connecticut State Agencies which soil has been treated to reduce the concentration of pollutants to levels which do not exceed the applicable pollutant mobility criteria and direct exposure criteria established in sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies and which soil is reused in accordance with R.C.S.A. subdivision (3) of subsection (h) of section 22a-133k-2 of such regulations.

For more information regarding the material intake protocol refer to Appendix D, Material Acceptance Procedure.

DESCRIPTION OF FILLING AND/OR EXCAVATION ACTIVITY WITHIN REGULATED AREA

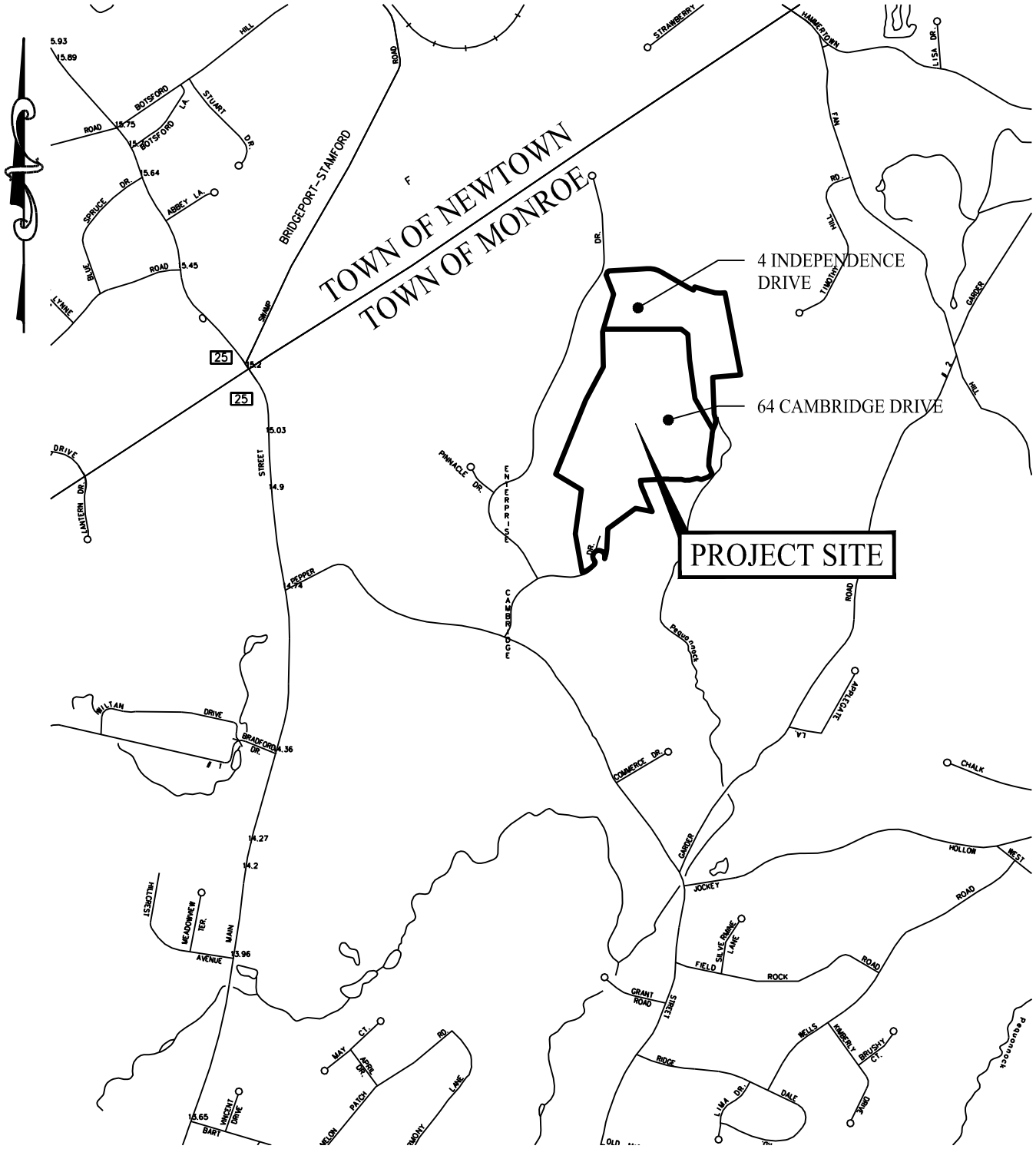
Proposed work within the regulated area consists the site access drive extension, earthwork activities to restore former watershed drainage patterns, upland enhancements and buffer plantings, as well as stormwater drainage system and basin construction.

Within the regulated area, the development will require a cut of approximately 99,778 CY. The proposed fill is approximately 576,097 CY. Therefore, the net fill (import) within the regulated area totals approximately 476,319 CY. The cut consists of excavation for the proposed stormwater detention basins and removal of existing material stockpiles. The fill is largely concentrated in the northern portion of the site to fill the existing hole.

The landscaping proposed within the regulated area consists of a variety of native overstory and understory trees and evergreen and deciduous shrub species. These are concentrated along the wetland edges and within the vernal pool envelope at the perimeter of the site. The biofiltration swales are seeded with a mix of New England Erosion Control Restoration Seed Mix and New England Conservation Wildlife Seed Mix. The basins bottoms are seeded with New England Wetmix and the banks with New England Roadside Matrix Upland Seed Mix. In the northeastern portion of 64 Cambridge Drive, approximately 1,215 SF ± of previously disturbed wetland area will be remediated to restore a portion of the property that was impacted as part of work associated with an approval granted for the neighboring property at 36 Timothy Hill Road. Any debris and invasive species within the remediation area will be removed. The area will be seeded and planted with shrubs, while protecting and maintaining the existing trees. In addition to the remediation area in the northeast, an area of approximately 1,410 SF ± in the southeast portion of 64 Cambridge Drive is proposed for wetland remediation.

APPENDIX A
FIGURES

Site Location Map (Figure 1)
FEMA Flood Map (Figure 2)
Soil Survey Map (Figure 3)
Public Water Supply Watershed Map (Figure 4)
Regulated Area Map (Figure 5)
Slope Area Map (Figure 6)
Cut/Fill Exhibit (Figure 7)



NOTE: BASE MAP INFORMATION TAKEN FROM THE CONNDOT TOWN ROAD MAPS (TRU), MAP NUMBER 84 AND 96.

1,500 0 750 1,500

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SITE LOCATION MAP

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Project #:	1903601
Plan Date:	05/26/20
Scale:	1" = 1,500'
Figure:	1



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

OTHER AREAS

ZONE X — Areas determined to be outside the 0.2% annual chance floodplain.

NOTE: BASE MAP INFORMATION TAKEN FROM FEMA FLOOD INSURANCE RATE MAP, MAP NUMBERS 09001C0257F AND 09001C0276F

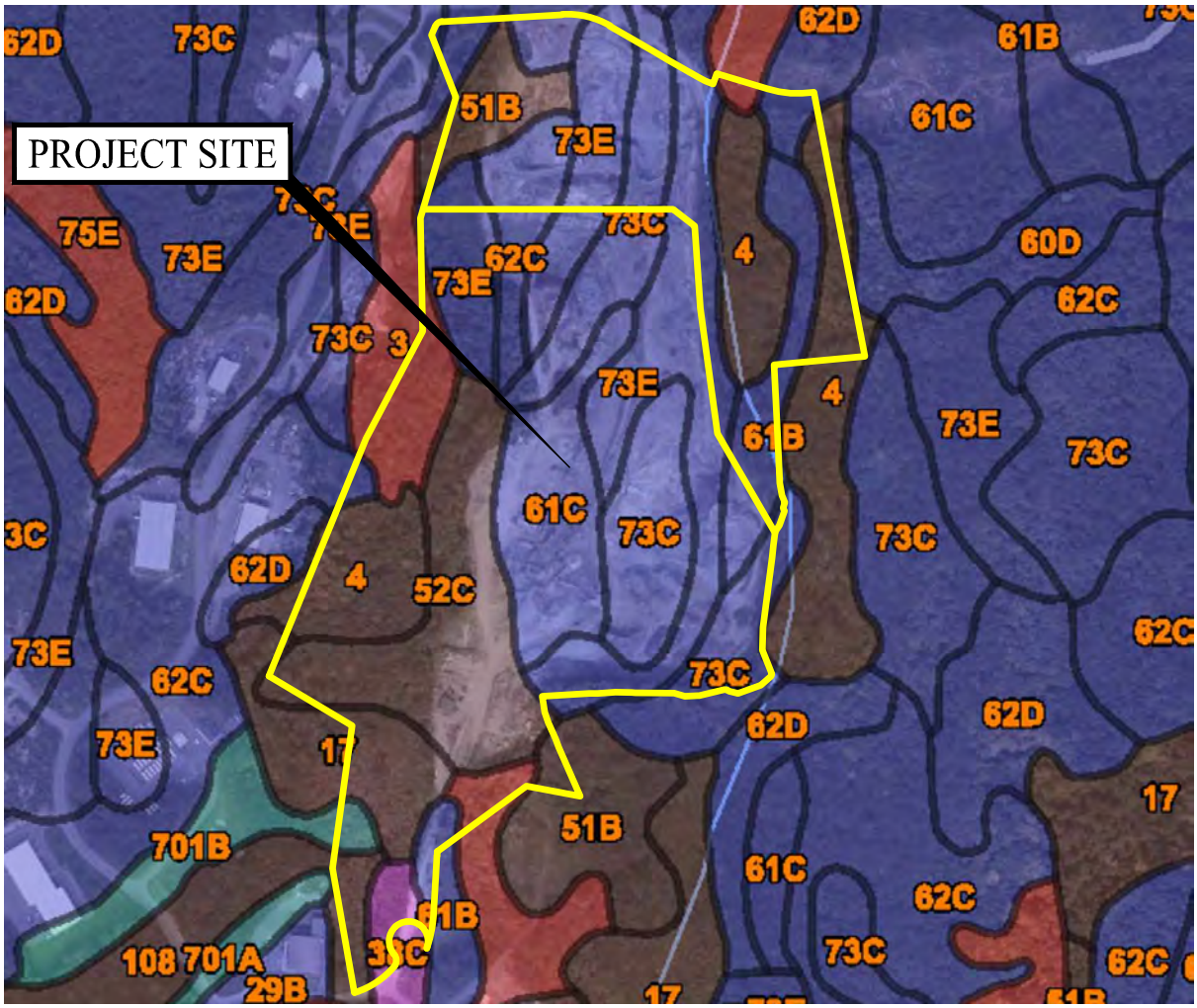
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FEMA FLOOD MAP

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Project #:	1903601
Plan Date:	05/26/20
Scale:	1" = 1,000'
Figure:	2



Map unit symbol	Map unit name	Rating
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D
4	Leicester fine sandy loam	B/D
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D
38C	Hinckley loamy sand, 3 to 15 percent slopes	A
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D
52C	Sutton fine sandy loam, 2 to 15 percent slopes, extremely stony	B/D

Map unit symbol	Map unit name	Rating
61B	Canton and Charlton fine sandy loams, 0 to 8 percent slopes, very stony	B
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B
62C	Canton and Charlton fine sandy loams, 3 to 15 percent slopes, extremely stony	B
73C	Charlton-Chatfield complex, 0 to 15 percent slopes, very rocky	B
73E	Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky	B

NOTE
SOIL MAP INFORMATION TAKEN FROM THE
NATURAL RESOURCES CONSERVATION SERVICE,
URL: http://websoilsurvey.nrcs.usda.gov
DATE OF IMAGE: OCTOBER 5, 2016.

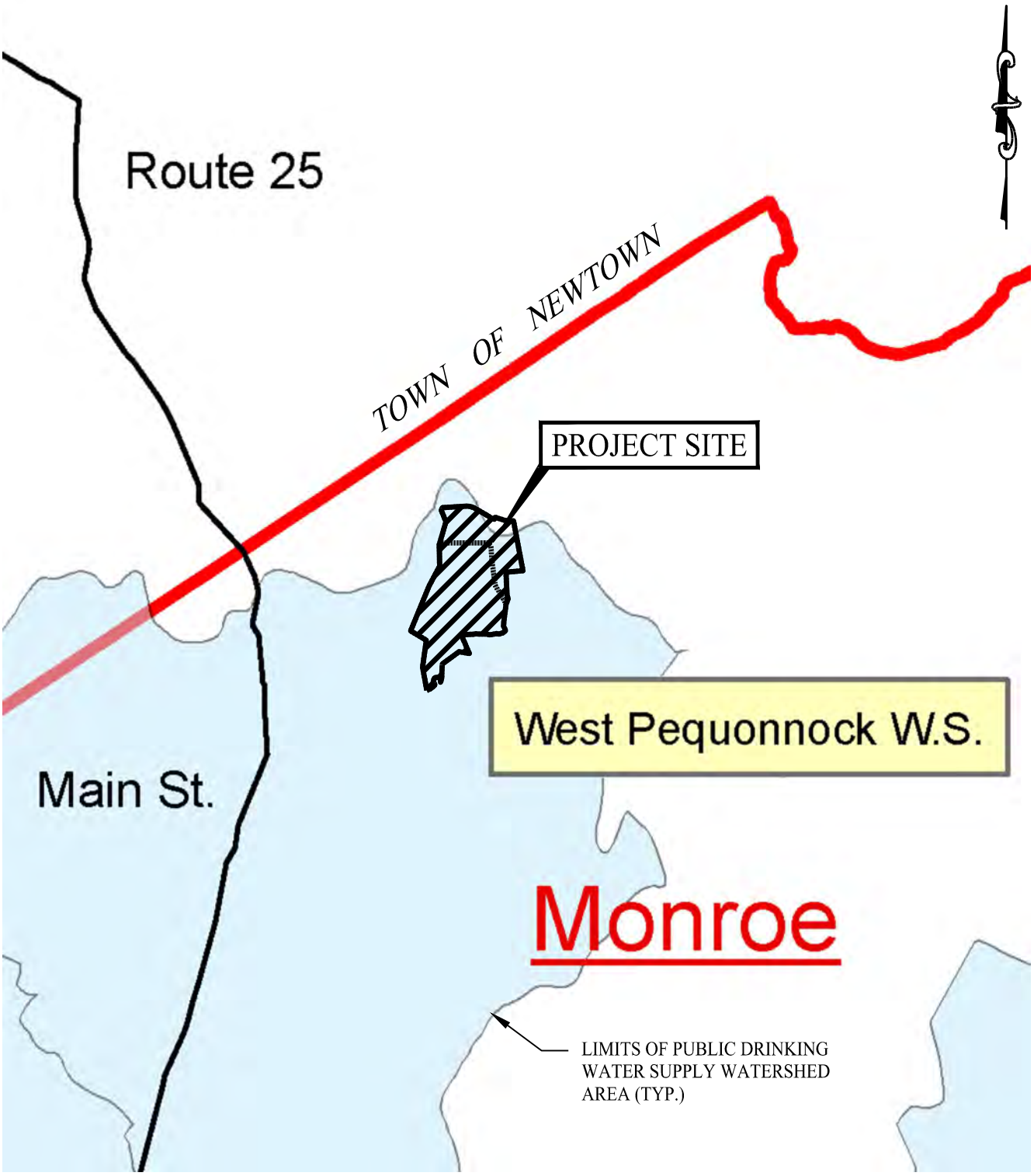
600 0 300 600

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SOIL SURVEY MAP

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Project #:	1903601
Plan Date:	05/26/20
Scale:	1" = 600'
Figure:	3



NOTE: WATERSHED INFORMATION TAKEN FROM A MAP ENTITLED "AQUARION WATER COMPANY PUBLIC DRINKING WATER SUPPLY WATERSHED AREAS; MONROE, CONNECTICUT," PROVIDED BY THE TOWN OF MONROE.

2,500 0 1,250 2,500

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 F: (203) 880-9695

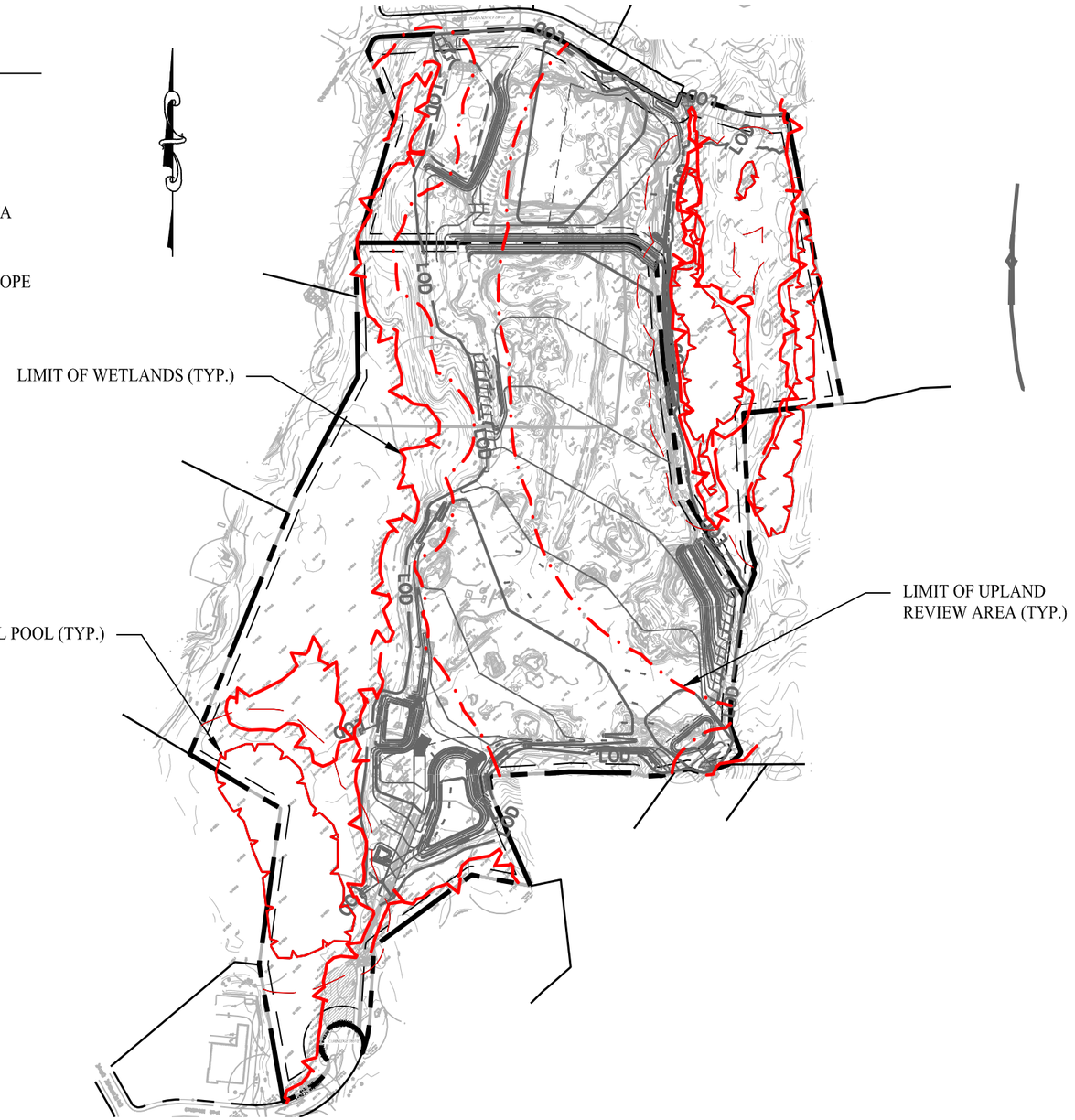
PUBLIC WATER SUPPLY WATERSHED MAP

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Project #:	1903601
Plan Date:	05/26/20
Scale:	1" = 2,500'
Figure:	4

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE



WETLAND AREA TABLE

AREA	LOT (ACRE)
LOT AREA	71.90±
WETLANDS ON LOT	18.89±
UPLAND REVIEW AREA ON LOT	37.44±
WETLANDS TO BE ALTERED	0.00±
UPLAND REVIEW AREA TO BE ALTERED	25.88±
TOTAL REGULATED AREA TO BE ALTERED	25.88±

400 0 200 400

Rev. #: Date Description

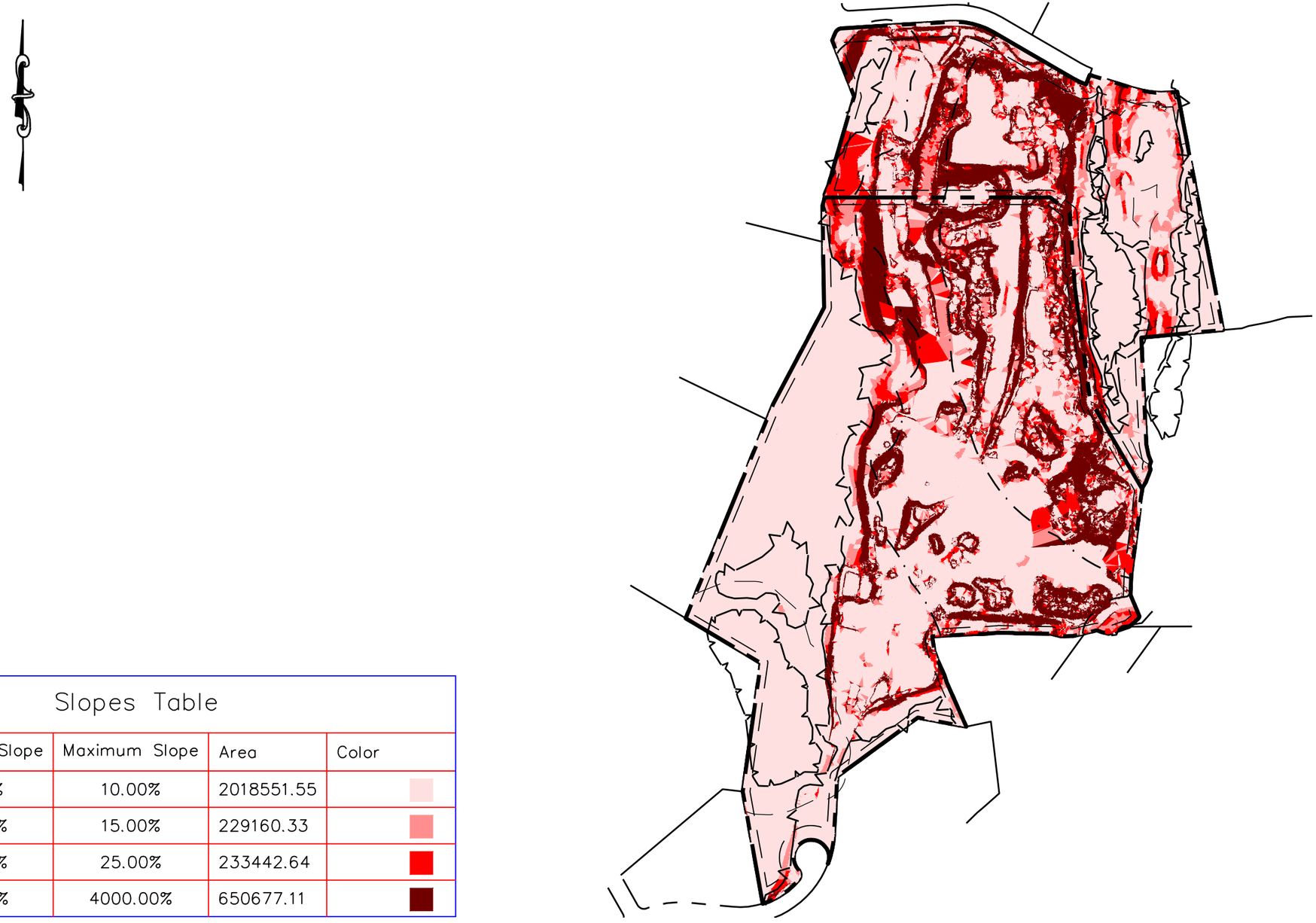
SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 400'

Project:
PROPOSED SITE REMEDIATION
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:
REGULATED AREA MAP

SHEET #:
FIG-5



Slopes Table			
Minimum Slope	Maximum Slope	Area	Color
0.00%	10.00%	2018551.55	
10.00%	15.00%	229160.33	
15.00%	25.00%	233442.64	
25.00%	4000.00%	650677.11	

400 0 200 400

Rev. #: Date Description

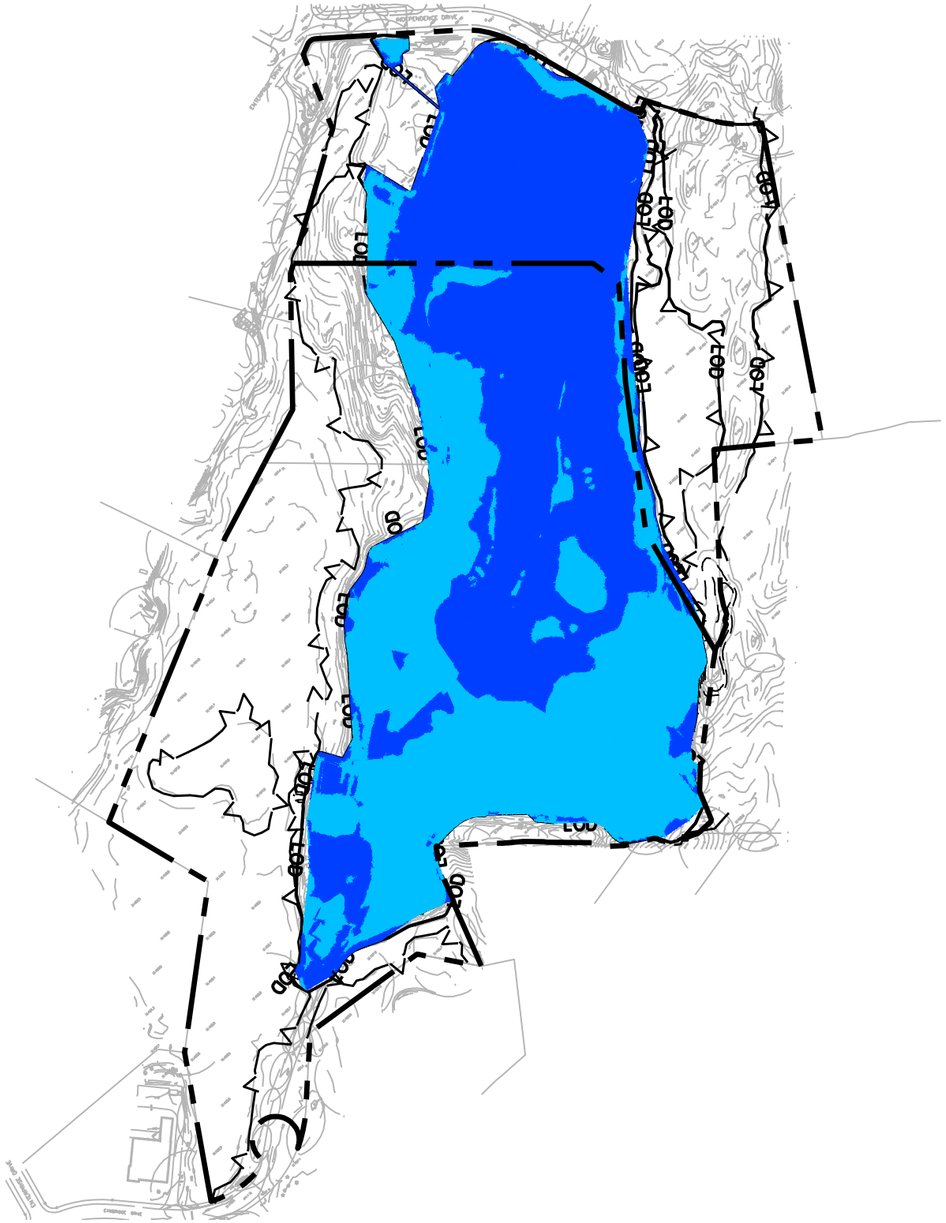
SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 | F: (203) 880-9695

Drawn By: AWC
Checked By: KMS
Project #: 1903601
Plan Date: 05/26/20
Scale: 1" = 400'

Project:
PROPOSED SITE DEVELOPMENT & RESTORATION
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:
SLOPE AREA MAP

SHEET #:
FIG. 6



Elevations Table				
Number	Minimum Elevation	Maximum Elevation	Area	Color
1	−62.08	0.00	739813.66	
2	0.00	79.85	832581.99	

400 0 200 400

Rev. #:	Date	Description

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	AWC
Checked By:	KMS
Project #:	1903601
Plan Date:	06/30/21
Scale:	1" = 400'

Project:
PROPOSED SITE RESTORATION
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:
CUT/FILL EXHIBIT

SHEET #:
FIG. 7

APPENDIX B
HYDROLOGY

Precipitation Data
Existing Drainage Area Map (DA-1)
Existing HydroCAD Report
Proposed Drainage Area Map (DA-2)
Proposed HydroCAD Report
Construction HydroCAD Report
Grass-Lined Swale HydroCAD Report
Hydrograph Return Recap Period Table
Hydrograph Summary Report
Hydrodynamic Separator Calculations and Details
Water Quality Flow Calculations
Storm Sewers Report & Profiles
Runoff Coefficient Calculations

NOAA Atlas 14, Volume 10, Version 3
Location name: Monroe, Connecticut, USA*
Latitude: 41.3481°, Longitude: -73.2522°
Elevation: 415.89 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.365** (0.278-0.469)	**0.427** (0.324-0.549)	**0.528** (0.400-0.681)	**0.612** (0.461-0.792)	**0.727** (0.533-0.973)	**0.814** (0.586-1.11)	**0.905** (0.635-1.27)	**1.01** (0.673-1.43)	**1.15** (0.743-1.68)	**1.26** (0.800-1.88)
10-min	**0.517** (0.393-0.664)	**0.604** (0.459-0.778)	**0.747** (0.567-0.964)	**0.866** (0.653-1.12)	**1.03** (0.755-1.38)	**1.15** (0.830-1.57)	**1.28** (0.899-1.79)	**1.43** (0.954-2.03)	**1.63** (1.05-2.38)	**1.79** (1.13-2.66)
15-min	**0.608** (0.463-0.781)	**0.711** (0.540-0.915)	**0.880** (0.667-1.14)	**1.02** (0.769-1.32)	**1.21** (0.888-1.62)	**1.36** (0.977-1.85)	**1.51** (1.06-2.11)	**1.68** (1.12-2.38)	**1.91** (1.24-2.80)	**2.11** (1.33-3.13)
30-min	**0.844** (0.642-1.09)	**0.986** (0.750-1.27)	**1.22** (0.923-1.57)	**1.41** (1.06-1.83)	**1.68** (1.23-2.24)	**1.88** (1.35-2.55)	**2.08** (1.46-2.90)	**2.30** (1.54-3.28)	**2.61** (1.69-3.81)	**2.84** (1.80-4.22)
60-min	**1.08** (0.822-1.39)	**1.26** (0.959-1.62)	**1.56** (1.18-2.01)	**1.80** (1.36-2.34)	**2.14** (1.57-2.86)	**2.40** (1.72-3.25)	**2.66** (1.85-3.69)	**2.93** (1.96-4.17)	**3.30** (2.13-4.82)	**3.58** (2.27-5.32)
2-hr	**1.40** (1.07-1.79)	**1.64** (1.26-2.10)	**2.04** (1.55-2.61)	**2.36** (1.79-3.04)	**2.81** (2.07-3.74)	**3.15** (2.28-4.26)	**3.51** (2.47-4.87)	**3.90** (2.62-5.51)	**4.46** (2.89-6.47)	**4.91** (3.12-7.25)
3-hr	**1.62** (1.24-2.06)	**1.90** (1.46-2.42)	**2.37** (1.81-3.02)	**2.76** (2.10-3.54)	**3.29** (2.44-4.37)	**3.69** (2.69-4.98)	**4.12** (2.92-5.73)	**4.60** (3.10-6.48)	**5.31** (3.45-7.68)	**5.89** (3.75-8.66)
6-hr	**2.03** (1.57-2.56)	**2.42** (1.87-3.05)	**3.05** (2.35-3.86)	**3.57** (2.74-4.55)	**4.29** (3.20-5.67)	**4.83** (3.54-6.49)	**5.40** (3.86-7.50)	**6.08** (4.11-8.51)	**7.08** (4.62-10.2)	**7.93** (5.06-11.6)
12-hr	**2.49** (1.94-3.12)	**3.01** (2.34-3.78)	**3.85** (2.98-4.85)	**4.55** (3.51-5.75)	**5.51** (4.13-7.24)	**6.23** (4.59-8.33)	**7.00** (5.03-9.67)	**7.91** (5.36-11.0)	**9.28** (6.07-13.2)	**10.4** (6.68-15.1)
24-hr	**2.93** (2.29-3.65)	**3.59** (2.81-4.48)	**4.68** (3.65-5.85)	**5.58** (4.33-7.01)	**6.82** (5.15-8.91)	**7.73** (5.74-10.3)	**8.73** (6.33-12.0)	**9.93** (6.76-13.7)	**11.8** (7.72-16.7)	**13.4** (8.57-19.2)
2-day	**3.32** (2.61-4.11)	**4.13** (3.25-5.12)	**5.45** (4.28-6.78)	**6.56** (5.12-8.18)	**8.07** (6.14-10.5)	**9.18** (6.87-12.2)	**10.4** (7.63-14.4)	**11.9** (8.15-16.4)	**14.4** (9.45-20.3)	**16.5** (10.6-23.6)
3-day	**3.62** (2.86-4.46)	**4.50** (3.56-5.56)	**5.96** (4.69-7.37)	**7.16** (5.61-8.90)	**8.82** (6.73-11.4)	**10.0** (7.53-13.3)	**11.4** (8.37-15.6)	**13.1** (8.94-17.9)	**15.8** (10.4-22.1)	**18.1** (11.7-25.8)
4-day	**3.89** (3.09-4.78)	**4.83** (3.83-5.94)	**6.36** (5.03-7.85)	**7.64** (6.00-9.46)	**9.39** (7.18-12.1)	**10.7** (8.03-14.1)	**12.1** (8.91-16.6)	**13.9** (9.51-18.9)	**16.7** (11.0-23.4)	**19.2** (12.4-27.3)
7-day	**4.66** (3.72-5.71)	**5.70** (4.54-6.97)	**7.38** (5.86-9.06)	**8.78** (6.93-10.8)	**10.7** (8.22-13.7)	**12.1** (9.14-15.9)	**13.7** (10.1-18.5)	**15.6** (10.7-21.1)	**18.5** (12.3-25.8)	**21.1** (13.6-29.8)
10-day	**5.43** (4.34-6.61)	**6.51** (5.21-7.94)	**8.29** (6.60-10.1)	**9.76** (7.73-12.0)	**11.8** (9.07-15.0)	**13.3** (10.0-17.3)	**14.9** (11.0-20.0)	**16.9** (11.6-22.8)	**19.8** (13.1-27.4)	**22.2** (14.4-31.3)
20-day	**7.74** (6.24-9.37)	**8.93** (7.19-10.8)	**10.9** (8.72-13.2)	**12.5** (9.96-15.2)	**14.7** (11.3-18.5)	**16.4** (12.4-21.0)	**18.1** (13.3-23.9)	**20.1** (13.9-26.9)	**22.8** (15.2-31.3)	**24.9** (16.2-34.9)
30-day	**9.65** (7.80-11.6)	**10.9** (8.81-13.2)	**13.0** (10.4-15.7)	**14.7** (11.7-17.8)	**17.0** (13.1-21.3)	**18.8** (14.2-23.8)	**20.6** (15.0-26.8)	**22.5** (15.7-30.0)	**25.0** (16.8-34.3)	**27.0** (17.6-37.6)
45-day	**12.0** (9.73-14.4)	**13.3** (10.8-16.0)	**15.5** (12.5-18.7)	**17.3** (13.9-20.9)	**19.8** (15.3-24.6)	**21.7** (16.4-27.3)	**23.6** (17.2-30.4)	**25.5** (17.8-33.8)	**27.9** (18.7-38.0)	**29.6** (19.3-41.1)
60-day	**13.9** (11.3-16.7)	**15.3** (12.5-18.3)	**17.6** (14.2-21.1)	**19.5** (15.7-23.5)	**22.1** (17.1-27.3)	**24.1** (18.2-30.2)	**26.1** (19.0-33.4)	**27.9** (19.6-36.9)	**30.3** (20.4-41.1)	**31.9** (20.9-44.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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NOAA Atlas 14, Volume 10, Version 3
Location name: Monroe, Connecticut, USA*
Latitude: 41.3481°, Longitude: -73.2522°
Elevation: 415.89 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**4.38** (3.34-5.63)	**5.12** (3.89-6.59)	**6.34** (4.80-8.17)	**7.34** (5.53-9.50)	**8.72** (6.40-11.7)	**9.77** (7.03-13.3)	**10.9** (7.62-15.2)	**12.1** (8.08-17.2)	**13.8** (8.92-20.2)	**15.2** (9.60-22.5)
10-min	**3.10** (2.36-3.98)	**3.62** (2.75-4.67)	**4.48** (3.40-5.78)	**5.20** (3.92-6.73)	**6.18** (4.53-8.27)	**6.92** (4.98-9.41)	**7.69** (5.39-10.8)	**8.55** (5.72-12.2)	**9.76** (6.31-14.3)	**10.8** (6.80-16.0)
15-min	**2.43** (1.85-3.12)	**2.84** (2.16-3.66)	**3.52** (2.67-4.54)	**4.08** (3.08-5.28)	**4.85** (3.55-6.49)	**5.43** (3.91-7.38)	**6.03** (4.23-8.44)	**6.70** (4.48-9.54)	**7.66** (4.95-11.2)	**8.43** (5.34-12.5)
30-min	**1.69** (1.28-2.17)	**1.97** (1.50-2.54)	**2.44** (1.85-3.14)	**2.82** (2.13-3.65)	**3.35** (2.45-4.48)	**3.76** (2.70-5.09)	**4.17** (2.91-5.80)	**4.61** (3.09-6.55)	**5.21** (3.37-7.61)	**5.69** (3.60-8.45)
60-min	**1.08** (0.822-1.39)	**1.26** (0.959-1.62)	**1.56** (1.18-2.01)	**1.80** (1.36-2.34)	**2.14** (1.57-2.86)	**2.40** (1.72-3.25)	**2.66** (1.85-3.69)	**2.93** (1.96-4.17)	**3.30** (2.13-4.82)	**3.58** (2.27-5.32)
2-hr	**0.700** (0.536-0.894)	**0.821** (0.628-1.05)	**1.02** (0.776-1.30)	**1.18** (0.896-1.52)	**1.41** (1.04-1.87)	**1.58** (1.14-2.13)	**1.75** (1.24-2.44)	**1.95** (1.31-2.76)	**2.23** (1.45-3.24)	**2.46** (1.56-3.62)
3-hr	**0.538** (0.413-0.684)	**0.633** (0.486-0.806)	**0.789** (0.604-1.01)	**0.918** (0.699-1.18)	**1.10** (0.812-1.46)	**1.23** (0.894-1.66)	**1.37** (0.972-1.91)	**1.53** (1.03-2.16)	**1.77** (1.15-2.56)	**1.96** (1.25-2.88)
6-hr	**0.339** (0.262-0.428)	**0.403** (0.312-0.510)	**0.509** (0.392-0.645)	**0.596** (0.457-0.759)	**0.717** (0.534-0.946)	**0.806** (0.591-1.08)	**0.902** (0.645-1.25)	**1.01** (0.686-1.42)	**1.18** (0.771-1.70)	**1.32** (0.845-1.93)
12-hr	**0.207** (0.161-0.259)	**0.249** (0.194-0.313)	**0.319** (0.248-0.402)	**0.378** (0.291-0.478)	**0.458** (0.343-0.601)	**0.517** (0.381-0.691)	**0.581** (0.418-0.803)	**0.657** (0.445-0.913)	**0.770** (0.503-1.10)	**0.866** (0.554-1.26)
24-hr	**0.122** (0.095-0.152)	**0.150** (0.117-0.187)	**0.195** (0.152-0.244)	**0.232** (0.180-0.292)	**0.284** (0.214-0.371)	**0.322** (0.239-0.429)	**0.364** (0.264-0.501)	**0.414** (0.282-0.572)	**0.491** (0.322-0.696)	**0.557** (0.357-0.802)
2-day	**0.069** (0.054-0.086)	**0.086** (0.068-0.107)	**0.114** (0.089-0.141)	**0.137** (0.107-0.170)	**0.168** (0.128-0.219)	**0.191** (0.143-0.254)	**0.217** (0.159-0.299)	**0.249** (0.170-0.342)	**0.299** (0.197-0.422)	**0.343** (0.221-0.491)
3-day	**0.050** (0.040-0.062)	**0.063** (0.049-0.077)	**0.083** (0.065-0.102)	**0.099** (0.078-0.124)	**0.122** (0.094-0.159)	**0.139** (0.105-0.185)	**0.158** (0.116-0.217)	**0.182** (0.124-0.248)	**0.219** (0.144-0.308)	**0.252** (0.162-0.359)
4-day	**0.041** (0.032-0.050)	**0.050** (0.040-0.062)	**0.066** (0.052-0.082)	**0.080** (0.062-0.099)	**0.098** (0.075-0.127)	**0.111** (0.084-0.147)	**0.126** (0.093-0.173)	**0.145** (0.099-0.197)	**0.174** (0.115-0.244)	**0.200** (0.129-0.284)
7-day	**0.028** (0.022-0.034)	**0.034** (0.027-0.042)	**0.044** (0.035-0.054)	**0.052** (0.041-0.064)	**0.064** (0.049-0.082)	**0.072** (0.054-0.094)	**0.081** (0.060-0.110)	**0.093** (0.064-0.126)	**0.110** (0.073-0.153)	**0.125** (0.081-0.177)
10-day	**0.023** (0.018-0.028)	**0.027** (0.022-0.033)	**0.035** (0.028-0.042)	**0.041** (0.032-0.050)	**0.049** (0.038-0.063)	**0.055** (0.042-0.072)	**0.062** (0.046-0.083)	**0.070** (0.048-0.095)	**0.082** (0.055-0.114)	**0.093** (0.060-0.131)
20-day	**0.016** (0.013-0.020)	**0.019** (0.015-0.023)	**0.023** (0.018-0.028)	**0.026** (0.021-0.032)	**0.031** (0.024-0.039)	**0.034** (0.026-0.044)	**0.038** (0.028-0.050)	**0.042** (0.029-0.056)	**0.047** (0.032-0.065)	**0.052** (0.034-0.073)
30-day	**0.013** (0.011-0.016)	**0.015** (0.012-0.018)	**0.018** (0.014-0.022)	**0.020** (0.016-0.025)	**0.024** (0.018-0.029)	**0.026** (0.020-0.033)	**0.029** (0.021-0.037)	**0.031** (0.022-0.042)	**0.035** (0.023-0.048)	**0.037** (0.024-0.052)
45-day	**0.011** (0.009-0.013)	**0.012** (0.010-0.015)	**0.014** (0.012-0.017)	**0.016** (0.013-0.019)	**0.018** (0.014-0.023)	**0.020** (0.015-0.025)	**0.022** (0.016-0.028)	**0.024** (0.016-0.031)	**0.026** (0.017-0.035)	**0.027** (0.018-0.038)
60-day	**0.010** (0.008-0.012)	**0.011** (0.009-0.013)	**0.012** (0.010-0.015)	**0.014** (0.011-0.016)	**0.015** (0.012-0.019)	**0.017** (0.013-0.021)	**0.018** (0.013-0.023)	**0.019** (0.014-0.026)	**0.021** (0.014-0.029)	**0.022** (0.014-0.031)

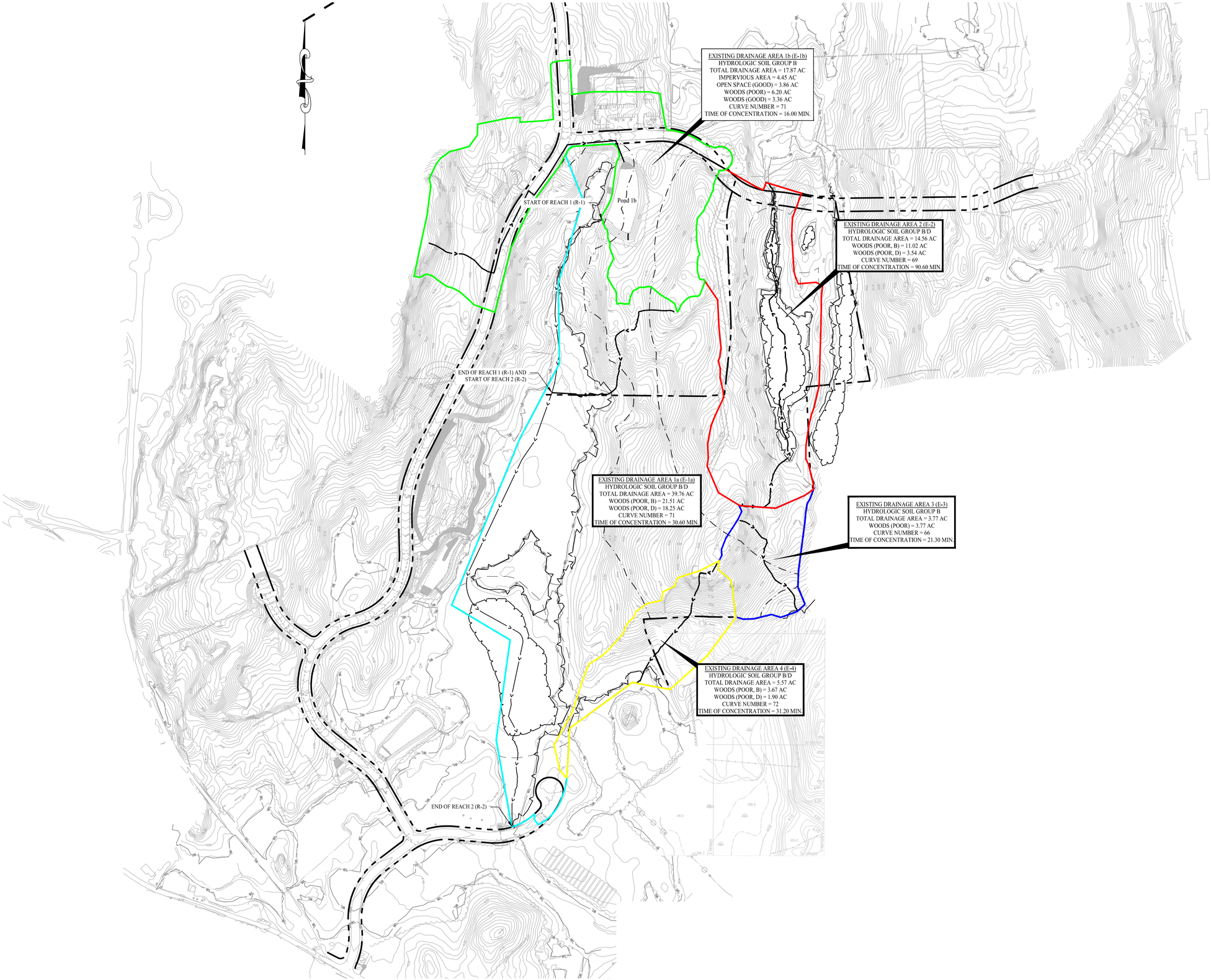
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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Existing Drainage Area Map (DA-1)



GENERAL NOTES

1. THE STORMWATER MANAGEMENT PLAN AND DESIGN IS INTENDED TO BE IN COMPLIANCE WITH THE 2000 CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT) DRAINAGE MANUAL AND THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL.
2. STORMWATER RUNOFF ANALYSIS WAS CALCULATED USING THE SCS TR-55 METHODOLOGY.

LEGEND

- PROPERTY LINE
- LIMITS OF EXISTING DRAINAGE AREA
- FLOW PATH

Rev. #:	Date	Description

Graphic Scale: 200 0 200 400

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	AWC
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 200'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE REMEDIATION

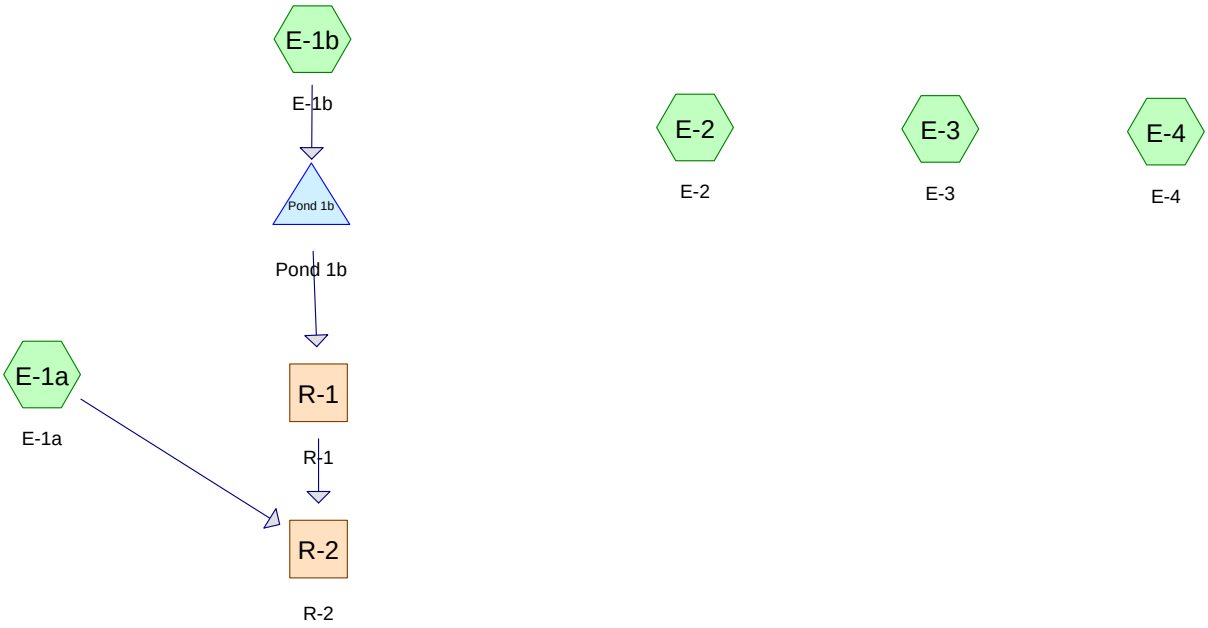
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: EXISTING DRAINAGE AREA MAP

Sheet #: DA-1

May 04, 2021 - 10:18am anthony
X:\CE Files\Project Data\2019\1903601 - 64 Cambridge Drive - Monroe\Cadd Data\LWC Remediation\1903601-DA Maps.dwg

Existing HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for 1903601 - Existing Hydrology
Prepared by Microsoft, Printed 5/5/2021
HydroCAD® 10.00-22 s/n 10621 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>1.09"
Flow Length=900' Tc=30.6 min CN=71 Runoff=34.44 cfs 3.614 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>1.10"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=23.31 cfs 1.633 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>0.96"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=4.94 cfs 1.160 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>0.83"
Flow Length=541' Tc=21.3 min CN=66 Runoff=2.90 cfs 0.260 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>1.15"
Flow Length=703' Tc=31.2 min CN=72 Runoff=5.08 cfs 0.533 af

Reach R-1: R-1 Avg. Flow Depth=0.40' Max Vel=3.39 fps Inflow=7.89 cfs 1.544 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=7.80 cfs 1.534 af

Reach R-2: R-2 Avg. Flow Depth=1.20' Max Vel=2.01 fps Inflow=40.15 cfs 5.147 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=29.60 cfs 4.998 af

Pond Pond 1b: Pond 1b Peak Elev=443.05' Storage=20,980 cf Inflow=23.31 cfs 1.633 af
Outflow=7.89 cfs 1.544 af

Summary for Subcatchment E-1a: E-1a

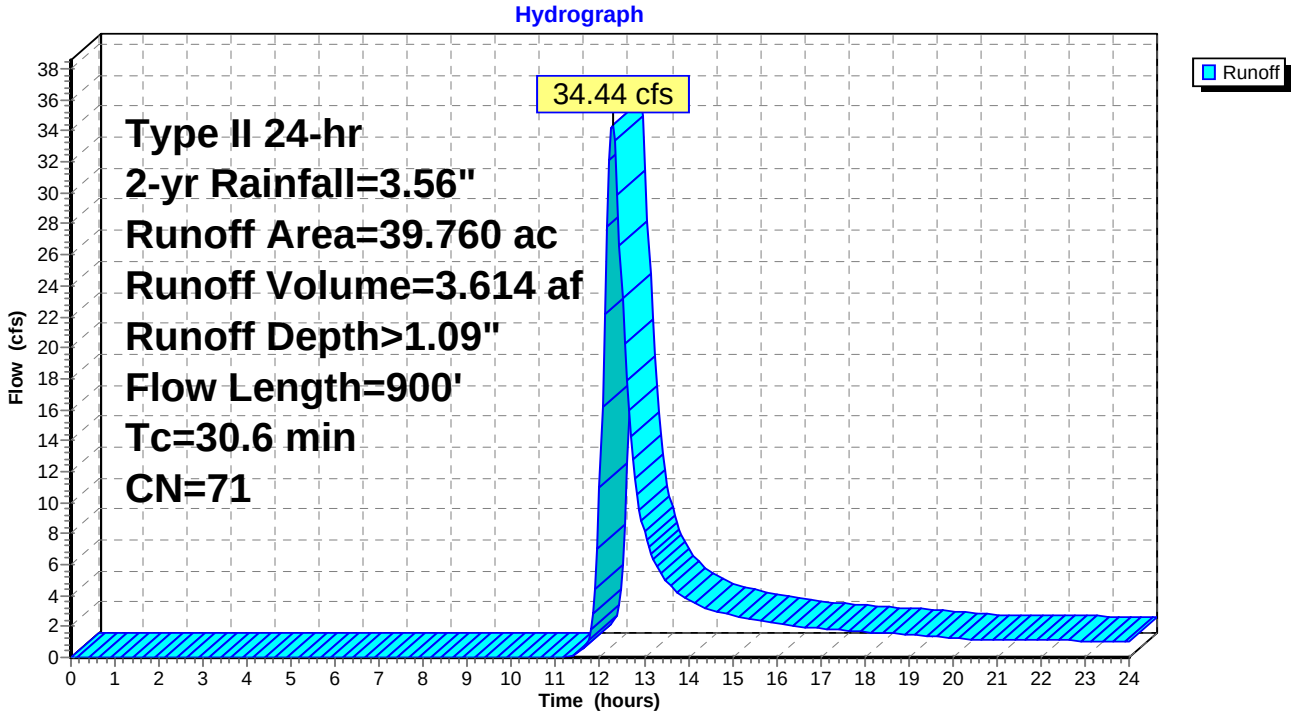
Runoff = 34.44 cfs @ 12.27 hrs, Volume= 3.614 af, Depth> 1.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

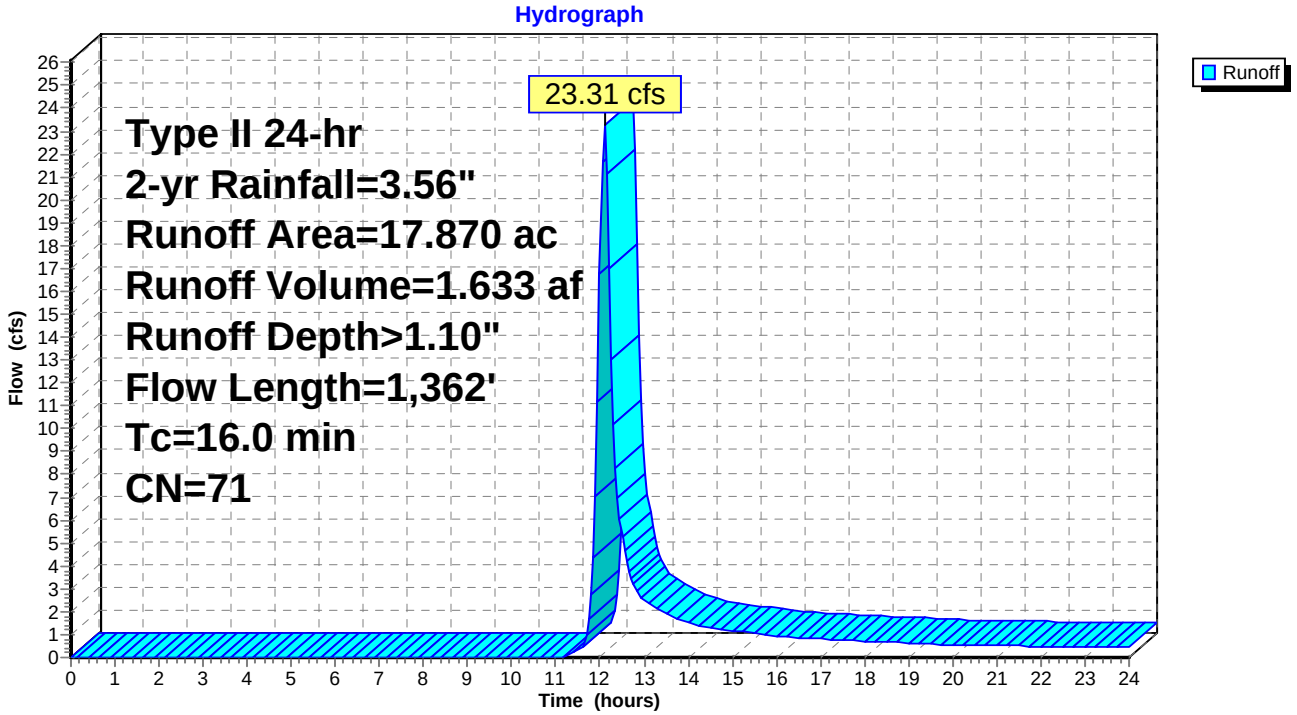
Runoff = 23.31 cfs @ 12.10 hrs, Volume= 1.633 af, Depth> 1.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

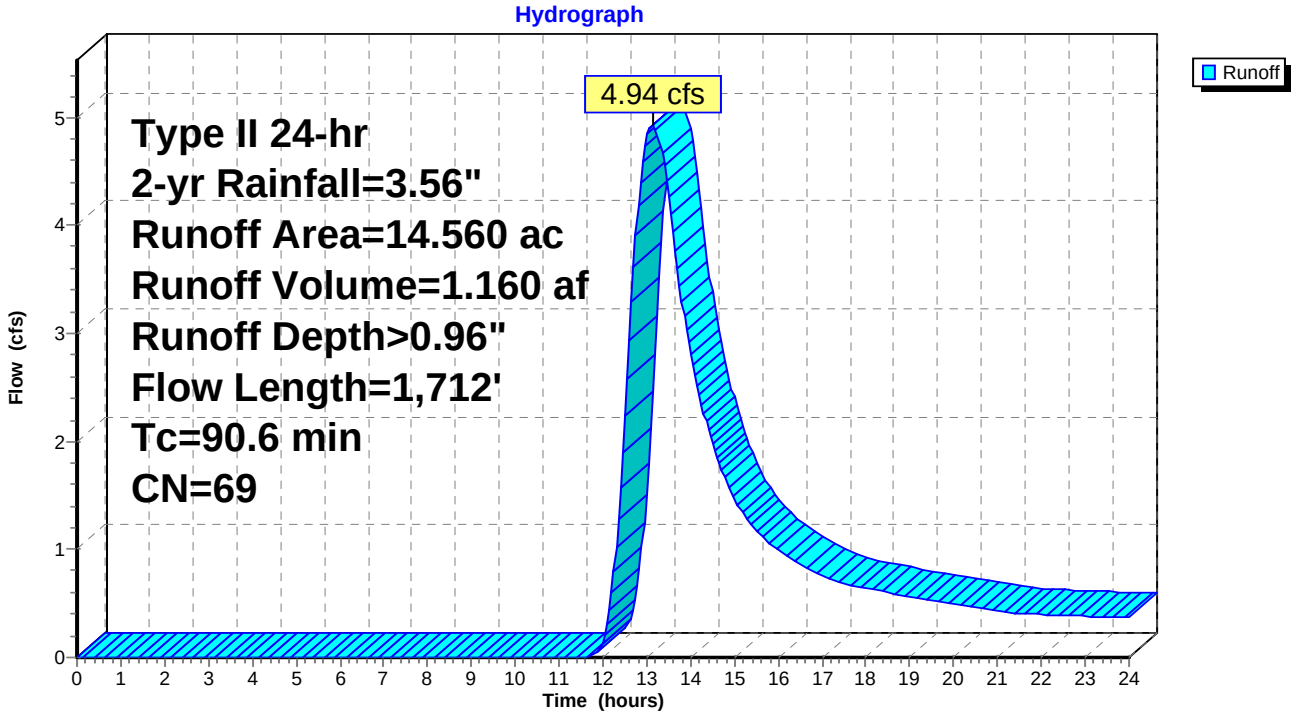
Runoff = 4.94 cfs @ 13.14 hrs, Volume= 1.160 af, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

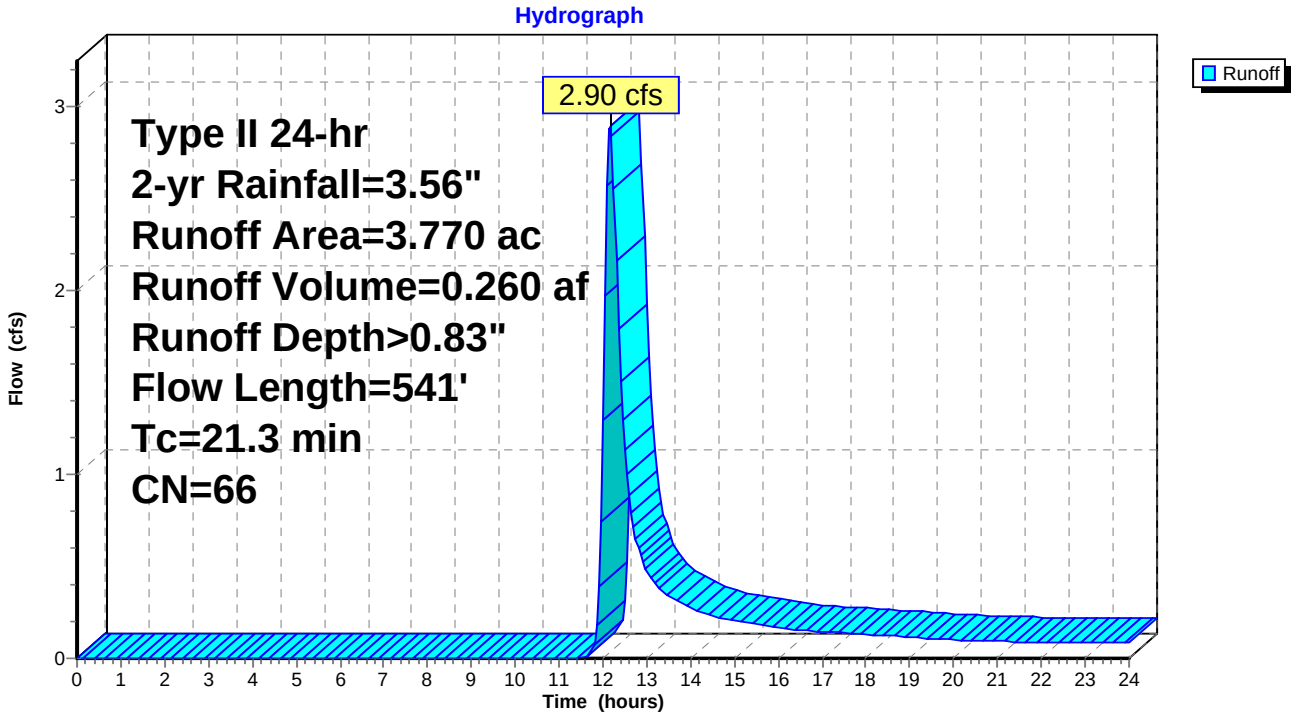
Runoff = 2.90 cfs @ 12.17 hrs, Volume= 0.260 af, Depth> 0.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

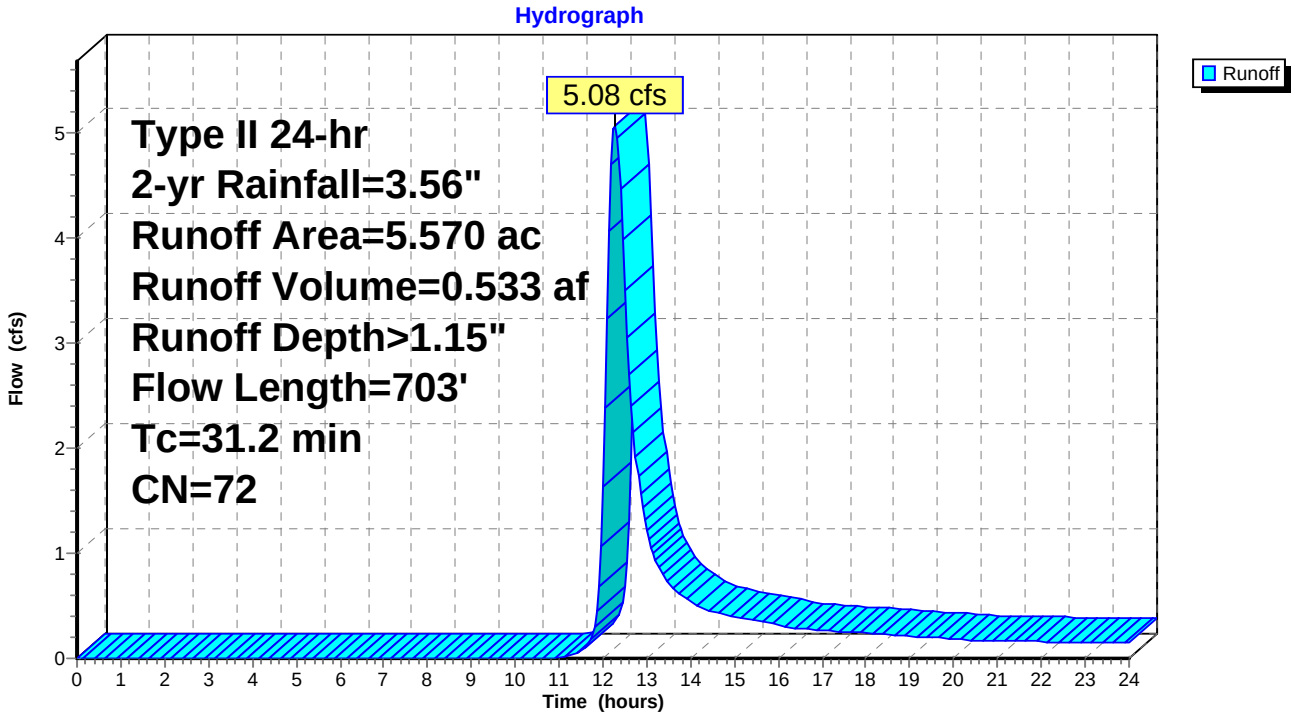
Runoff = 5.08 cfs @ 12.28 hrs, Volume= 0.533 af, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 1.04" for 2-yr event
Inflow = 7.89 cfs @ 12.37 hrs, Volume= 1.544 af
Outflow = 7.80 cfs @ 12.51 hrs, Volume= 1.534 af, Atten= 1%, Lag= 8.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.39 fps, Min. Travel Time= 4.3 min
Avg. Velocity = 1.70 fps, Avg. Travel Time= 8.6 min

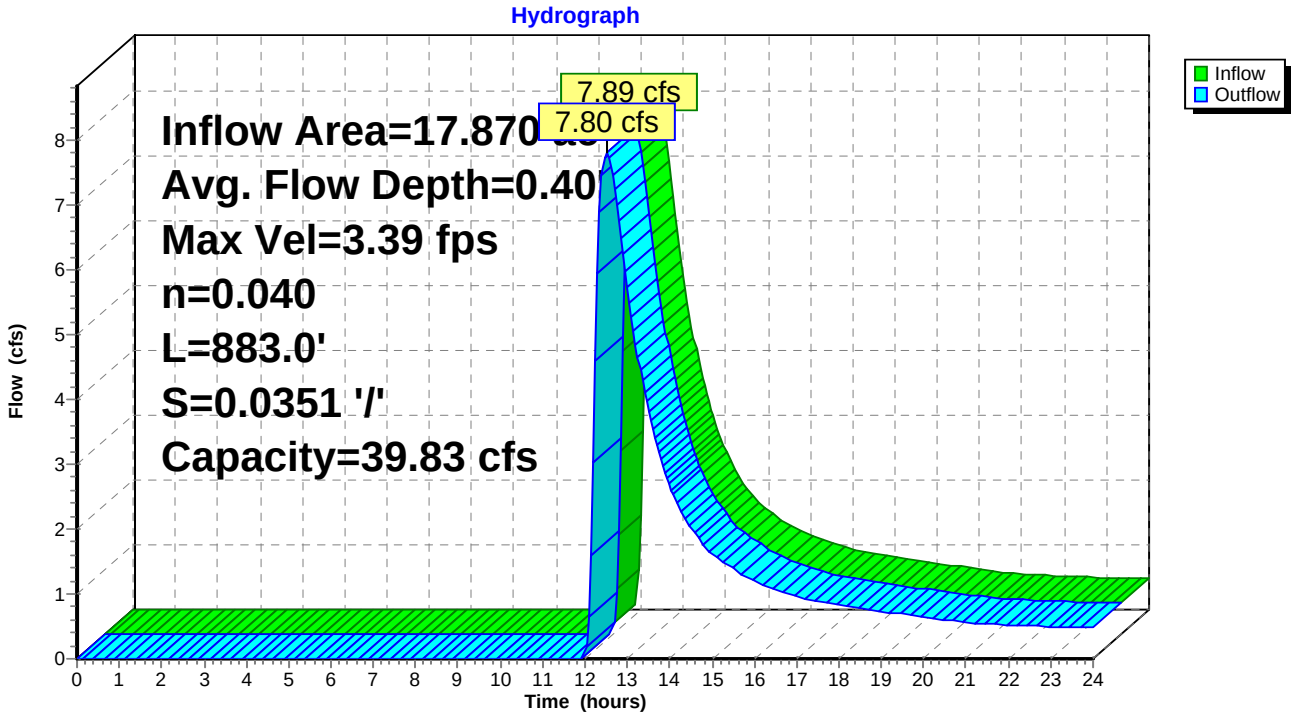
Peak Storage= 2,035 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 1.07" for 2-yr event
Inflow = 40.15 cfs @ 12.31 hrs, Volume= 5.147 af
Outflow = 29.60 cfs @ 12.83 hrs, Volume= 4.998 af, Atten= 26%, Lag= 31.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.01 fps, Min. Travel Time= 18.4 min
Avg. Velocity = 0.93 fps, Avg. Travel Time= 39.6 min

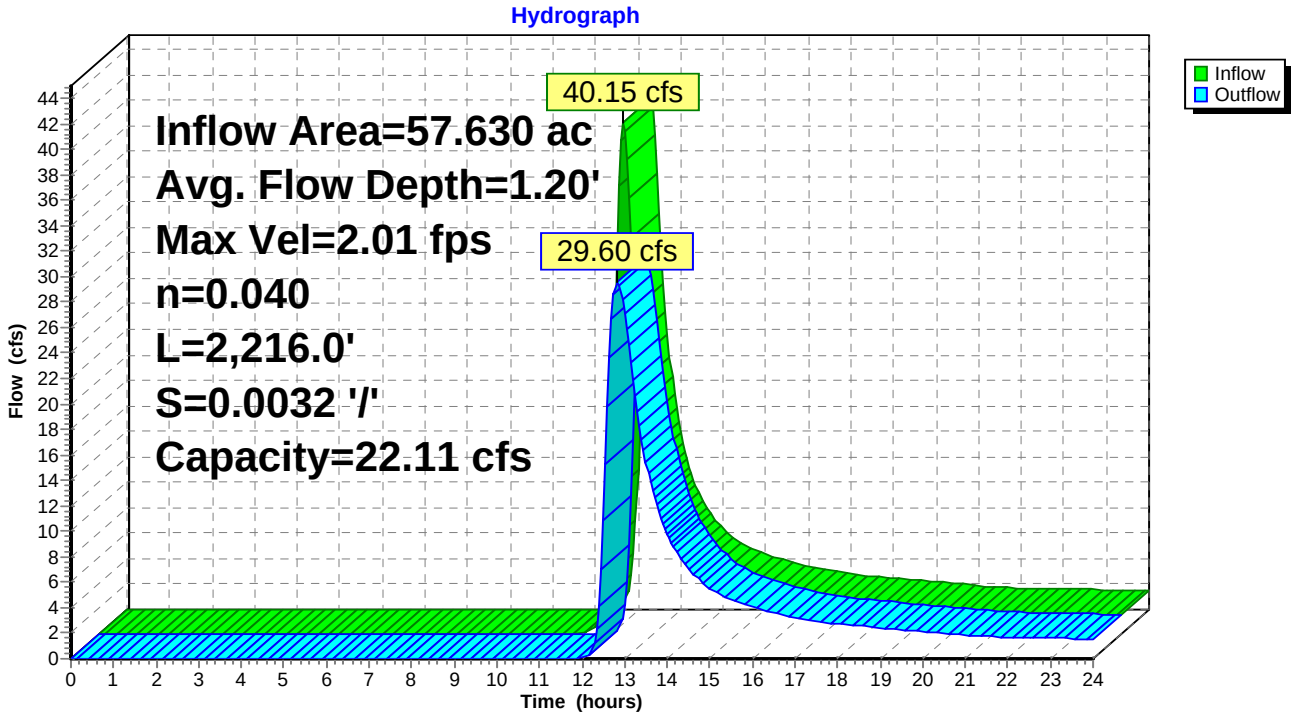
Peak Storage= 32,699 cf @ 12.52 hrs
Average Depth at Peak Storage= 1.20'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 1.10" for 2-yr event
Inflow = 23.31 cfs @ 12.10 hrs, Volume= 1.633 af
Outflow = 7.89 cfs @ 12.37 hrs, Volume= 1.544 af, Atten= 66%, Lag= 16.2 min
Primary = 7.89 cfs @ 12.37 hrs, Volume= 1.544 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.05' @ 12.37 hrs Surf.Area= 23,413 sf Storage= 20,980 cf

Plug-Flow detention time= 67.7 min calculated for 1.544 af (95% of inflow)
Center-of-Mass det. time= 38.8 min (906.7 - 867.9)

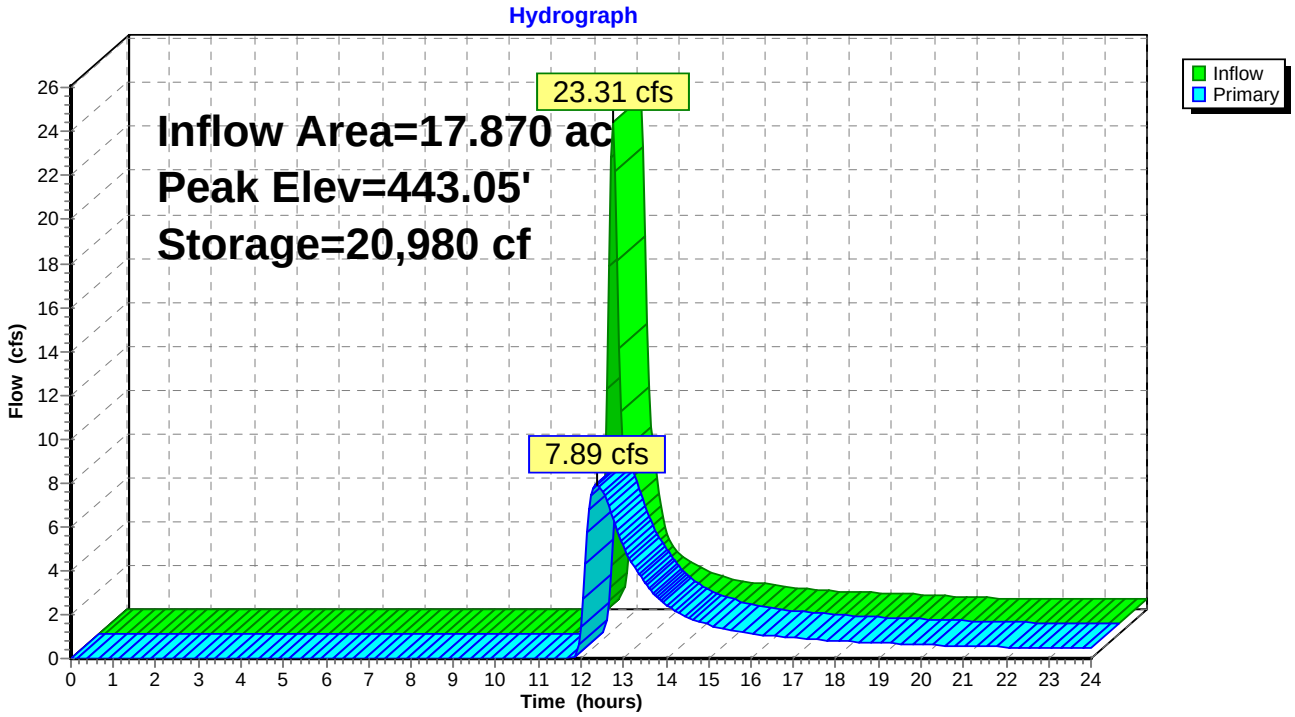
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=7.87 cfs @ 12.37 hrs HW=443.05' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 7.87 cfs @ 3.81 fps)
  └**2=Sharp-Crested Vee/Trap Weir** (Passes 7.87 cfs of 12.97 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>1.82"
Flow Length=900' Tc=30.6 min CN=71 Runoff=60.28 cfs 6.020 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>1.83"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=40.17 cfs 2.718 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>1.64"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=9.01 cfs 1.984 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>1.46"
Flow Length=541' Tc=21.3 min CN=66 Runoff=5.60 cfs 0.460 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>1.89"
Flow Length=703' Tc=31.2 min CN=72 Runoff=8.75 cfs 0.878 af

Reach R-1: R-1 Avg. Flow Depth=0.55' Max Vel=4.11 fps Inflow=13.99 cfs 2.613 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=13.92 cfs 2.599 af

Reach R-2: R-2 Avg. Flow Depth=1.86' Max Vel=2.29 fps Inflow=72.15 cfs 8.619 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=55.05 cfs 8.428 af

Pond Pond 1b: Pond 1b Peak Elev=443.64' Storage=36,914 cf Inflow=40.17 cfs 2.718 af
Outflow=13.99 cfs 2.613 af

Summary for Subcatchment E-1a: E-1a

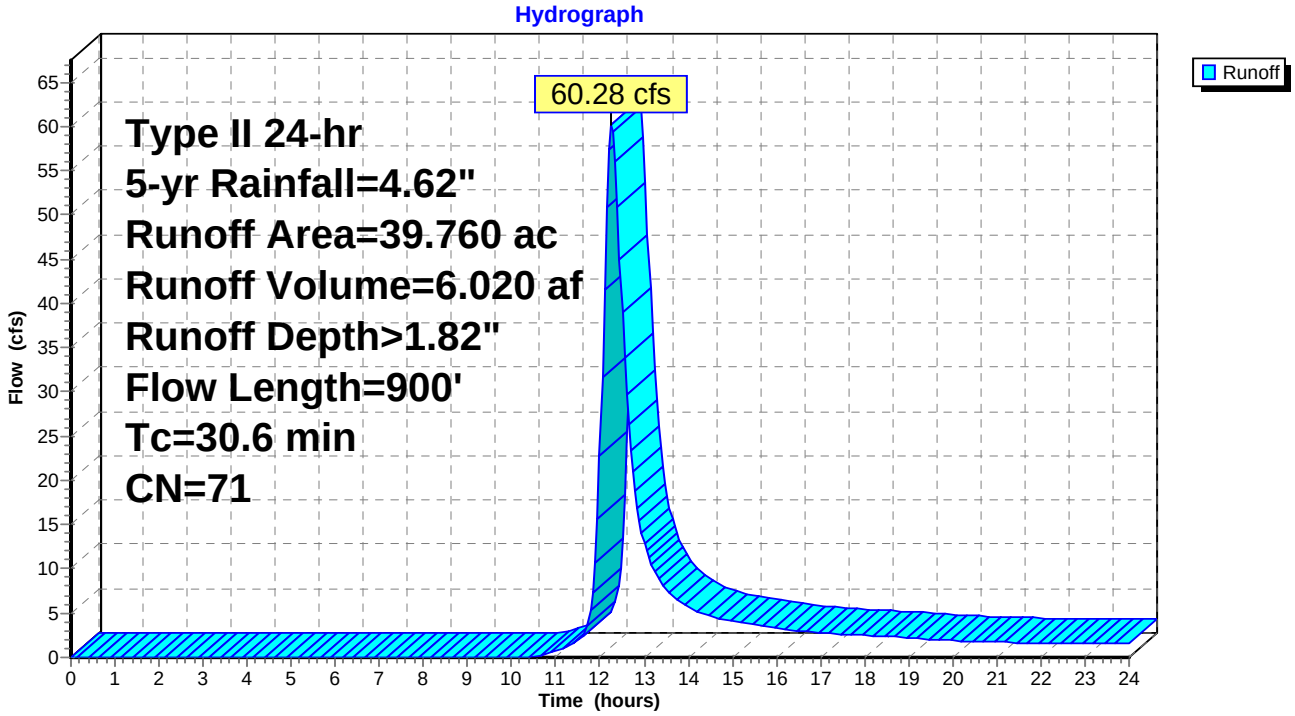
Runoff = 60.28 cfs @ 12.26 hrs, Volume= 6.020 af, Depth> 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

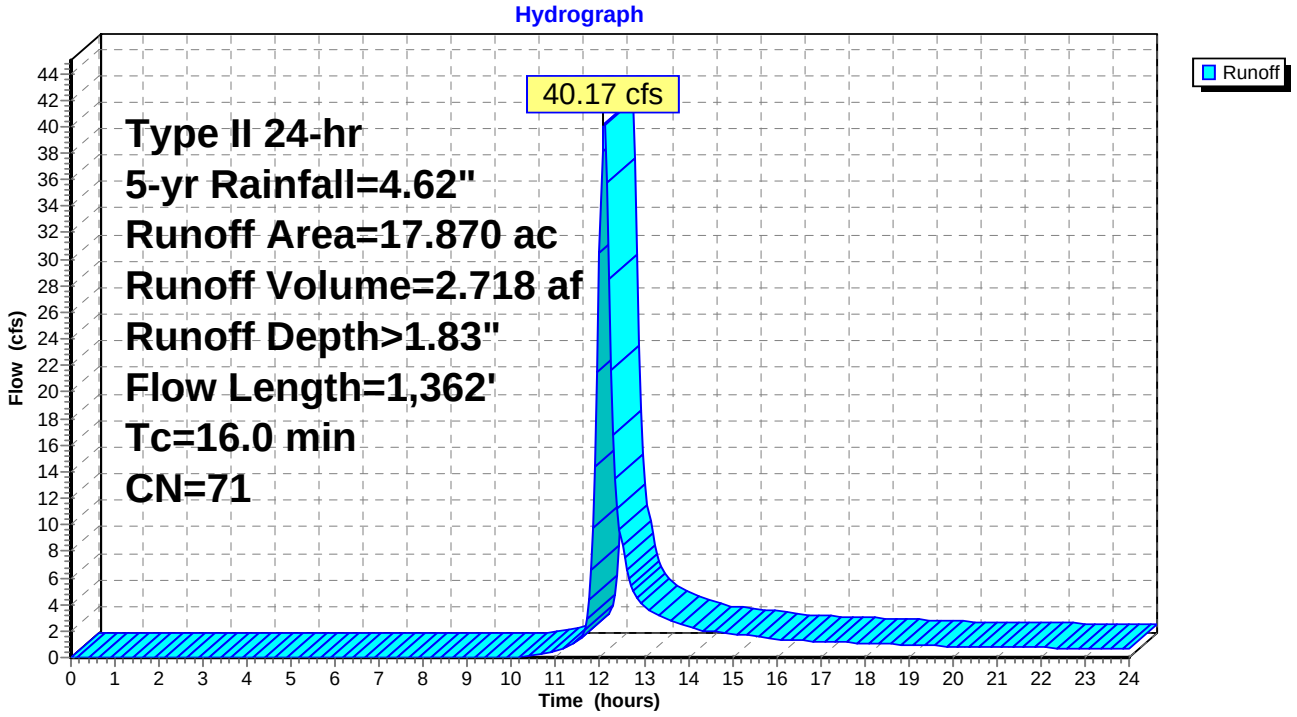
Runoff = 40.17 cfs @ 12.09 hrs, Volume= 2.718 af, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

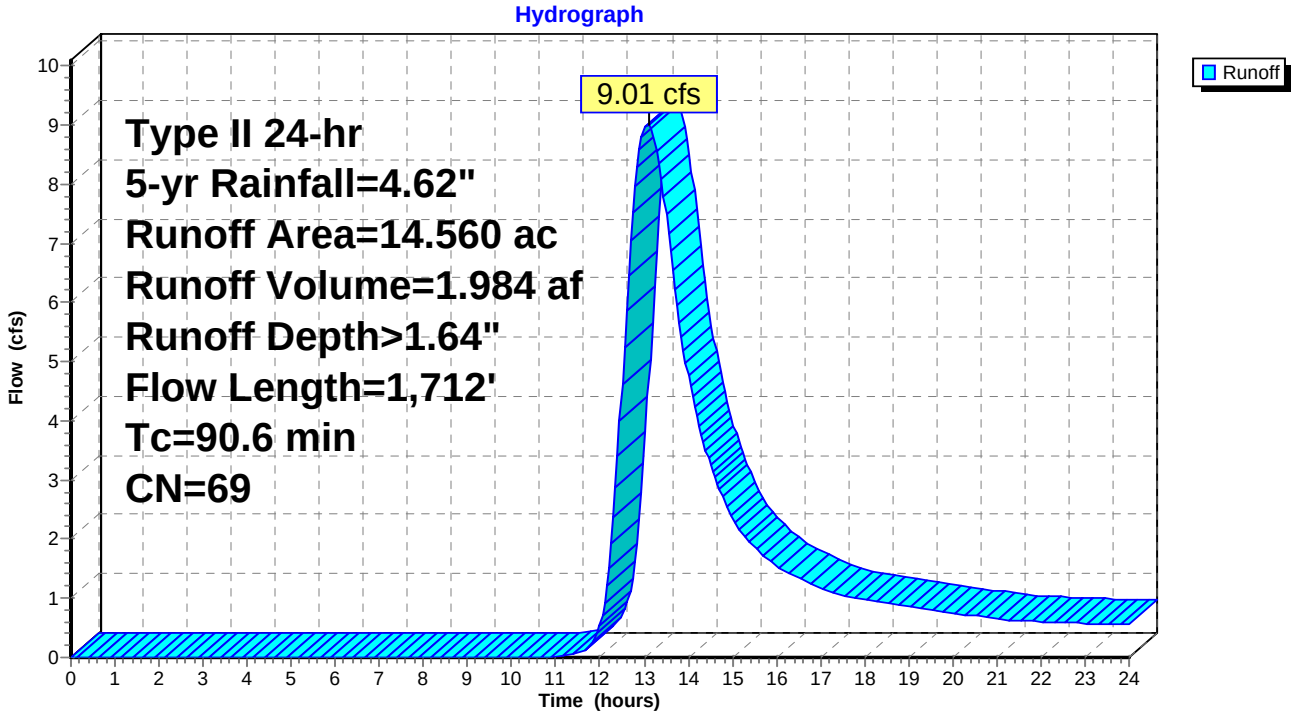
Runoff = 9.01 cfs @ 13.09 hrs, Volume= 1.984 af, Depth> 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

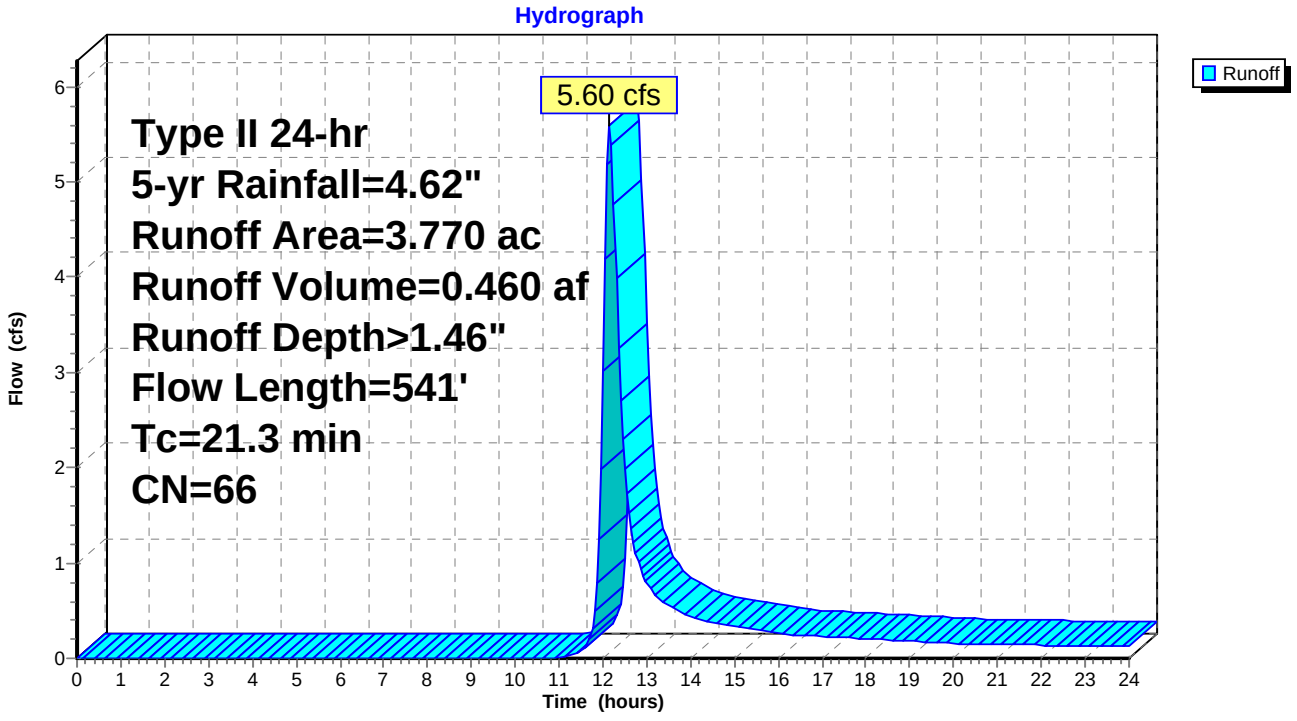
Runoff = 5.60 cfs @ 12.16 hrs, Volume= 0.460 af, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

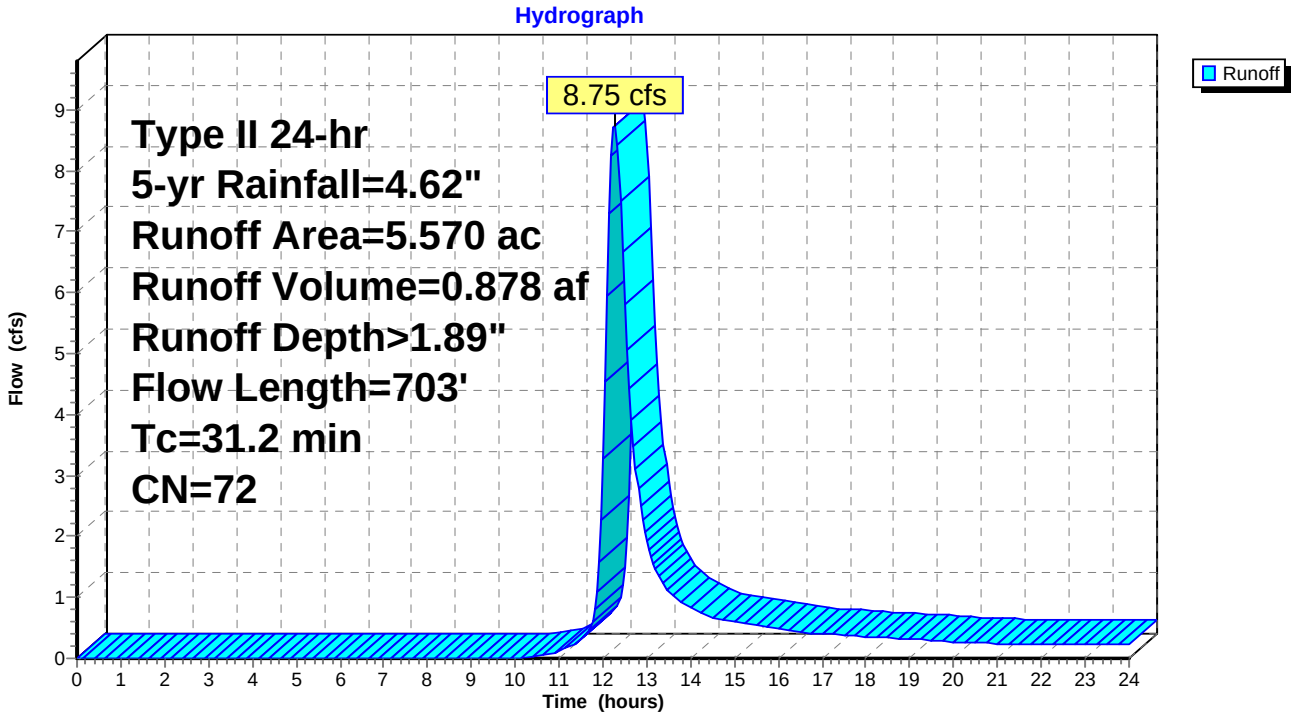
Runoff = 8.75 cfs @ 12.27 hrs, Volume= 0.878 af, Depth> 1.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 1.75" for 5-yr event
Inflow = 13.99 cfs @ 12.35 hrs, Volume= 2.613 af
Outflow = 13.92 cfs @ 12.46 hrs, Volume= 2.599 af, Atten= 1%, Lag= 6.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.11 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.97 fps, Avg. Travel Time= 7.5 min

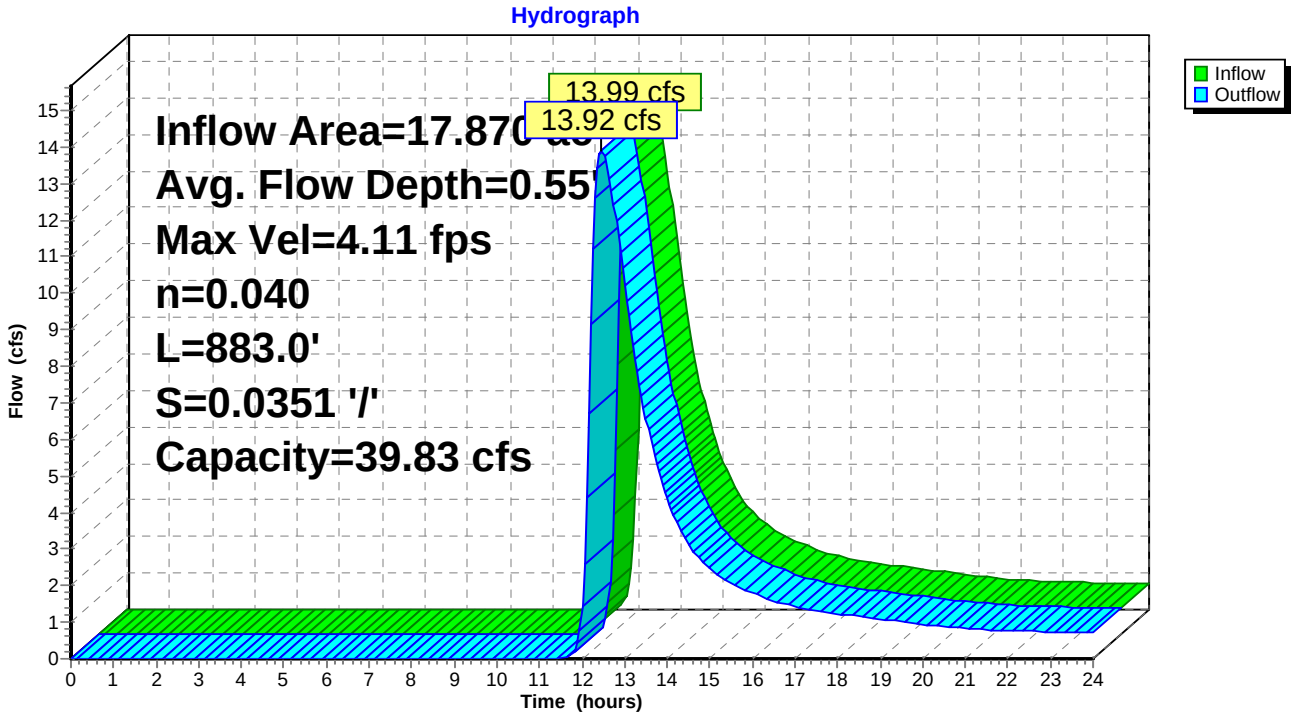
Peak Storage= 2,994 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.55'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 1.79" for 5-yr event
Inflow = 72.15 cfs @ 12.29 hrs, Volume= 8.619 af
Outflow = 55.05 cfs @ 12.75 hrs, Volume= 8.428 af, Atten= 24%, Lag= 28.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.29 fps, Min. Travel Time= 16.1 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 35.5 min

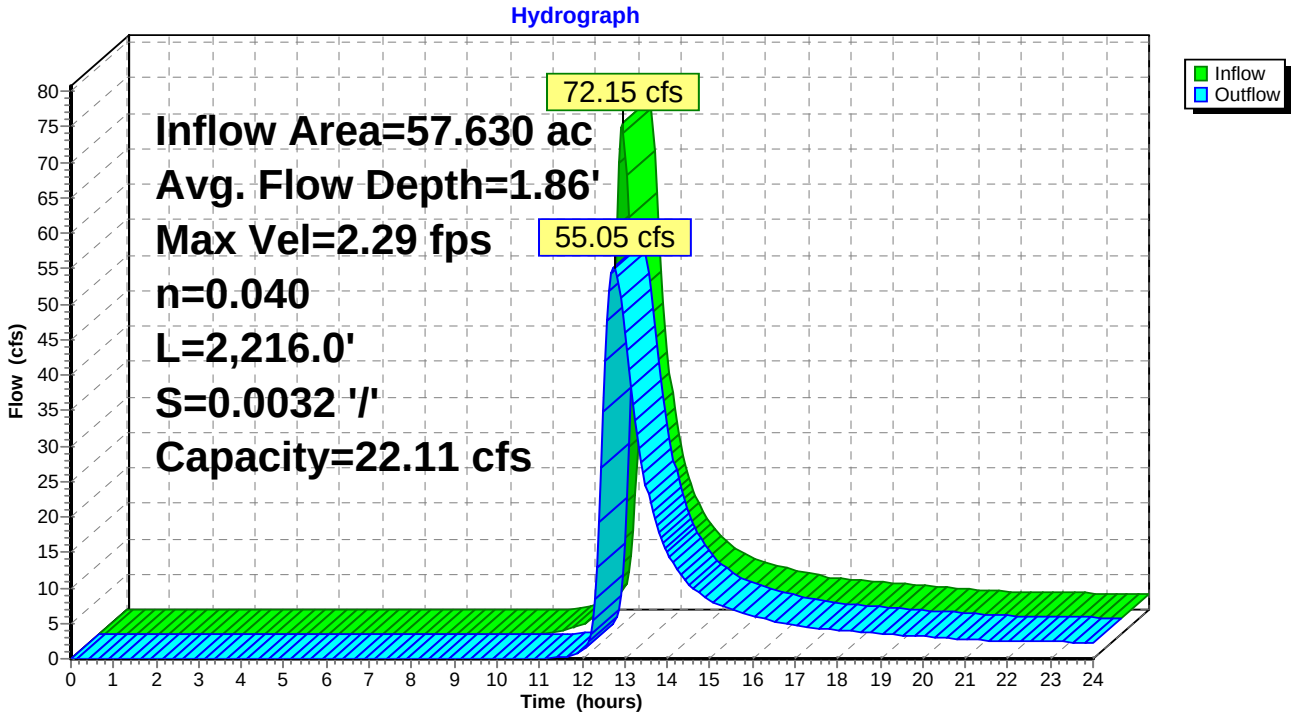
Peak Storage= 53,349 cf @ 12.48 hrs
Average Depth at Peak Storage= 1.86'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 1.83" for 5-yr event
Inflow = 40.17 cfs @ 12.09 hrs, Volume= 2.718 af
Outflow = 13.99 cfs @ 12.35 hrs, Volume= 2.613 af, Atten= 65%, Lag= 15.3 min
Primary = 13.99 cfs @ 12.35 hrs, Volume= 2.613 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.64' @ 12.35 hrs Surf.Area= 30,511 sf Storage= 36,914 cf

Plug-Flow detention time= 57.5 min calculated for 2.607 af (96% of inflow)
Center-of-Mass det. time= 36.1 min (888.7 - 852.6)

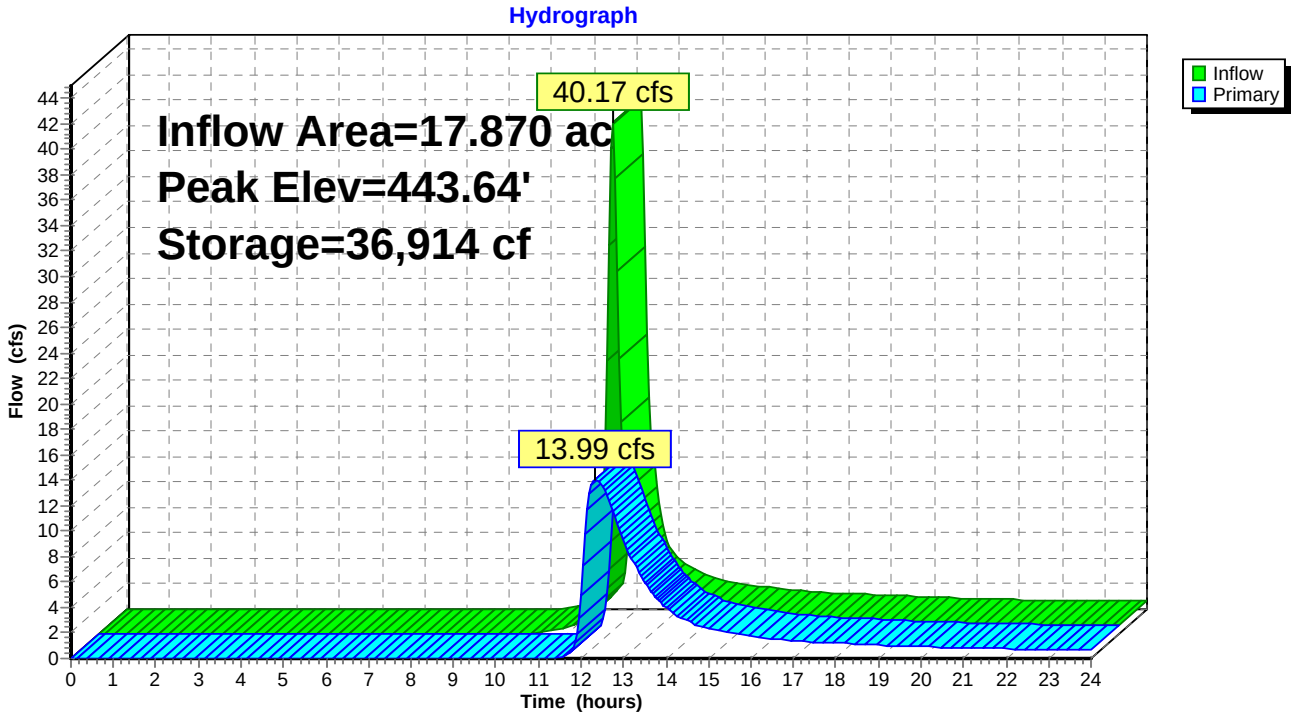
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=13.99 cfs @ 12.35 hrs HW=443.64' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 13.99 cfs @ 4.62 fps)
  └**2=Sharp-Crested Vee/Trap Weir** (Passes 13.99 cfs of 22.78 cfs potential flow)
  └**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>2.48"
Flow Length=900' Tc=30.6 min CN=71 Runoff=83.71 cfs 8.217 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>2.49"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=55.38 cfs 3.709 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>2.26"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=12.80 cfs 2.746 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>2.06"
Flow Length=541' Tc=21.3 min CN=66 Runoff=8.12 cfs 0.648 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>2.57"
Flow Length=703' Tc=31.2 min CN=72 Runoff=12.05 cfs 1.192 af

Reach R-1: R-1 Avg. Flow Depth=0.63' Max Vel=4.41 fps Inflow=17.45 cfs 3.591 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=17.41 cfs 3.575 af

Reach R-2: R-2 Avg. Flow Depth=2.43' Max Vel=2.40 fps Inflow=99.36 cfs 11.792 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=76.72 cfs 11.567 af

Pond Pond 1b: Pond 1b Peak Elev=444.13' Storage=53,139 cf Inflow=55.38 cfs 3.709 af
Outflow=17.45 cfs 3.591 af

Summary for Subcatchment E-1a: E-1a

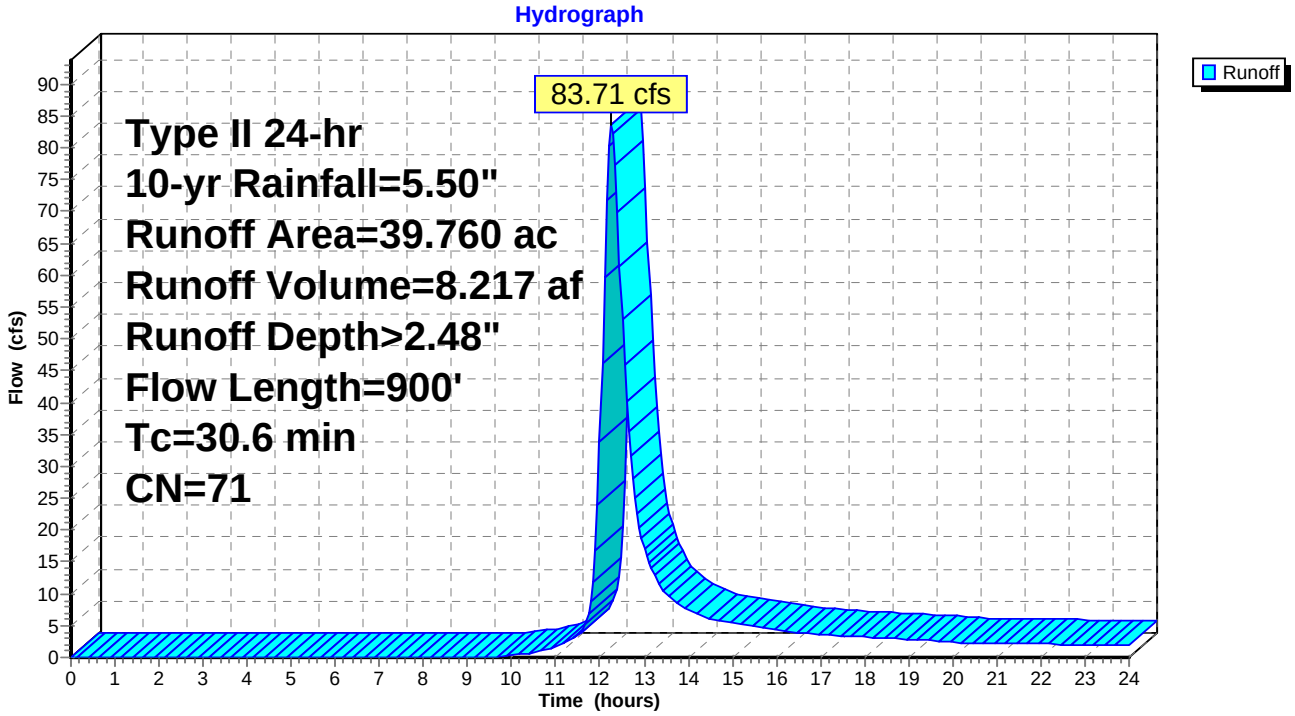
Runoff = 83.71 cfs @ 12.26 hrs, Volume= 8.217 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

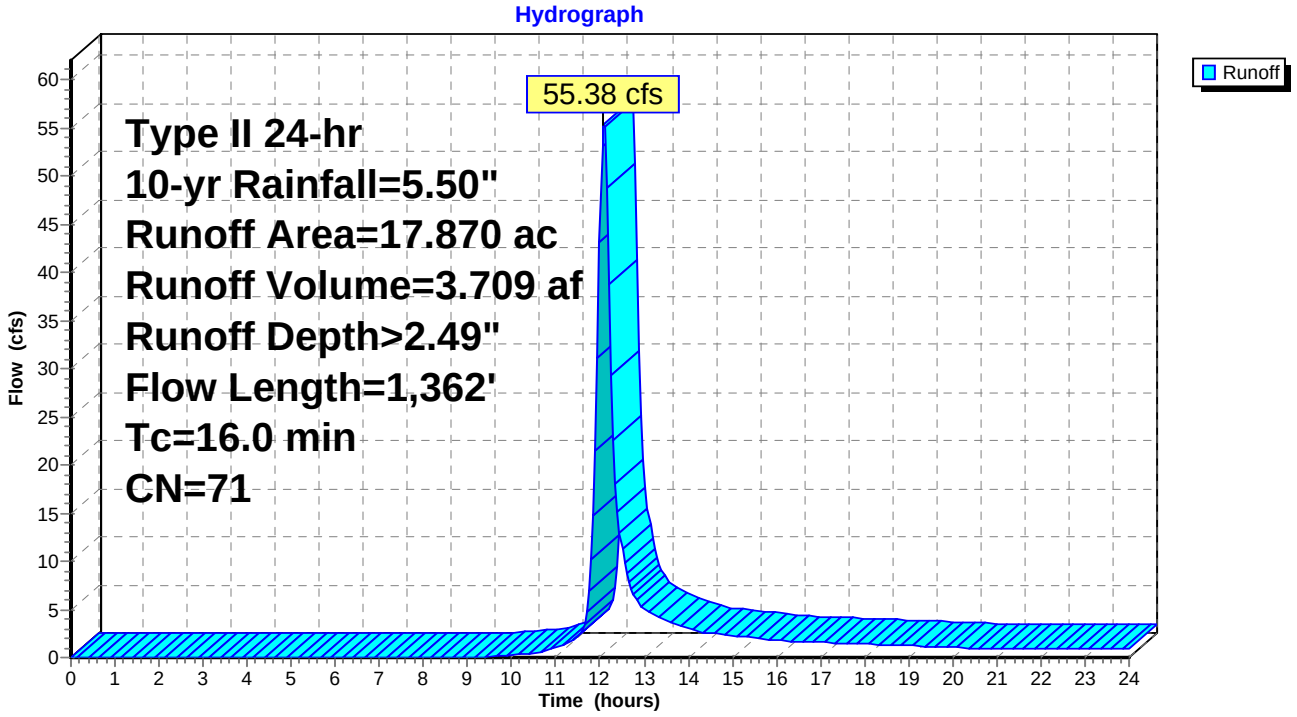
Runoff = 55.38 cfs @ 12.09 hrs, Volume= 3.709 af, Depth> 2.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

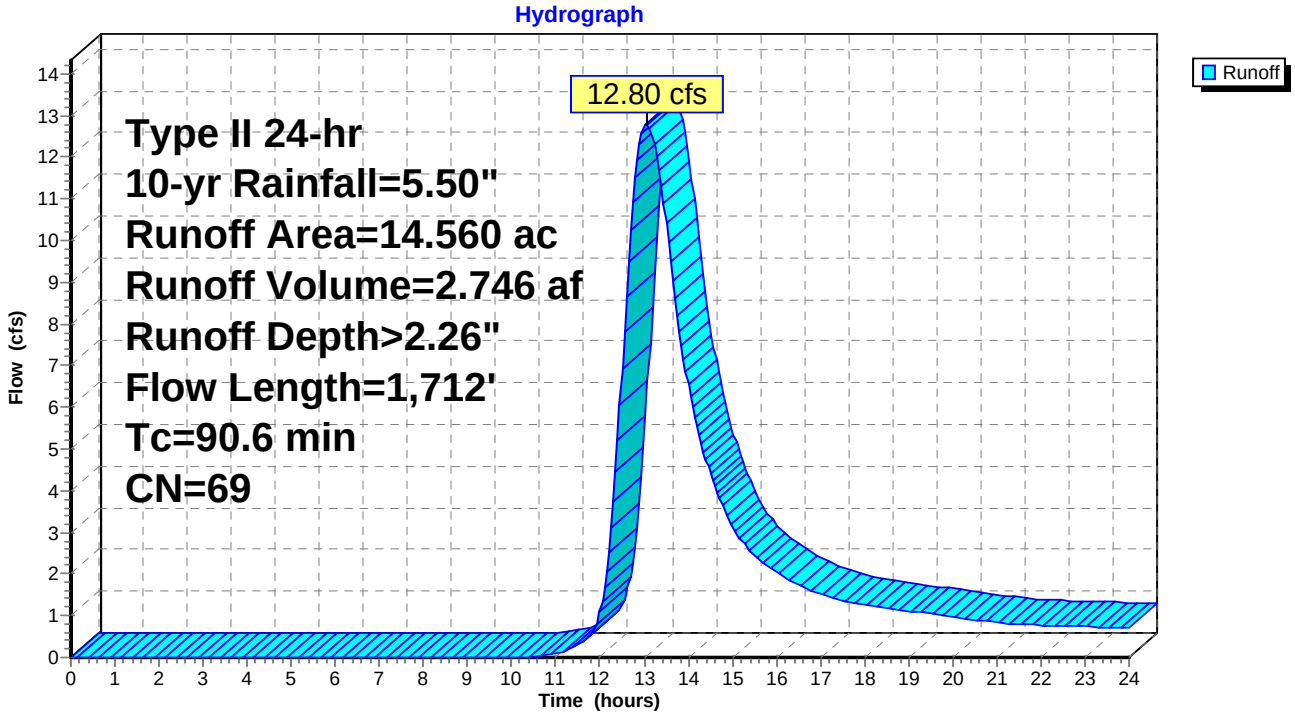
Runoff = 12.80 cfs @ 13.06 hrs, Volume= 2.746 af, Depth> 2.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

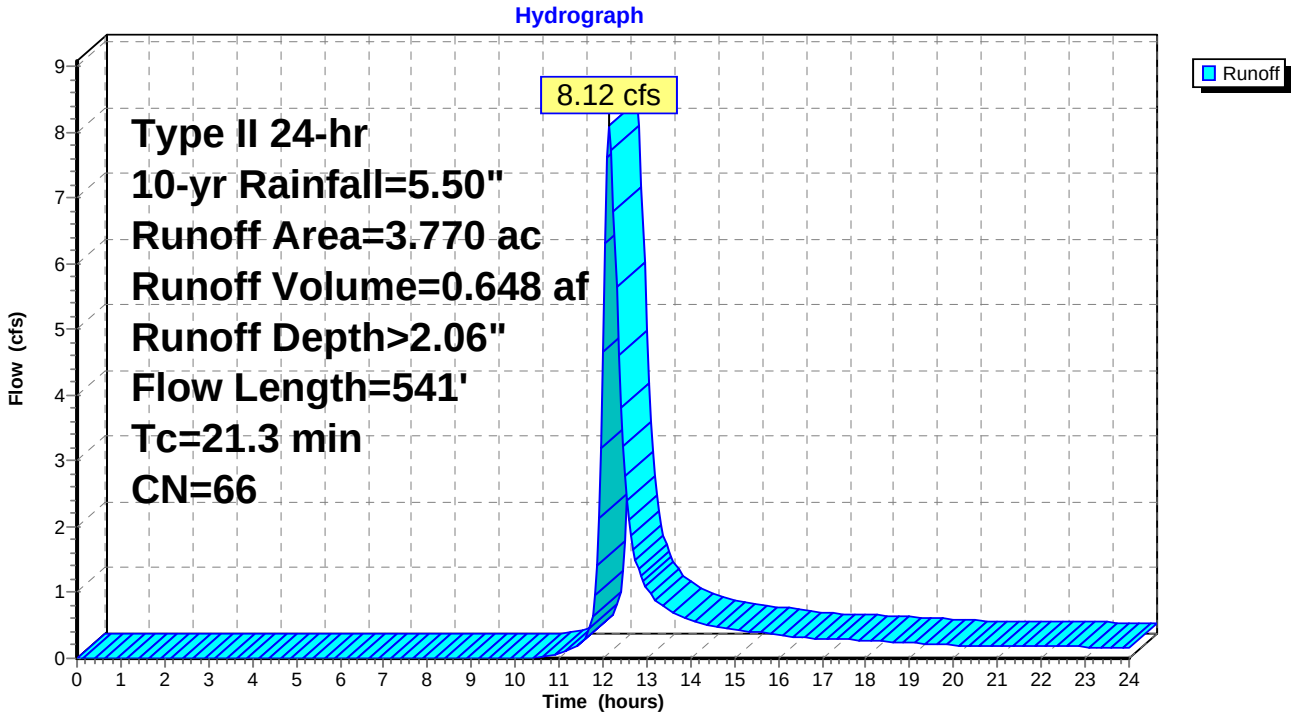
Runoff = 8.12 cfs @ 12.15 hrs, Volume= 0.648 af, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

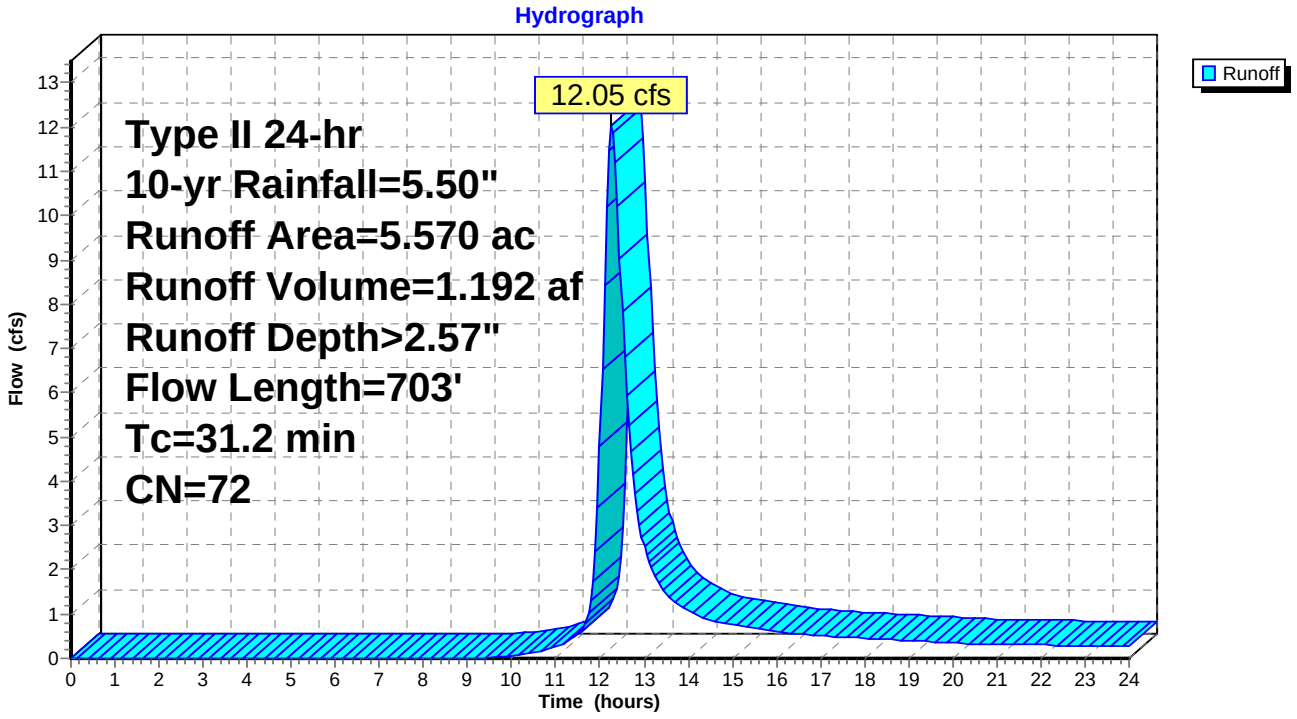
Runoff = 12.05 cfs @ 12.27 hrs, Volume= 1.192 af, Depth> 2.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 2.41" for 10-yr event
Inflow = 17.45 cfs @ 12.36 hrs, Volume= 3.591 af
Outflow = 17.41 cfs @ 12.47 hrs, Volume= 3.575 af, Atten= 0%, Lag= 6.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.41 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 2.13 fps, Avg. Travel Time= 6.9 min

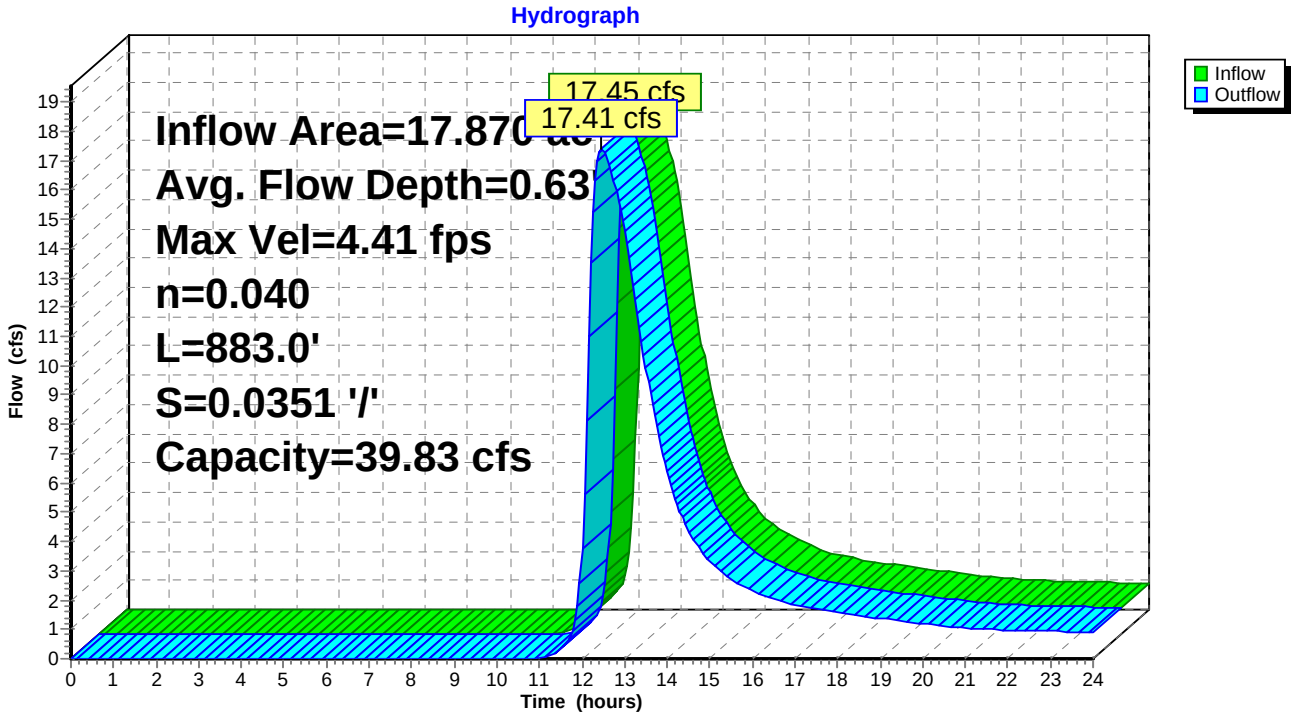
Peak Storage= 3,485 cf @ 12.41 hrs
Average Depth at Peak Storage= 0.63'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 2.46" for 10-yr event
Inflow = 99.36 cfs @ 12.27 hrs, Volume= 11.792 af
Outflow = 76.72 cfs @ 12.72 hrs, Volume= 11.567 af, Atten= 23%, Lag= 26.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 15.4 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 33.3 min

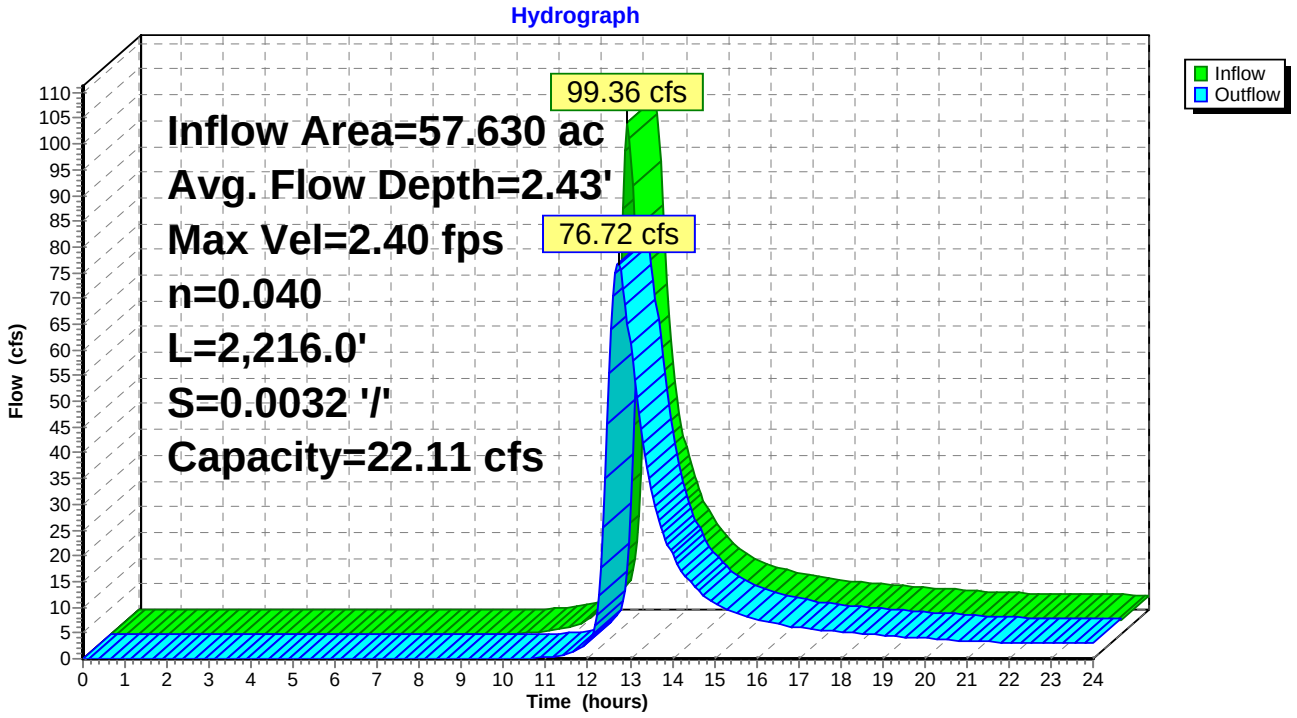
Peak Storage= 70,851 cf @ 12.46 hrs
Average Depth at Peak Storage= 2.43'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 2.49" for 10-yr event
Inflow = 55.38 cfs @ 12.09 hrs, Volume= 3.709 af
Outflow = 17.45 cfs @ 12.36 hrs, Volume= 3.591 af, Atten= 68%, Lag= 16.6 min
Primary = 17.45 cfs @ 12.36 hrs, Volume= 3.591 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.13' @ 12.36 hrs Surf.Area= 35,015 sf Storage= 53,139 cf

Plug-Flow detention time= 55.3 min calculated for 3.583 af (97% of inflow)
Center-of-Mass det. time= 37.3 min (880.9 - 843.6)

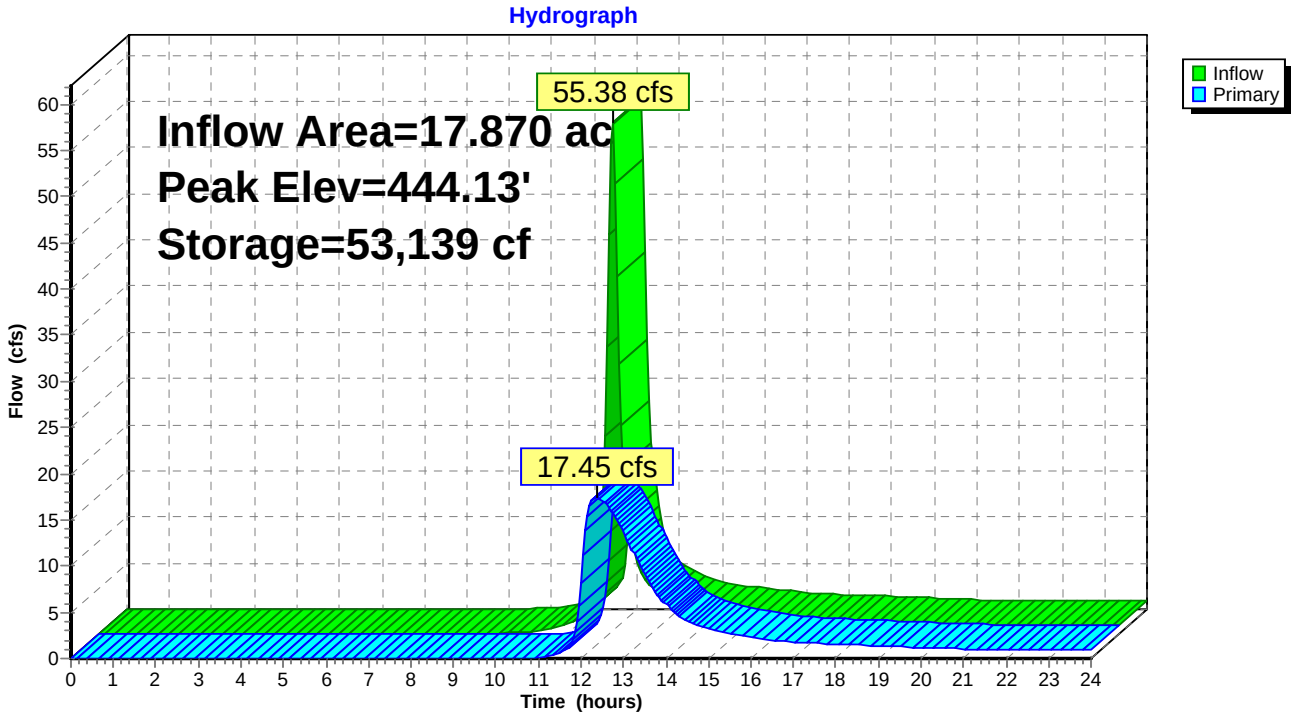
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=17.44 cfs @ 12.36 hrs HW=444.13' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 17.44 cfs @ 5.55 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes 17.44 cfs of 32.59 cfs potential flow)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>3.45"
Flow Length=900' Tc=30.6 min CN=71 Runoff=117.77 cfs 11.440 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>3.47"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=77.39 cfs 5.163 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>3.19"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=18.42 cfs 3.874 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>2.96"
Flow Length=541' Tc=21.3 min CN=66 Runoff=11.86 cfs 0.930 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>3.55"
Flow Length=703' Tc=31.2 min CN=72 Runoff=16.82 cfs 1.650 af

Reach R-1: R-1 Avg. Flow Depth=0.71' Max Vel=4.72 fps Inflow=21.58 cfs 5.027 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=21.55 cfs 5.009 af

Reach R-2: R-2 Avg. Flow Depth=3.22' Max Vel=2.49 fps Inflow=137.23 cfs 16.449 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=106.97 cfs 16.180 af

Pond Pond 1b: Pond 1b Peak Elev=444.84' Storage=78,237 cf Inflow=77.39 cfs 5.163 af
Outflow=21.58 cfs 5.027 af

Summary for Subcatchment E-1a: E-1a

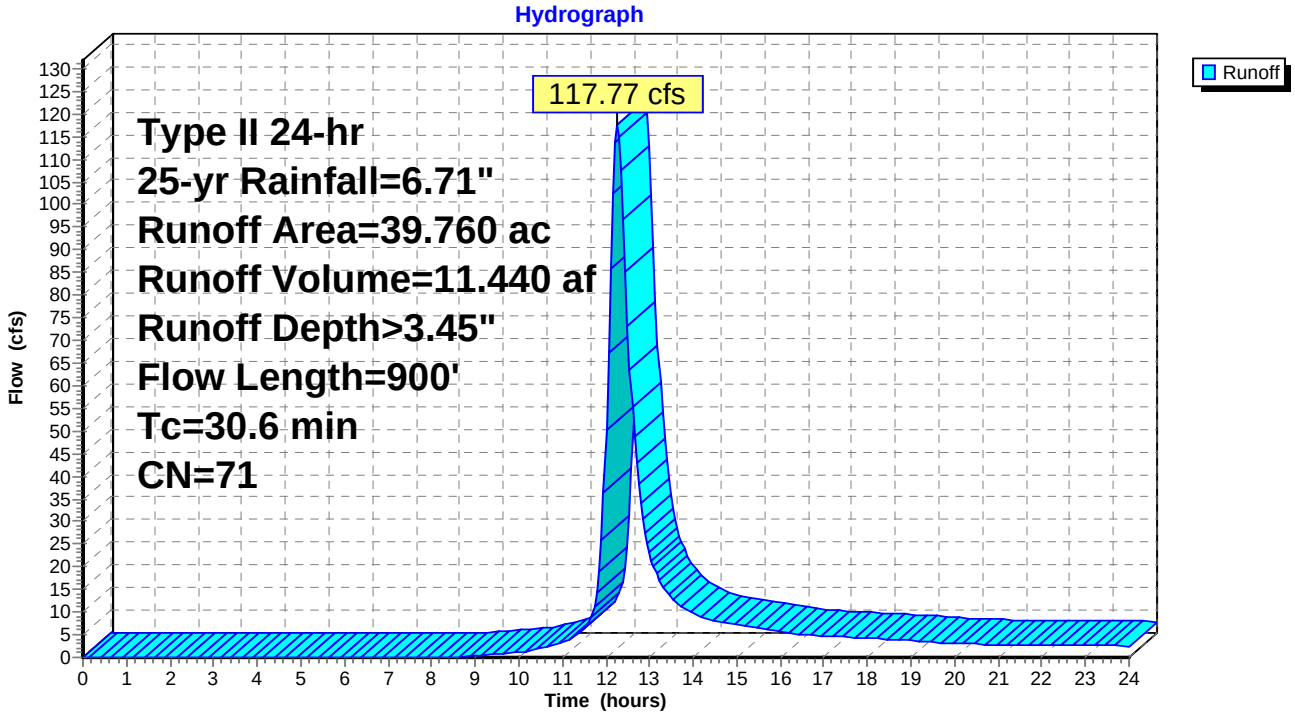
Runoff = 117.77 cfs @ 12.25 hrs, Volume= 11.440 af, Depth> 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

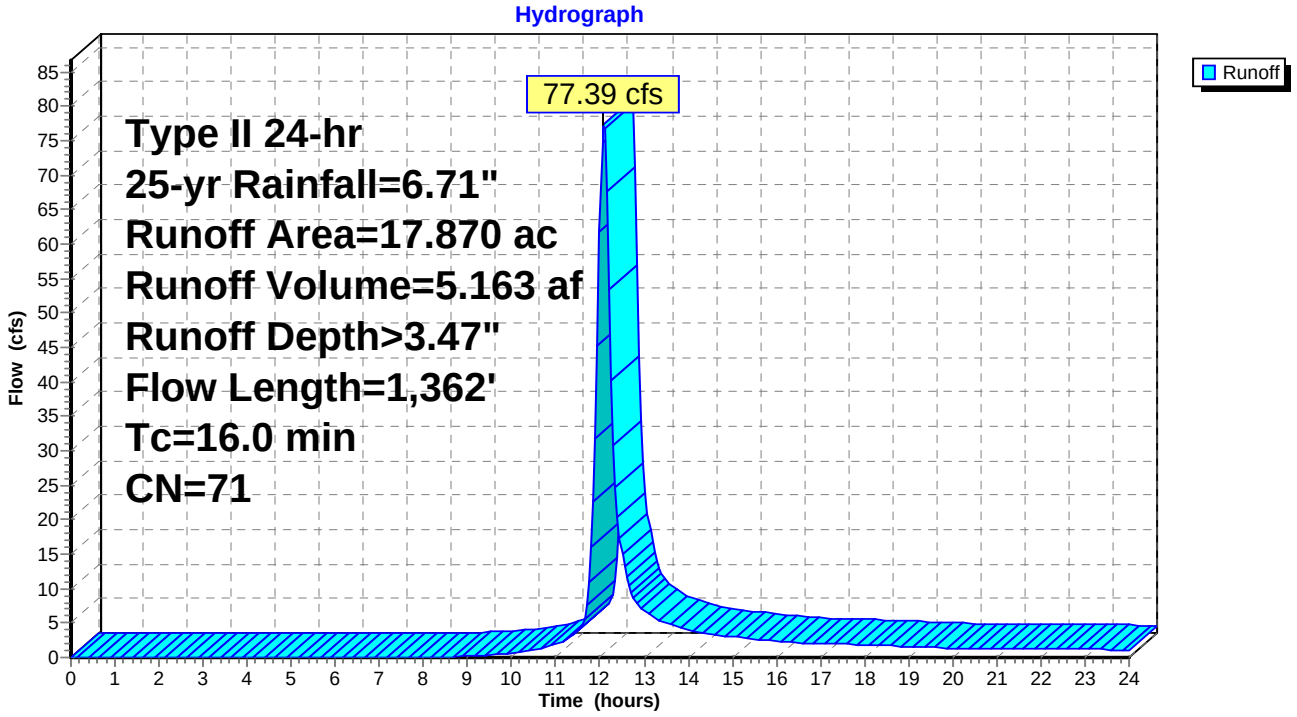
Runoff = 77.39 cfs @ 12.08 hrs, Volume= 5.163 af, Depth> 3.47"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

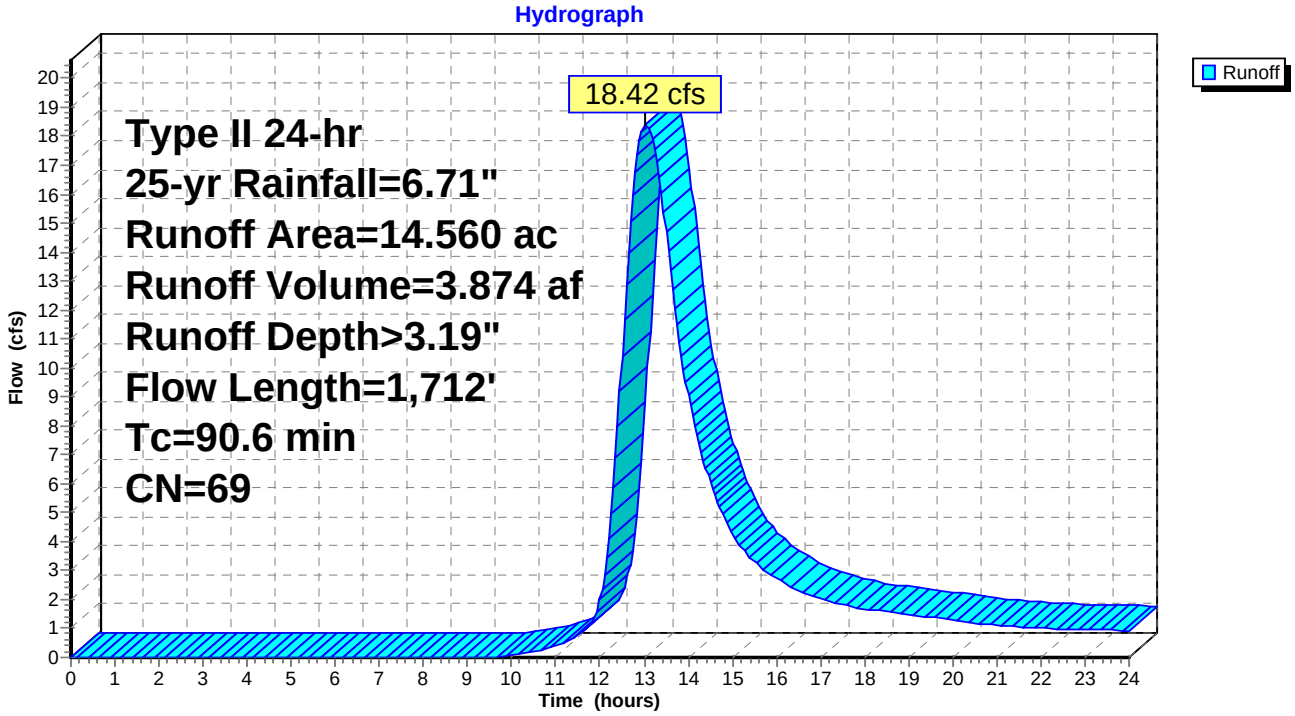
Runoff = 18.42 cfs @ 13.02 hrs, Volume= 3.874 af, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

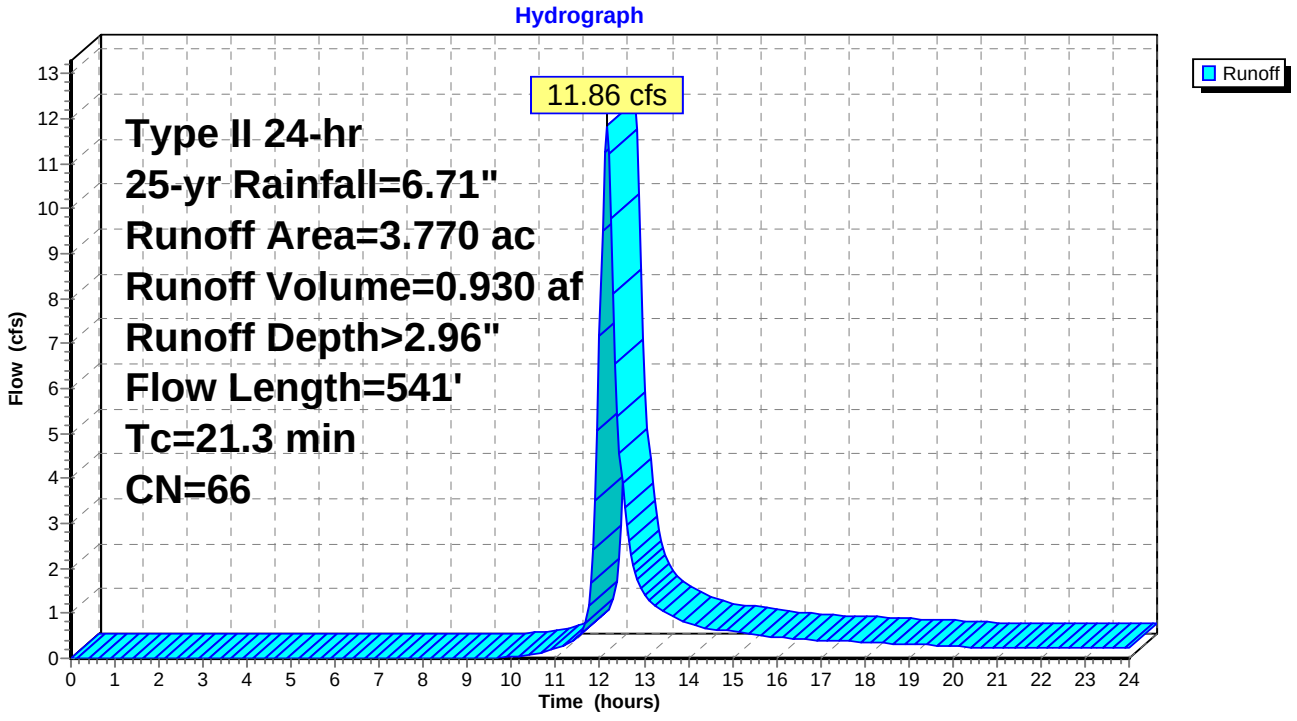
Runoff = 11.86 cfs @ 12.15 hrs, Volume= 0.930 af, Depth> 2.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

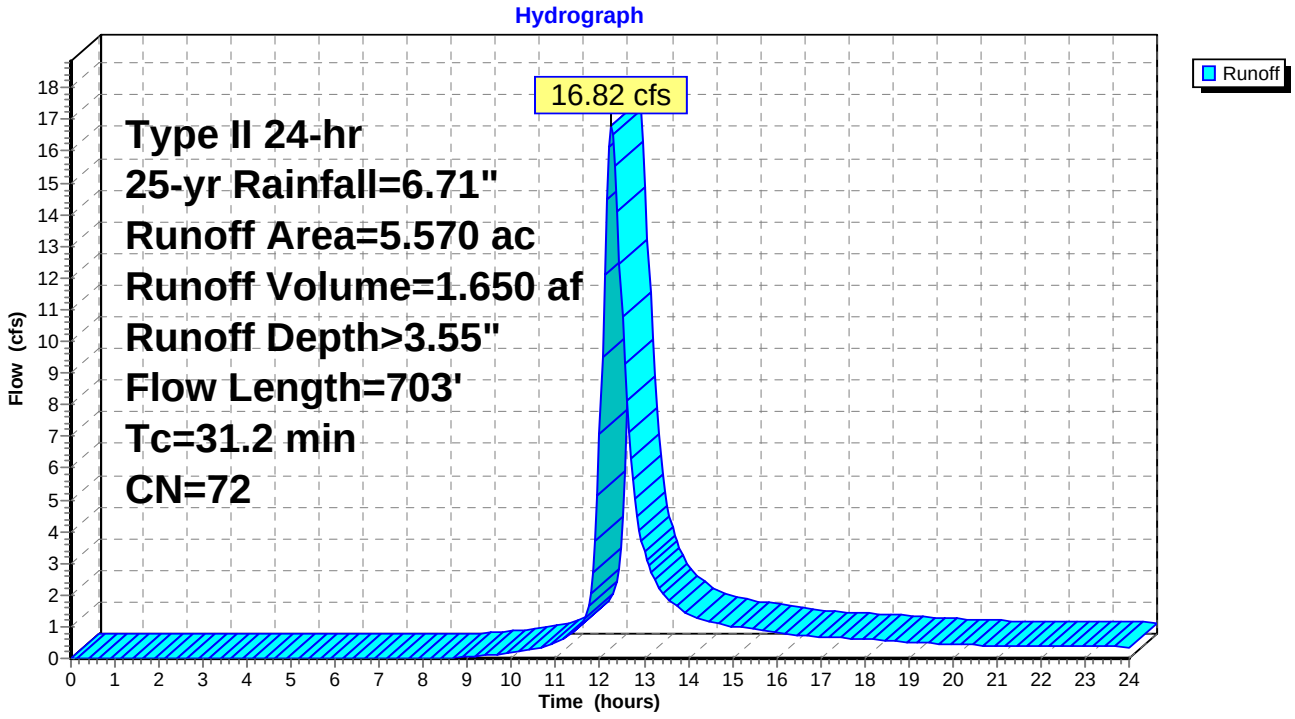
Runoff = 16.82 cfs @ 12.26 hrs, Volume= 1.650 af, Depth> 3.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 3.38" for 25-yr event
Inflow = 21.58 cfs @ 12.39 hrs, Volume= 5.027 af
Outflow = 21.55 cfs @ 12.48 hrs, Volume= 5.009 af, Atten= 0%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.72 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 2.33 fps, Avg. Travel Time= 6.3 min

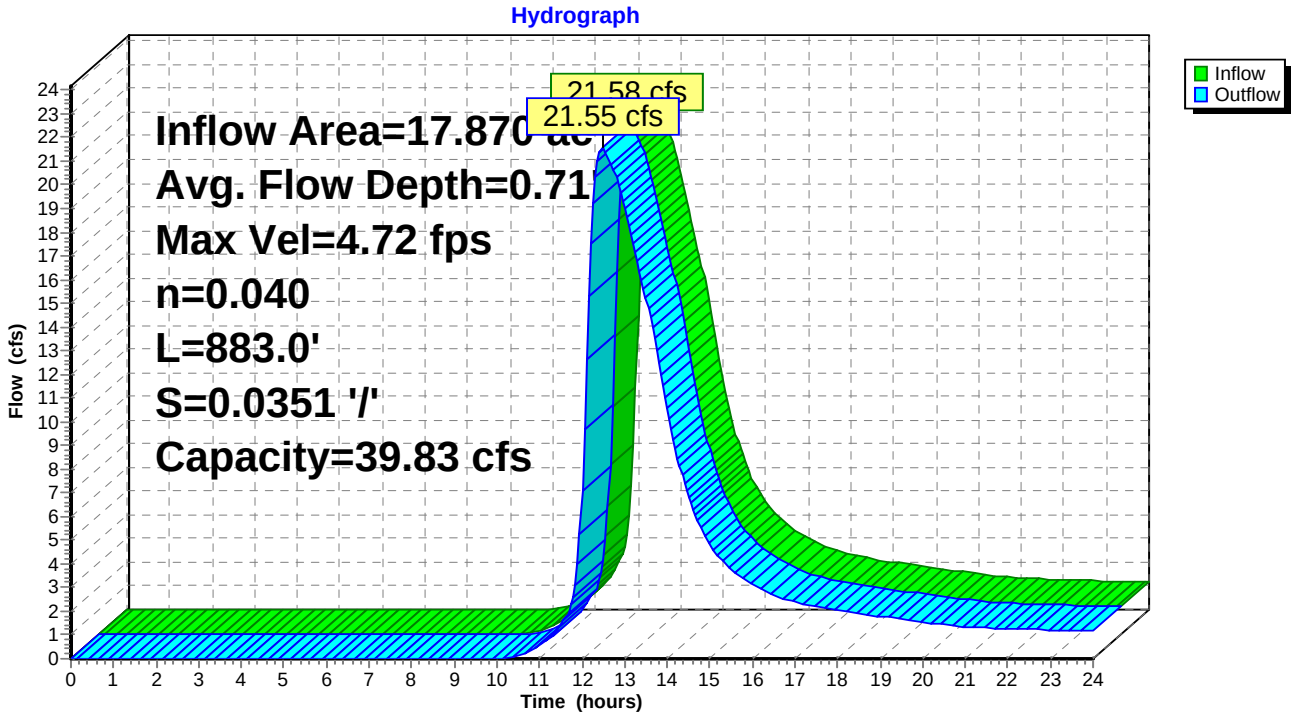
Peak Storage= 4,032 cf @ 12.43 hrs
Average Depth at Peak Storage= 0.71'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 3.43" for 25-yr event
Inflow = 137.23 cfs @ 12.26 hrs, Volume= 16.449 af
Outflow = 106.97 cfs @ 12.70 hrs, Volume= 16.180 af, Atten= 22%, Lag= 26.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.49 fps, Min. Travel Time= 14.8 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 31.0 min

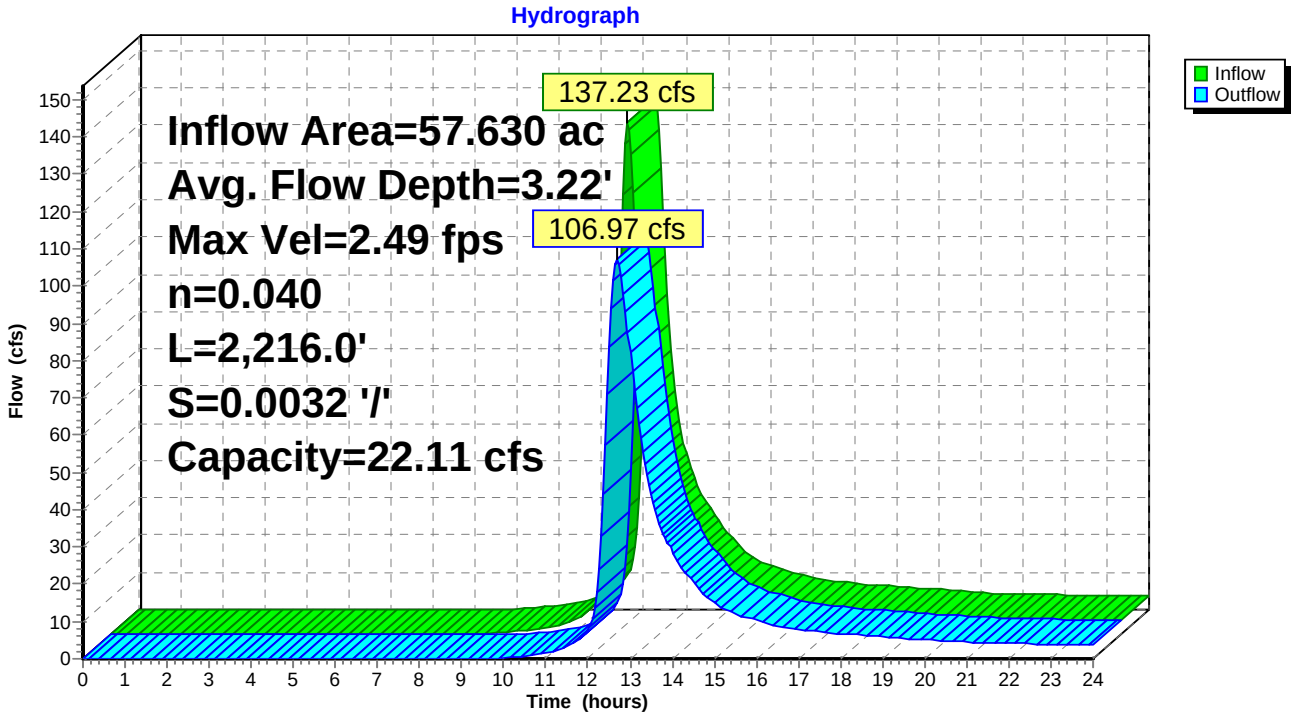
Peak Storage= 95,299 cf @ 12.45 hrs
Average Depth at Peak Storage= 3.22'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 3.47" for 25-yr event
Inflow = 77.39 cfs @ 12.08 hrs, Volume= 5.163 af
Outflow = 21.58 cfs @ 12.39 hrs, Volume= 5.027 af, Atten= 72%, Lag= 18.2 min
Primary = 21.58 cfs @ 12.39 hrs, Volume= 5.027 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.84' @ 12.39 hrs Surf.Area= 36,202 sf Storage= 78,237 cf

Plug-Flow detention time= 55.9 min calculated for 5.027 af (97% of inflow)
Center-of-Mass det. time= 40.8 min (875.0 - 834.3)

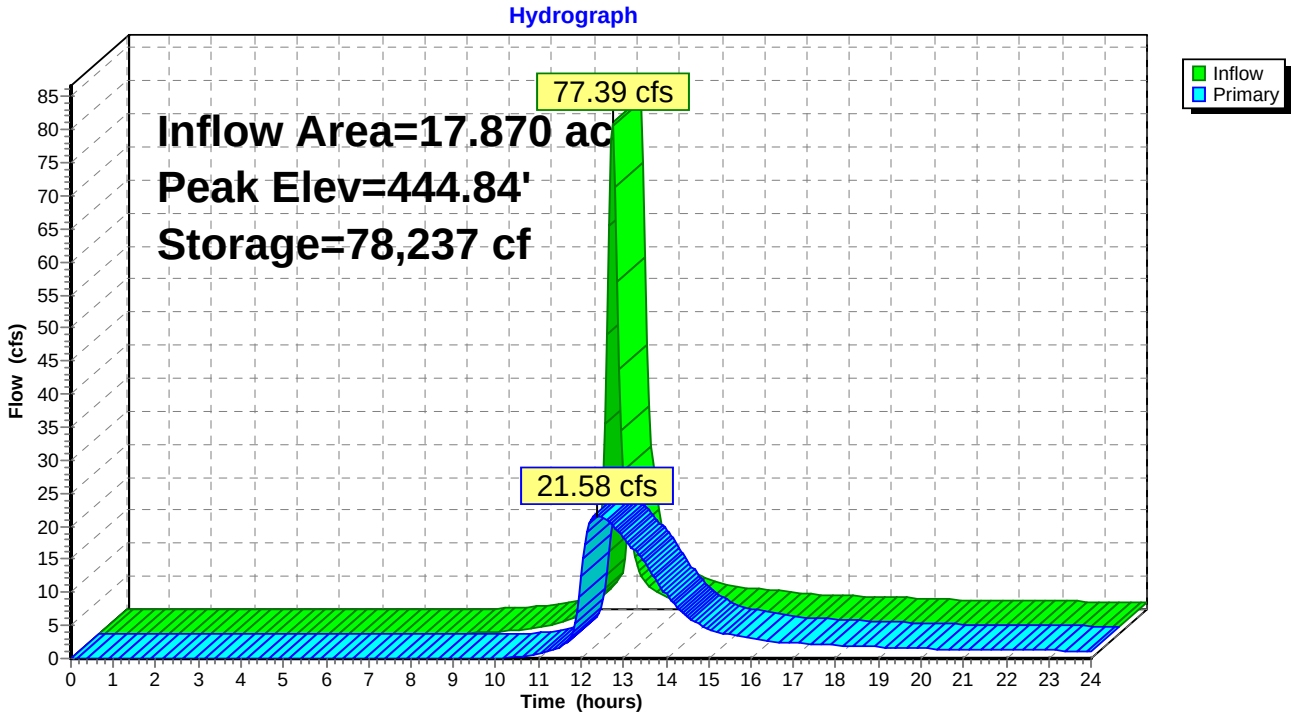
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=21.58 cfs @ 12.39 hrs HW=444.83' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 21.58 cfs @ 6.87 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes 21.58 cfs of 49.62 cfs potential flow)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>4.21"
Flow Length=900' Tc=30.6 min CN=71 Runoff=144.01 cfs 13.948 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>4.23"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=94.29 cfs 6.294 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>3.92"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=22.78 cfs 4.756 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>3.67"
Flow Length=541' Tc=21.3 min CN=66 Runoff=14.79 cfs 1.153 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>4.32"
Flow Length=703' Tc=31.2 min CN=72 Runoff=20.49 cfs 2.005 af

Reach R-1: R-1 Avg. Flow Depth=0.76' Max Vel=4.90 fps Inflow=24.33 cfs 6.146 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=24.30 cfs 6.125 af

Reach R-2: R-2 Avg. Flow Depth=3.81' Max Vel=2.53 fps Inflow=165.96 cfs 20.074 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=129.63 cfs 19.774 af

Pond Pond 1b: Pond 1b Peak Elev=445.39' Storage=98,435 cf Inflow=94.29 cfs 6.294 af
Outflow=24.33 cfs 6.146 af

Summary for Subcatchment E-1a: E-1a

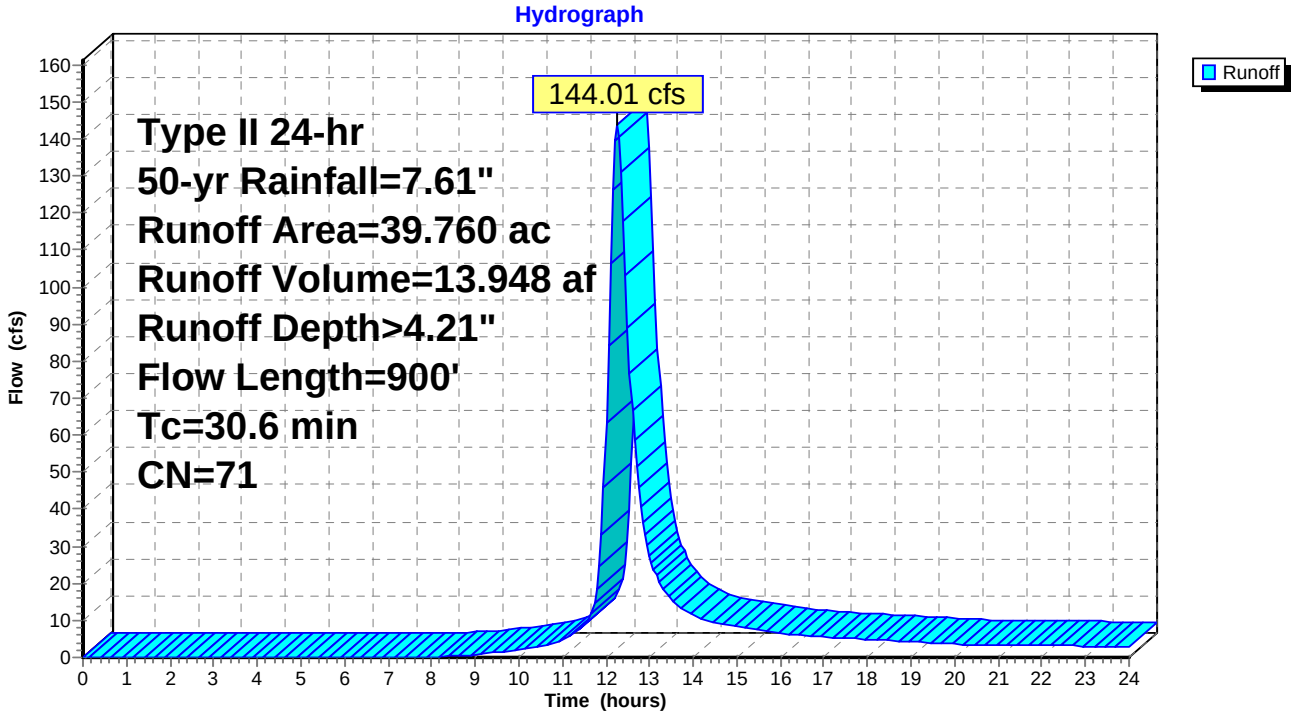
Runoff = 144.01 cfs @ 12.25 hrs, Volume= 13.948 af, Depth> 4.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

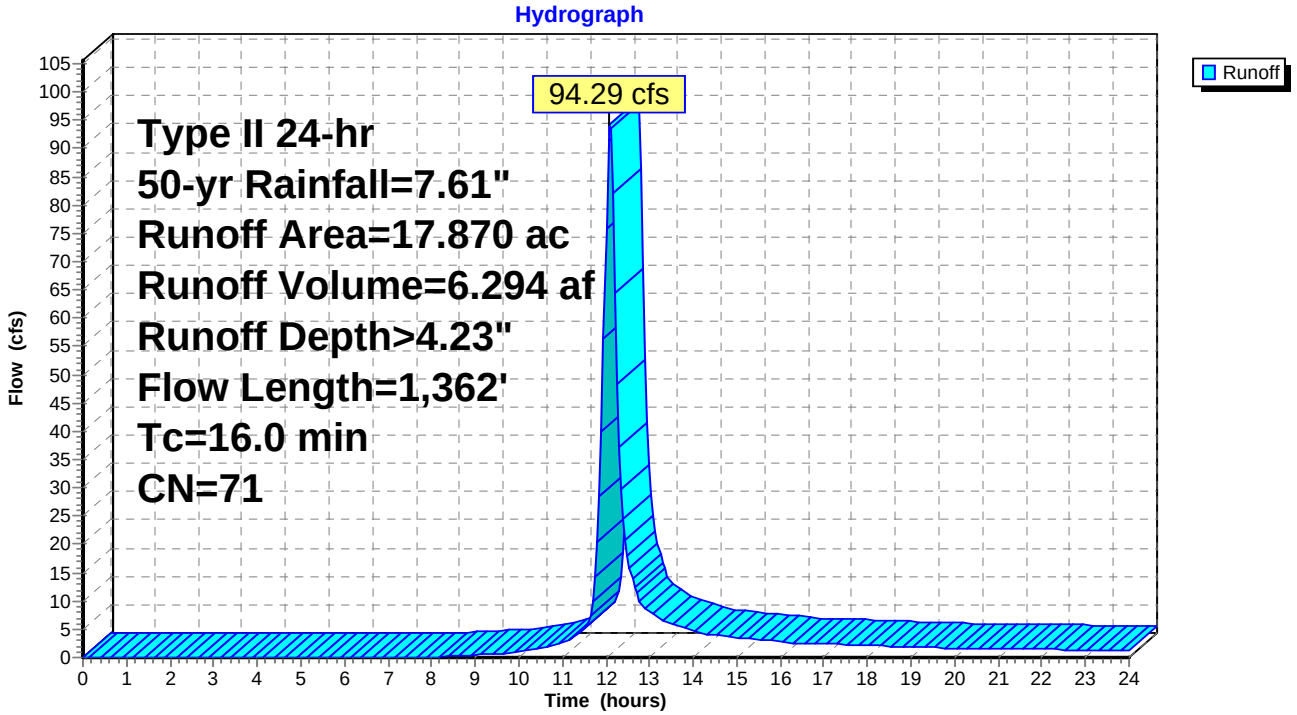
Runoff = 94.29 cfs @ 12.08 hrs, Volume= 6.294 af, Depth> 4.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

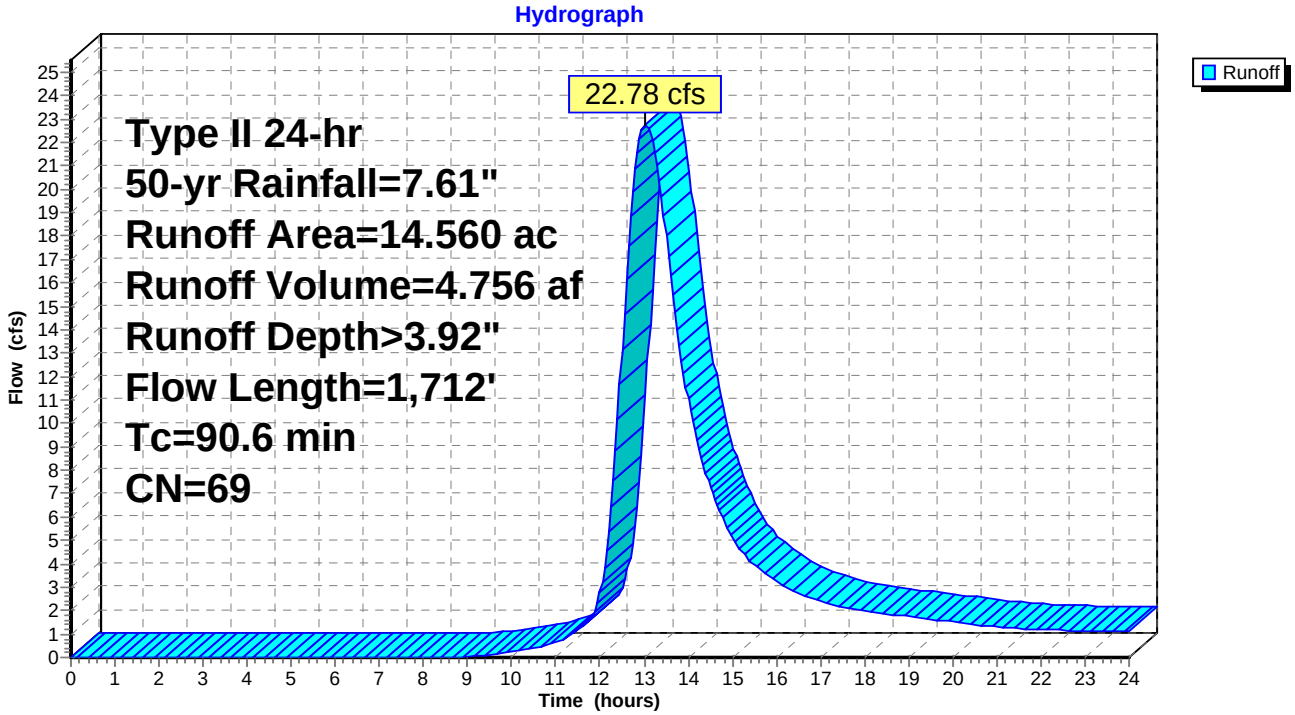
Runoff = 22.78 cfs @ 13.02 hrs, Volume= 4.756 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

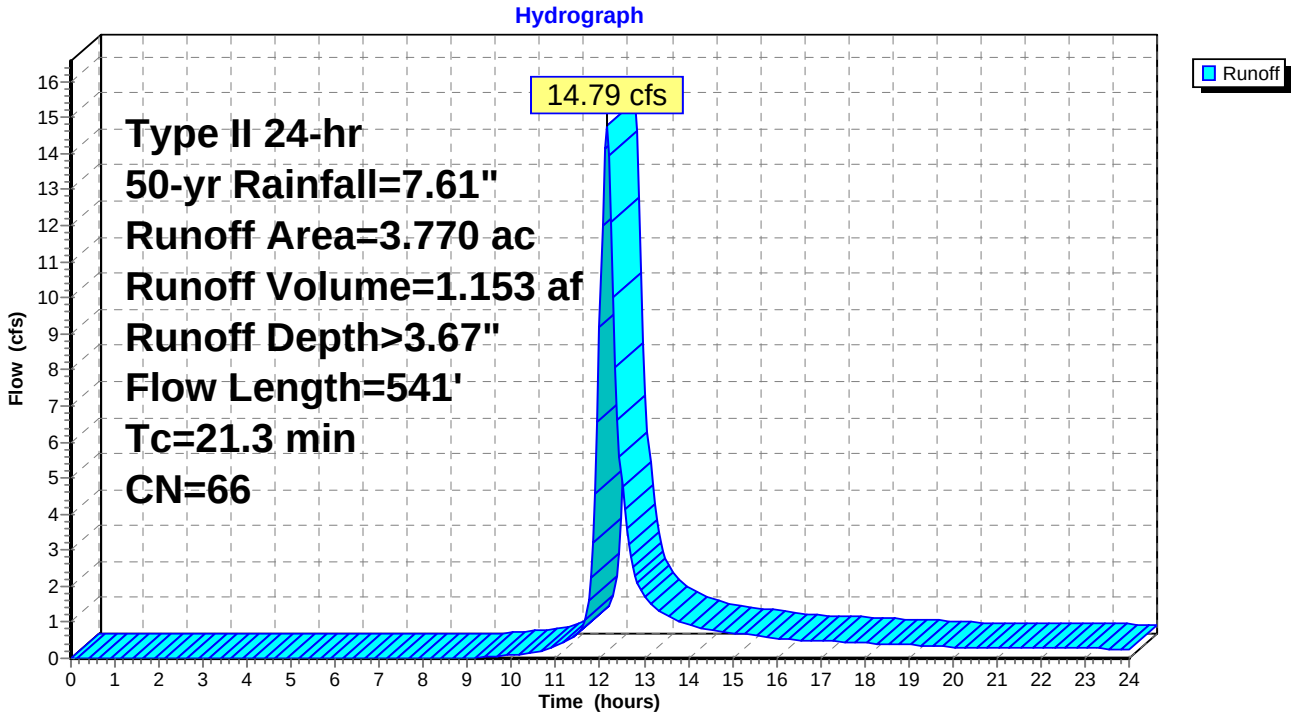
Runoff = 14.79 cfs @ 12.15 hrs, Volume= 1.153 af, Depth> 3.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

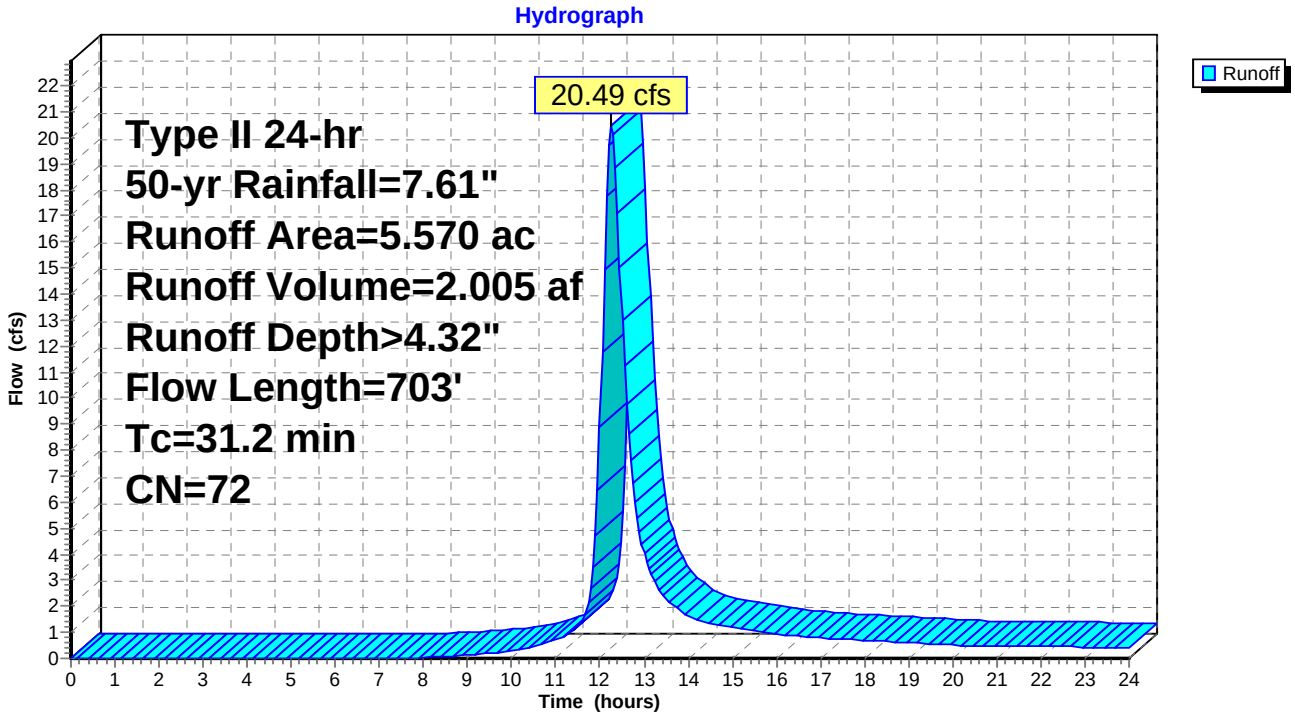
Runoff = 20.49 cfs @ 12.26 hrs, Volume= 2.005 af, Depth> 4.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 4.13" for 50-yr event
Inflow = 24.33 cfs @ 12.41 hrs, Volume= 6.146 af
Outflow = 24.30 cfs @ 12.50 hrs, Volume= 6.125 af, Atten= 0%, Lag= 5.4 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.90 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 6.0 min

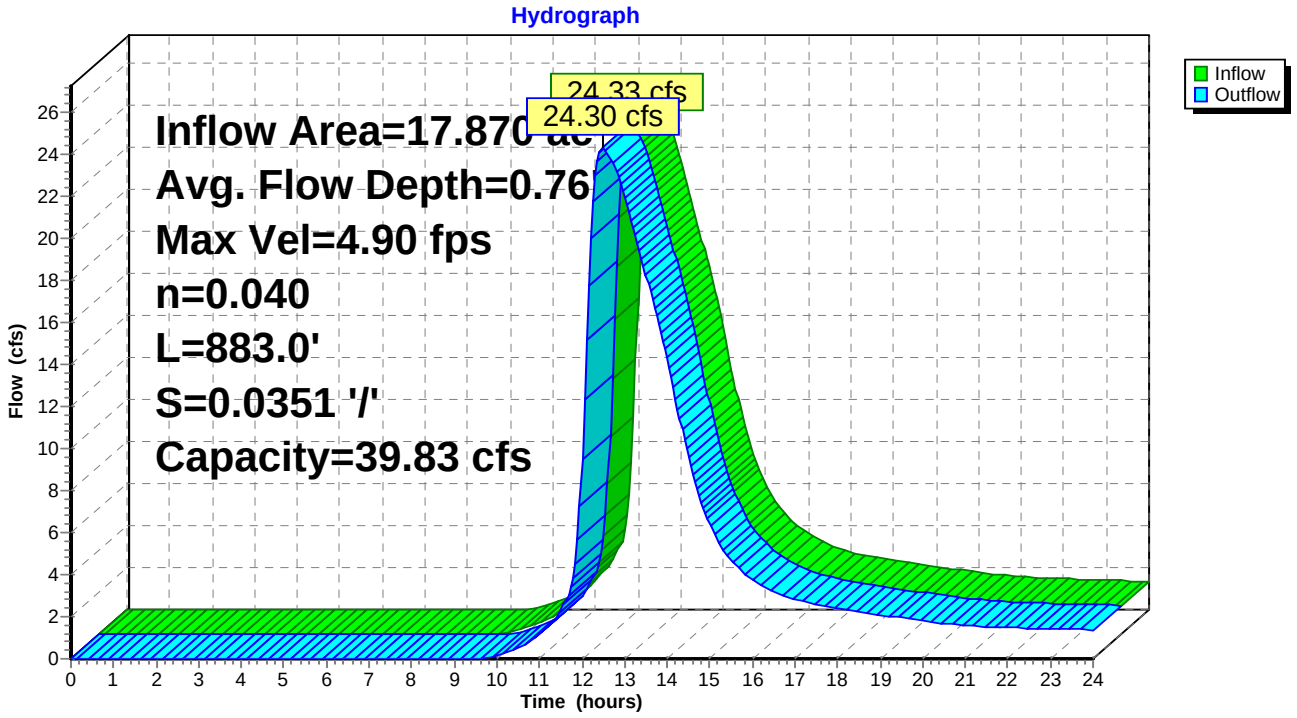
Peak Storage= 4,380 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 4.18" for 50-yr event
Inflow = 165.96 cfs @ 12.26 hrs, Volume= 20.074 af
Outflow = 129.63 cfs @ 12.69 hrs, Volume= 19.774 af, Atten= 22%, Lag= 25.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.53 fps, Min. Travel Time= 14.6 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 29.7 min

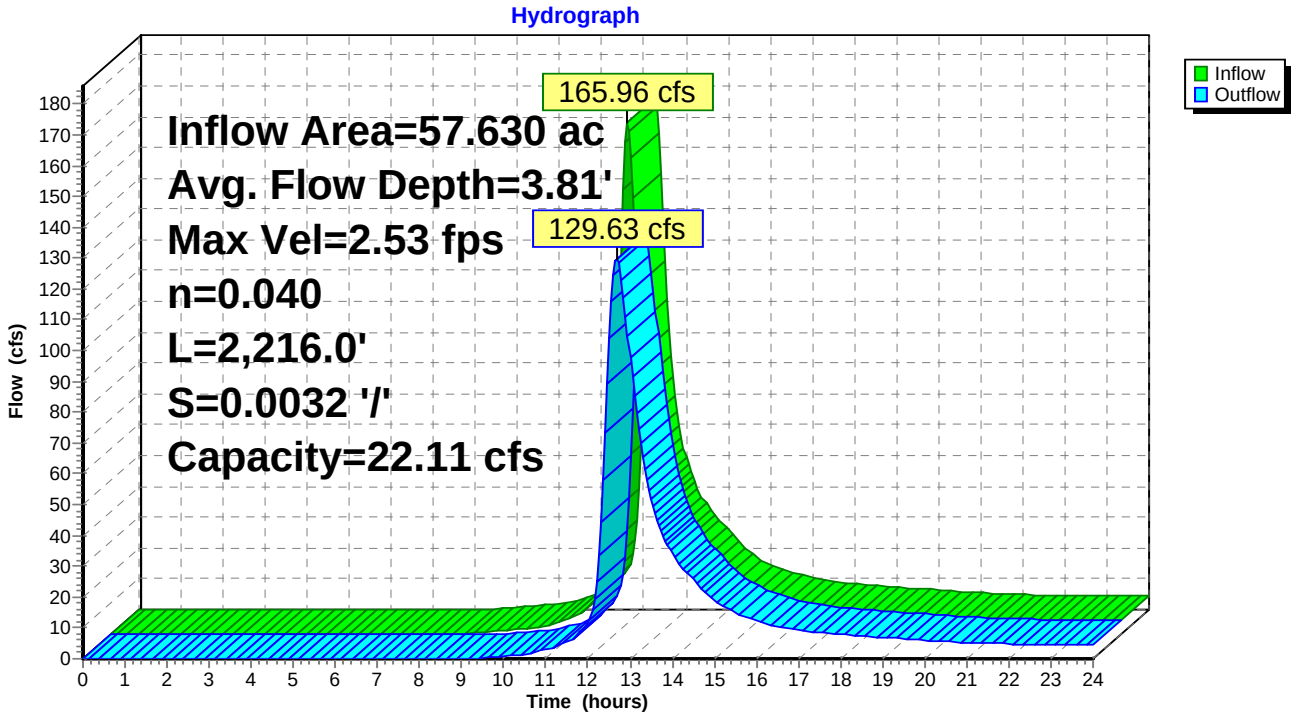
Peak Storage= 113,733 cf @ 12.44 hrs
Average Depth at Peak Storage= 3.81'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 4.23" for 50-yr event
Inflow = 94.29 cfs @ 12.08 hrs, Volume= 6.294 af
Outflow = 24.33 cfs @ 12.41 hrs, Volume= 6.146 af, Atten= 74%, Lag= 19.4 min
Primary = 24.33 cfs @ 12.41 hrs, Volume= 6.146 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 445.39' @ 12.41 hrs Surf.Area= 37,130 sf Storage= 98,435 cf

Plug-Flow detention time= 57.4 min calculated for 6.133 af (97% of inflow)
Center-of-Mass det. time= 43.8 min (872.5 - 828.7)

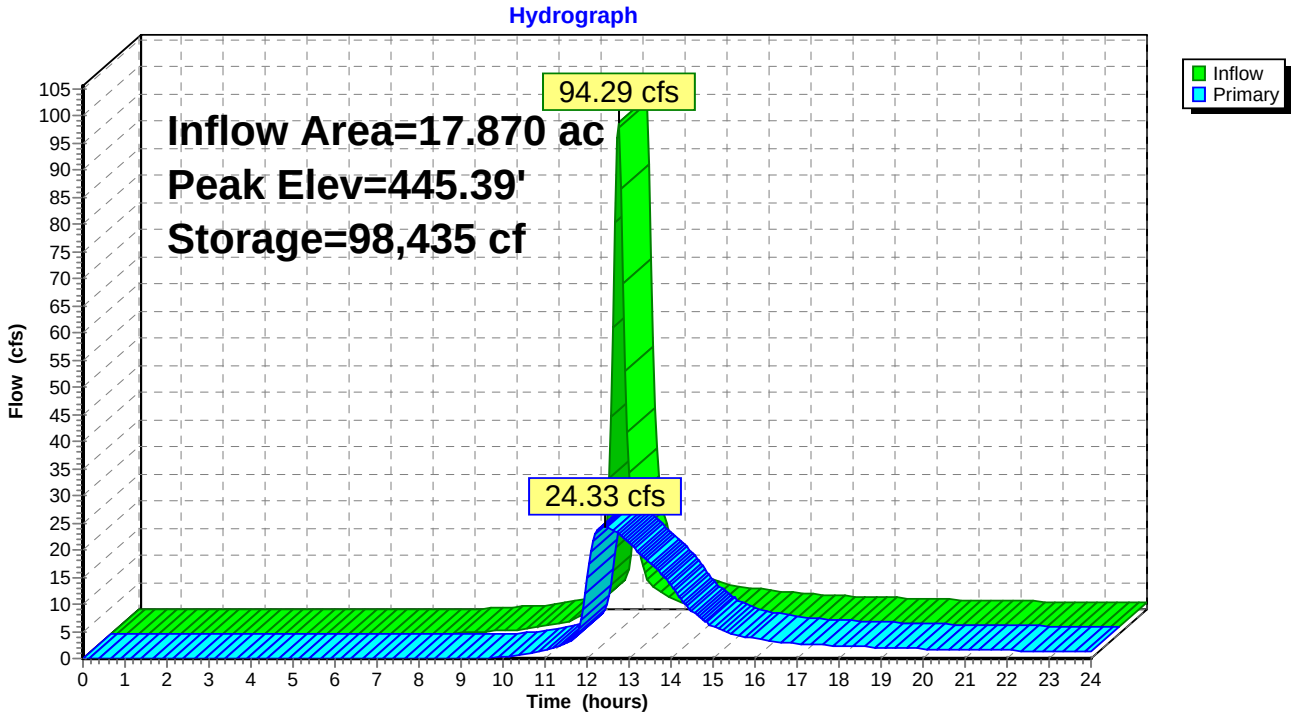
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=24.32 cfs @ 12.41 hrs HW=445.39' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 24.32 cfs @ 7.74 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes < 65.29 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 3.89 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E-1a: E-1a Runoff Area=39.760 ac 0.00% Impervious Runoff Depth>5.05"
Flow Length=900' Tc=30.6 min CN=71 Runoff=172.85 cfs 16.729 af

Subcatchment E-1b: E-1b Runoff Area=17.870 ac 24.90% Impervious Runoff Depth>5.07"
Flow Length=1,362' Tc=16.0 min CN=71 Runoff=112.82 cfs 7.547 af

Subcatchment E-2: E-2 Runoff Area=14.560 ac 0.00% Impervious Runoff Depth>4.73"
Flow Length=1,712' Tc=90.6 min CN=69 Runoff=27.62 cfs 5.740 af

Subcatchment E-3: E-3 Runoff Area=3.770 ac 0.00% Impervious Runoff Depth>4.46"
Flow Length=541' Tc=21.3 min CN=66 Runoff=18.05 cfs 1.402 af

Subcatchment E-4: E-4 Runoff Area=5.570 ac 0.00% Impervious Runoff Depth>5.17"
Flow Length=703' Tc=31.2 min CN=72 Runoff=24.52 cfs 2.399 af

Reach R-1: R-1 Avg. Flow Depth=0.81' Max Vel=5.06 fps Inflow=27.04 cfs 7.388 af
n=0.040 L=883.0' S=0.0351 '/' Capacity=39.83 cfs Outflow=27.02 cfs 7.365 af

Reach R-2: R-2 Avg. Flow Depth=4.46' Max Vel=2.56 fps Inflow=197.23 cfs 24.094 af
n=0.040 L=2,216.0' S=0.0032 '/' Capacity=22.11 cfs Outflow=154.25 cfs 23.761 af

Pond Pond 1b: Pond 1b Peak Elev=446.00' Storage=121,348 cf Inflow=112.82 cfs 7.547 af
Outflow=27.04 cfs 7.388 af

Summary for Subcatchment E-1a: E-1a

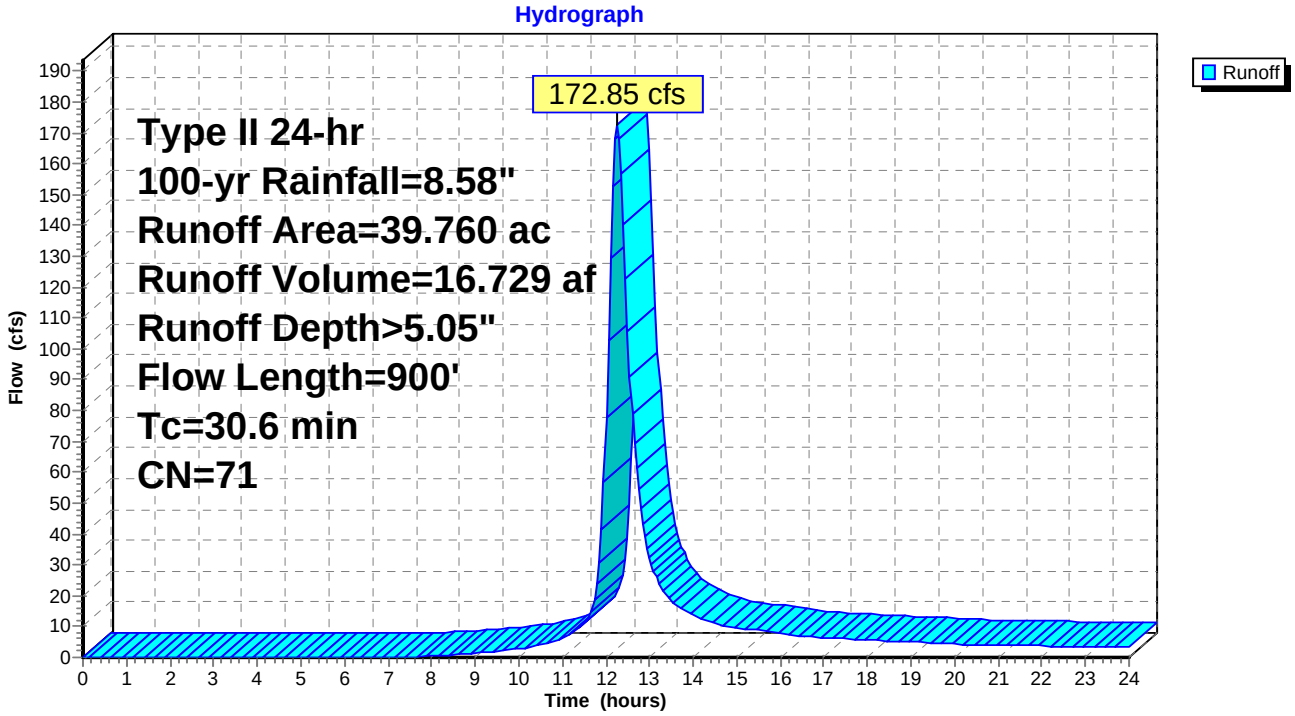
Runoff = 172.85 cfs @ 12.25 hrs, Volume= 16.729 af, Depth> 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
18.250	77	Woods, Poor, HSG C
21.510	66	Woods, Poor, HSG B
39.760	71	Weighted Average
39.760		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.1	150	0.1870	0.12		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
5.2	505	0.1030	1.60		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
5.3	245	0.0240	0.77		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
30.6	900	Total			

Subcatchment E-1a: E-1a



Summary for Subcatchment E-1b: E-1b

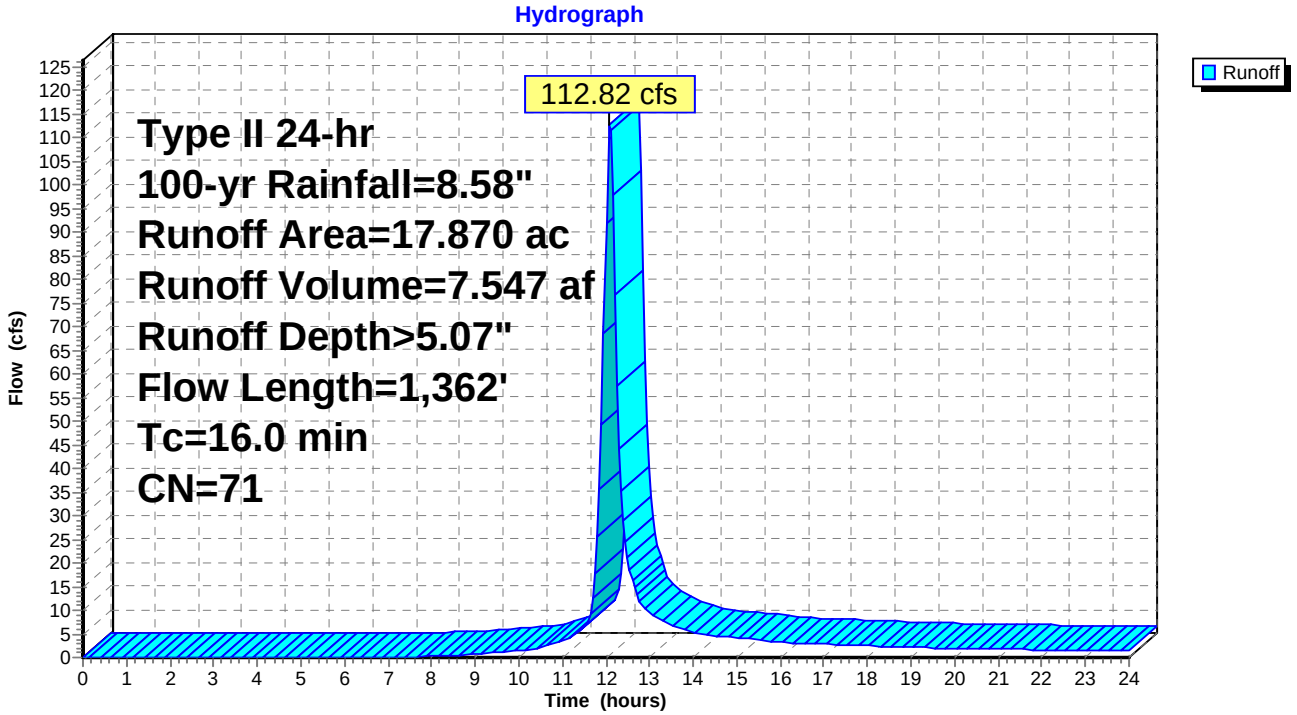
Runoff = 112.82 cfs @ 12.08 hrs, Volume= 7.547 af, Depth> 5.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
4.450	98	Paved parking, HSG B
3.860	61	>75% Grass cover, Good, HSG B
6.200	66	Woods, Poor, HSG B
3.360	55	Woods, Good, HSG B
17.870	71	Weighted Average
13.420		75.10% Pervious Area
4.450		24.90% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	100	0.3600	0.15		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
0.8	232	0.0950	4.96		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
1.0	130	0.0120	2.22		**Shallow Concentrated Flow, CD** Paved Kv= 20.3 fps
3.0	900		5.00		**Direct Entry, DE**
16.0	1,362	Total			

Subcatchment E-1b: E-1b



Summary for Subcatchment E-2: E-2

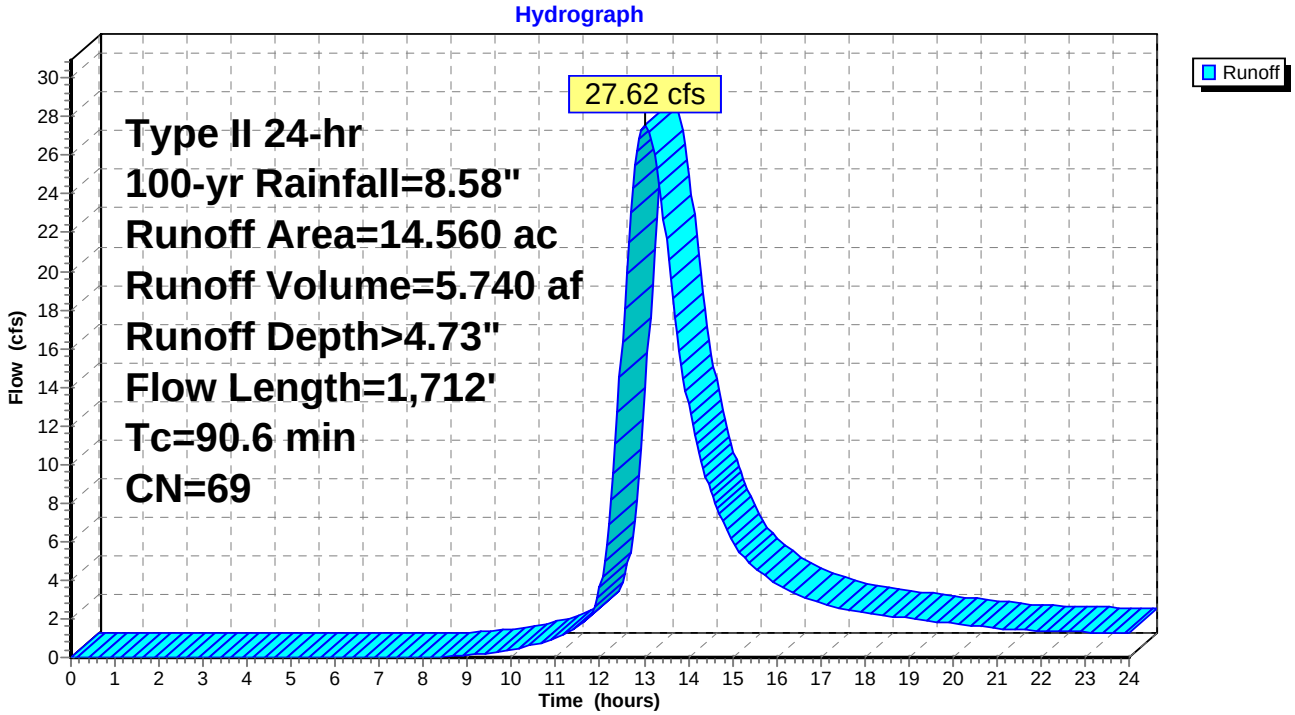
Runoff = 27.62 cfs @ 13.01 hrs, Volume= 5.740 af, Depth> 4.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.540	77	Woods, Poor, HSG C
11.020	66	Woods, Poor, HSG B
14.560	69	Weighted Average
14.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	150	0.2330	0.14		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
2.5	211	0.0810	1.42		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
65.2	1,157	0.0035	0.30		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
90.6	1,712	Total			

Subcatchment E-2: E-2



Summary for Subcatchment E-3: E-3

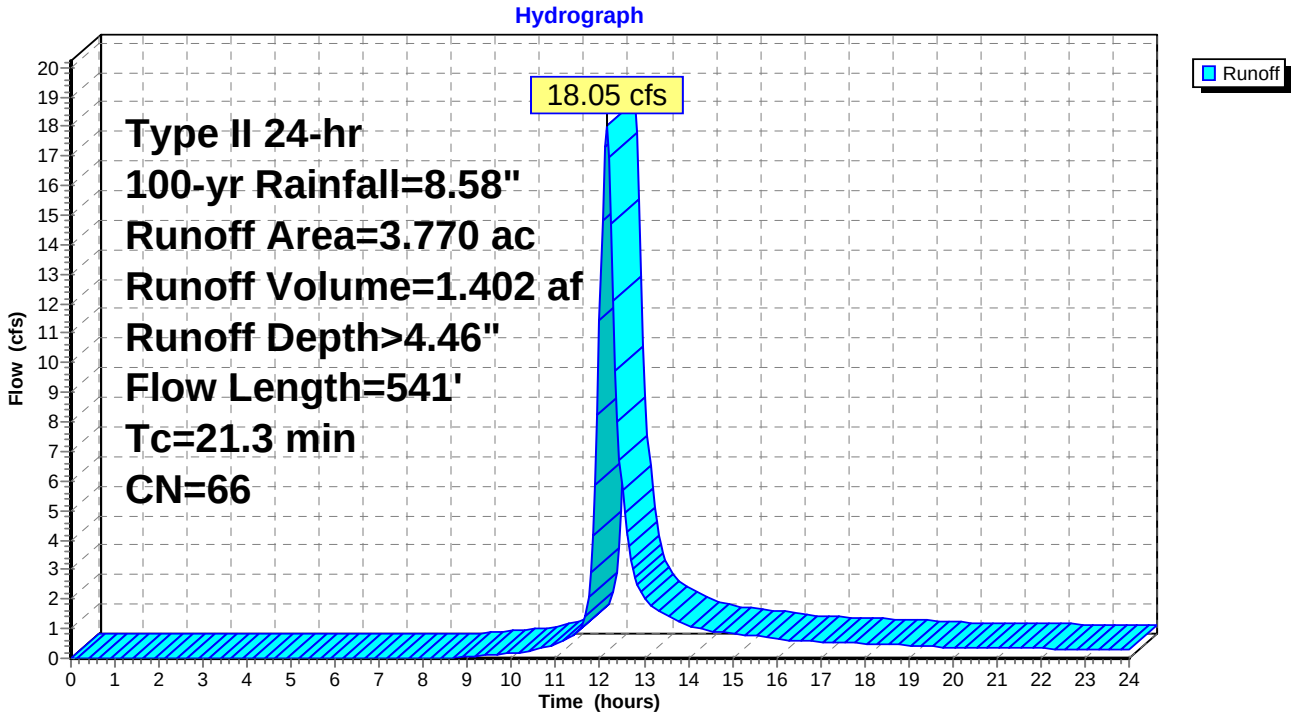
Runoff = 18.05 cfs @ 12.14 hrs, Volume= 1.402 af, Depth> 4.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.770	66	Woods, Poor, HSG B
3.770		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.6	150	0.2600	0.14		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
3.7	391	0.1230	1.75		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
21.3	541	Total			

Subcatchment E-3: E-3



Summary for Subcatchment E-4: E-4

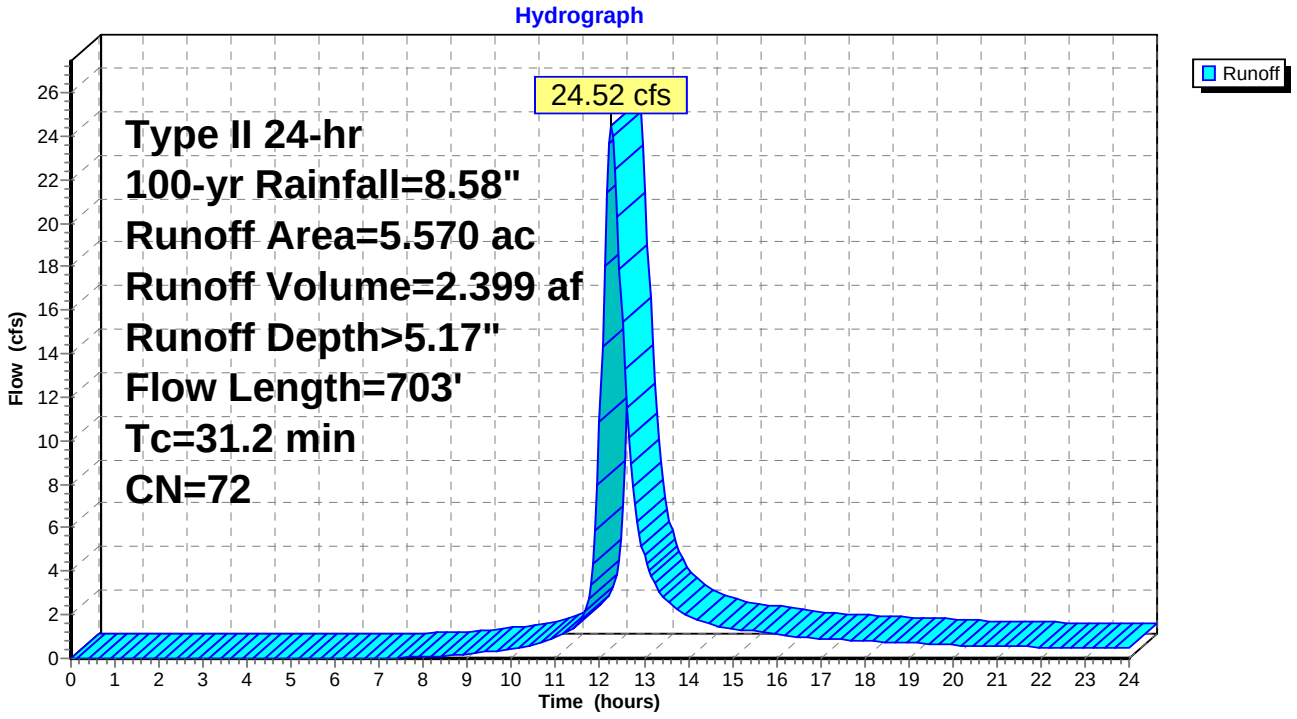
Runoff = 24.52 cfs @ 12.26 hrs, Volume= 2.399 af, Depth> 5.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.670	66	Woods, Poor, HSG B
1.900	83	Woods, Poor, HSG D
5.570	72	Weighted Average
5.570		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
26.5	150	0.0930	0.09		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.7	553	0.1570	1.98		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
31.2	703	Total			

Subcatchment E-4: E-4



Summary for Reach R-1: R-1

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 4.96" for 100-yr event
Inflow = 27.04 cfs @ 12.42 hrs, Volume= 7.388 af
Outflow = 27.02 cfs @ 12.51 hrs, Volume= 7.365 af, Atten= 0%, Lag= 5.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.06 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.57 fps, Avg. Travel Time= 5.7 min

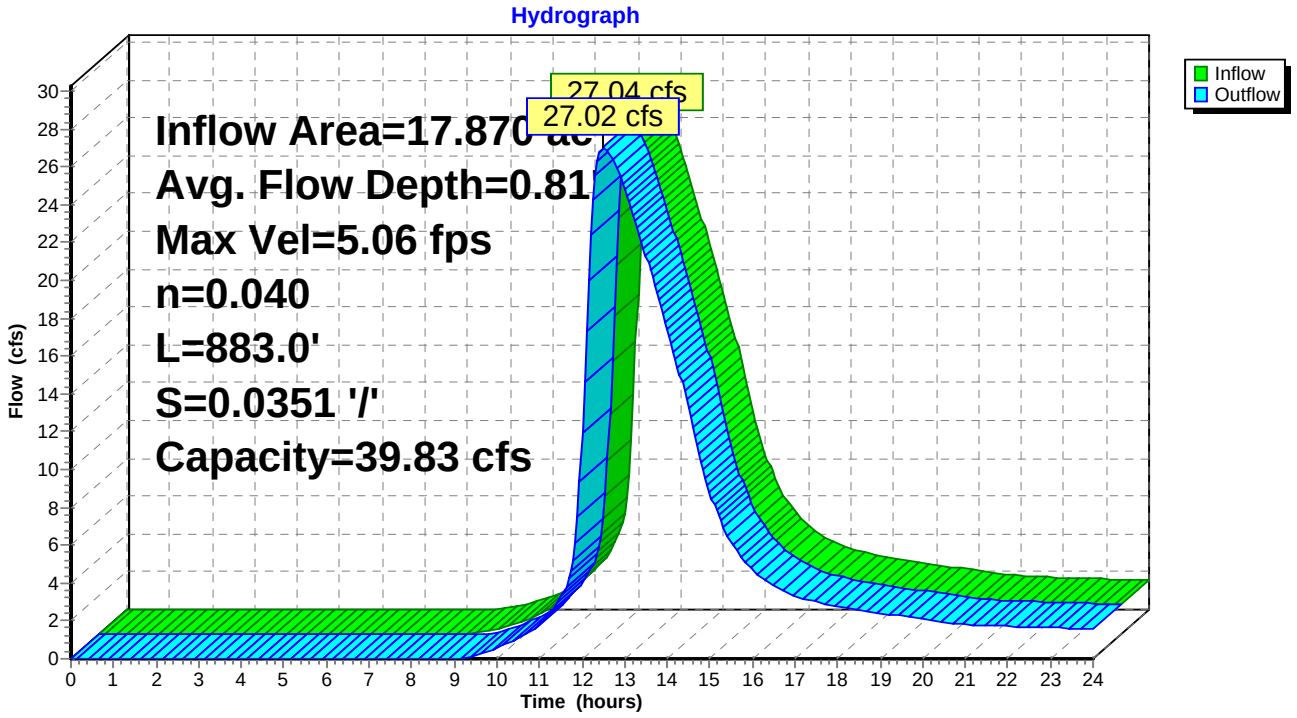
Peak Storage= 4,713 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.81'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 39.83 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0351 '/'
Inlet Invert= 441.00', Outlet Invert= 410.00'



‡

Reach R-1: R-1



Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00
441.01	0.32	0.02
441.02	0.51	0.05
441.03	0.67	0.10
441.04	0.80	0.16
441.05	0.93	0.24
441.06	1.05	0.32
441.07	1.16	0.42
441.08	1.26	0.52
441.09	1.36	0.63
441.10	1.45	0.76
441.11	1.54	0.89
441.12	1.63	1.03
441.13	1.72	1.17
441.14	1.80	1.33
441.15	1.88	1.49
441.16	1.96	1.66
441.17	2.03	1.84
441.18	2.10	2.03
441.19	2.18	2.22
441.20	2.25	2.43
441.21	2.31	2.63
441.22	2.38	2.85
441.23	2.45	3.07
441.24	2.51	3.30
441.25	2.57	3.54
441.26	2.63	3.78
441.27	2.70	4.03
441.28	2.76	4.29
441.29	2.81	4.55
441.30	2.87	4.82
441.31	2.93	5.10
441.32	2.98	5.38
441.33	3.04	5.68
441.34	3.09	5.97
441.35	3.15	6.28
441.36	3.20	6.59
441.37	3.25	6.90
441.38	3.30	7.23
441.39	3.35	7.56
441.40	3.40	7.89
441.41	3.45	8.24
441.42	3.50	8.59
441.43	3.55	8.94
441.44	3.60	9.30
441.45	3.64	9.67
441.46	3.69	10.05
441.47	3.74	10.43
441.48	3.78	10.82
441.49	3.83	11.21
441.50	3.87	11.61
441.51	3.91	12.02
441.52	3.96	12.43
441.53	4.00	12.85
441.54	4.04	13.28
441.55	4.09	13.71
441.56	4.13	14.15
441.57	4.17	14.59
441.58	4.21	15.04
441.59	4.25	15.50
441.60	4.29	15.97
441.61	4.33	16.44
441.62	4.37	16.91
441.63	4.41	17.40
441.64	4.45	17.89
441.65	4.49	18.38
441.66	4.53	18.89
441.67	4.57	19.39
441.68	4.60	19.91
441.69	4.64	20.43
441.70	4.68	20.96
441.71	4.72	21.49
441.72	4.75	22.03
441.73	4.79	22.58
441.74	4.82	23.14
441.75	4.86	23.70
441.76	4.90	24.26
441.77	4.93	24.84
441.78	4.97	25.42
441.79	5.00	26.00
441.80	5.04	26.60
441.81	5.07	27.19
441.82	5.11	27.80
441.83	5.14	28.41
441.84	5.17	29.03
441.85	5.21	29.66
441.86	5.24	30.29
441.87	5.27	30.93
441.88	5.31	31.57
441.89	5.34	32.22
441.90	5.37	32.88
441.91	5.41	33.55
441.92	5.44	34.22
441.93	5.47	34.90
441.94	5.50	35.58
441.95	5.53	36.27
441.96	5.57	36.97
441.97	5.60	37.67
441.98	5.63	38.39
441.99	5.66	39.10
442.00	**5.69**	**39.83**

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0
441.01	0.1	44
441.02	0.1	89
441.03	0.2	134
441.04	0.2	179
441.05	0.3	225
441.06	0.3	271
441.07	0.4	318
441.08	0.4	365
441.09	0.5	412
441.10	0.5	459
441.11	0.6	507
441.12	0.6	555
441.13	0.7	604
441.14	0.7	653
441.15	0.8	702
441.16	0.9	752
441.17	0.9	802
441.18	1.0	852
441.19	1.0	903
441.20	1.1	954
441.21	1.1	1,005
441.22	1.2	1,057
441.23	1.3	1,109
441.24	1.3	1,161
441.25	1.4	1,214
441.26	1.4	1,267
441.27	1.5	1,321
441.28	1.6	1,375
441.29	1.6	1,429
441.30	1.7	1,483
441.31	1.7	1,538
441.32	1.8	1,594
441.33	1.9	1,649
441.34	1.9	1,705
441.35	2.0	1,762
441.36	2.1	1,818
441.37	2.1	1,875
441.38	2.2	1,933
441.39	2.3	1,990
441.40	2.3	2,049
441.41	2.4	2,107
441.42	2.5	2,166
441.43	2.5	2,225
441.44	2.6	2,284
441.45	2.7	2,344
441.46	2.7	2,405
441.47	2.8	2,465
441.48	2.9	2,526
441.49	2.9	2,587
441.50	3.0	2,649
441.51	3.1	2,711
441.52	3.1	2,773
441.53	3.2	2,836
441.54	3.3	2,899
441.55	3.4	2,962
441.56	3.4	3,026
441.57	3.5	3,090
441.58	3.6	3,155
441.59	3.6	3,220
441.60	3.7	3,285
441.61	3.8	3,350
441.62	3.9	3,416
441.63	3.9	3,482
441.64	4.0	3,549
441.65	4.1	3,616
441.66	4.2	3,683
441.67	4.2	3,751
441.68	4.3	3,819
441.69	4.4	3,887
441.70	4.5	3,956
441.71	4.6	4,025
441.72	4.6	4,094
441.73	4.7	4,164
441.74	4.8	4,234
441.75	4.9	4,305
441.76	5.0	4,375
441.77	5.0	4,447
441.78	5.1	4,518
441.79	5.2	4,590
441.80	5.3	4,662
441.81	5.4	4,735
441.82	5.4	4,808
441.83	5.5	4,881
441.84	5.6	4,955
441.85	5.7	5,029
441.86	5.8	5,103
441.87	5.9	5,178
441.88	5.9	5,253
441.89	6.0	5,328
441.90	6.1	5,404
441.91	6.2	5,480
441.92	6.3	5,557
441.93	6.4	5,633
441.94	6.5	5,711
441.95	6.6	5,788
441.96	6.6	5,866
441.97	6.7	5,944
441.98	6.8	6,023
441.99	6.9	6,102
442.00	**7.0**	**6,181**

Summary for Reach R-2: R-2

Inflow Area = 57.630 ac, 7.72% Impervious, Inflow Depth > 5.02" for 100-yr event
Inflow = 197.23 cfs @ 12.26 hrs, Volume= 24.094 af
Outflow = 154.25 cfs @ 12.68 hrs, Volume= 23.761 af, Atten= 22%, Lag= 25.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.56 fps, Min. Travel Time= 14.4 min
Avg. Velocity = 1.29 fps, Avg. Travel Time= 28.5 min

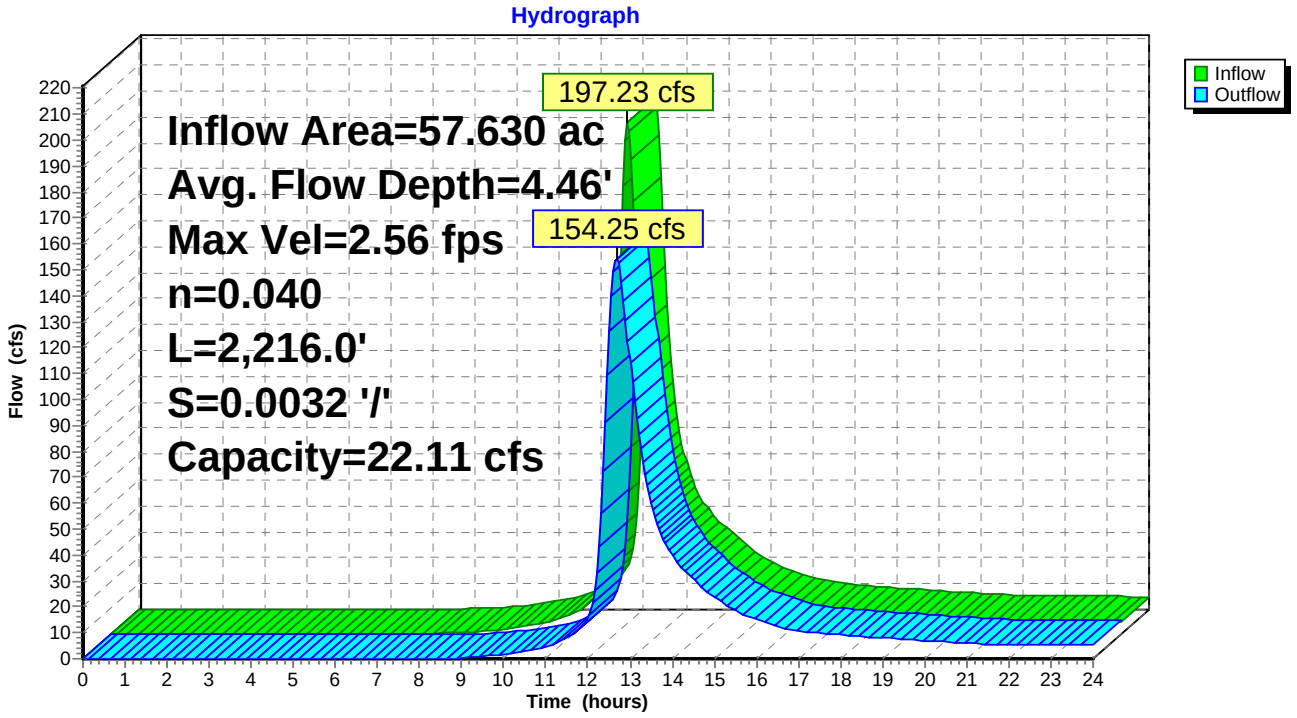
Peak Storage= 133,745 cf @ 12.44 hrs
Average Depth at Peak Storage= 4.46'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 22.11 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 2,216.0' Slope= 0.0032 '/'
Inlet Invert= 410.00', Outlet Invert= 403.00'



‡

Reach R-2: R-2



Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
410.00	0.00	0.00
410.01	0.10	0.01
410.02	0.15	0.03
410.03	0.20	0.06
410.04	0.24	0.10
410.05	0.28	0.14
410.06	0.32	0.19
410.07	0.35	0.25
410.08	0.38	0.31
410.09	0.41	0.38
410.10	0.44	0.45
410.11	0.47	0.53
410.12	0.50	0.61
410.13	0.52	0.70
410.14	0.55	0.79
410.15	0.58	0.89
410.16	0.60	0.99
410.17	0.62	1.10
410.18	0.65	1.21
410.19	0.67	1.32
410.20	0.69	1.44
410.21	0.71	1.56
410.22	0.74	1.69
410.23	0.76	1.82
410.24	0.78	1.96
410.25	0.80	2.09
410.26	0.82	2.24
410.27	0.84	2.38
410.28	0.86	2.53
410.29	0.88	2.69
410.30	0.89	2.84
410.31	0.91	3.01
410.32	0.93	3.17
410.33	0.95	3.34
410.34	0.97	3.51
410.35	0.98	3.69
410.36	1.00	3.87
410.37	1.02	4.05
410.38	1.04	4.24
410.39	1.05	4.43
410.40	1.07	4.62
410.41	1.09	4.82
410.42	1.10	5.02
410.43	1.12	5.22
410.44	1.13	5.43
410.45	1.15	5.64
410.46	1.16	5.85
410.47	1.18	6.07
410.48	1.20	6.29
410.49	1.21	6.51
410.50	1.23	6.74
410.51	1.24	6.97
410.52	1.25	7.20
410.53	1.27	7.44
410.54	1.28	7.68
410.55	1.30	7.92
410.56	1.31	8.17
410.57	1.33	8.42
410.58	1.34	8.67
410.59	1.35	8.93
410.60	1.37	9.19
410.61	1.38	9.45
410.62	1.39	9.72
410.63	1.41	9.98
410.64	1.42	10.26
410.65	1.43	10.53
410.66	1.45	10.81
410.67	1.46	11.09
410.68	1.47	11.38
410.69	1.49	11.66
410.70	1.50	11.95
410.71	1.51	12.25
410.72	1.52	12.55
410.73	1.54	12.85
410.74	1.55	13.15
410.75	1.56	13.46
410.76	1.57	13.77
410.77	1.58	14.08
410.78	1.60	14.39
410.79	1.61	14.71
410.80	1.62	15.03
410.81	1.63	15.36
410.82	1.64	15.69
410.83	1.66	16.02
410.84	1.67	16.35
410.85	1.68	16.69
410.86	1.69	17.03
410.87	1.70	17.37
410.88	1.71	17.72
410.89	1.72	18.07
410.90	1.73	18.42
410.91	1.75	18.78
410.92	1.76	19.14
410.93	1.77	19.50
410.94	1.78	19.86
410.95	1.79	20.23
410.96	1.80	20.60
410.97	1.81	20.97
410.98	1.82	21.35
410.99	1.83	21.73
411.00	**1.84**	**22.11**

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
410.00	0.0	0
410.01	0.1	222
410.02	0.2	445
410.03	0.3	669
410.04	0.4	893
410.05	0.5	1,119
410.06	0.6	1,346
410.07	0.7	1,573
410.08	0.8	1,801
410.09	0.9	2,030
410.10	1.0	2,260
410.11	1.1	2,491
410.12	1.2	2,723
410.13	1.3	2,956
410.14	1.4	3,189
410.15	1.5	3,424
410.16	1.7	3,659
410.17	1.8	3,895
410.18	1.9	4,132
410.19	2.0	4,370
410.20	2.1	4,609
410.21	2.2	4,849
410.22	2.3	5,090
410.23	2.4	5,331
410.24	2.5	5,574
410.25	2.6	5,817
410.26	2.7	6,061
410.27	2.8	6,306
410.28	3.0	6,552
410.29	3.1	6,799
410.30	3.2	7,047
410.31	3.3	7,296
410.32	3.4	7,545
410.33	3.5	7,795
410.34	3.6	8,047
410.35	3.7	8,299
410.36	3.9	8,552
410.37	4.0	8,806
410.38	4.1	9,061
410.39	4.2	9,317
410.40	4.3	9,573
410.41	4.4	9,831
410.42	4.6	10,089
410.43	4.7	10,348
410.44	4.8	10,608
410.45	4.9	10,869
410.46	5.0	11,131
410.47	5.1	11,394
410.48	5.3	11,658
410.49	5.4	11,923
410.50	5.5	12,188
410.51	5.6	12,454
410.52	5.7	12,722
410.53	5.9	12,990
410.54	6.0	13,259
410.55	6.1	13,529
410.56	6.2	13,799
410.57	6.3	14,071
410.58	6.5	14,344
410.59	6.6	14,617
410.60	6.7	14,892
410.61	6.8	15,167
410.62	7.0	15,443
410.63	7.1	15,720
410.64	7.2	15,998
410.65	7.3	16,277
410.66	7.5	16,556
410.67	7.6	16,837
410.68	7.7	17,118
410.69	7.9	17,400
410.70	8.0	17,684
410.71	8.1	17,968
410.72	8.2	18,253
410.73	8.4	18,539
410.74	8.5	18,825
410.75	8.6	19,113
410.76	8.8	19,402
410.77	8.9	19,691
410.78	9.0	19,981
410.79	9.1	20,272
410.80	9.3	20,564
410.81	9.4	20,857
410.82	9.5	21,151
410.83	9.7	21,446
410.84	9.8	21,742
410.85	9.9	22,038
410.86	10.1	22,336
410.87	10.2	22,634
410.88	10.3	22,933
410.89	10.5	23,233
410.90	10.6	23,534
410.91	10.8	23,836
410.92	10.9	24,138
410.93	11.0	24,442
410.94	11.2	24,747
410.95	11.3	25,052
410.96	11.4	25,358
410.97	11.6	25,665
410.98	11.7	25,973
410.99	11.9	26,282
411.00	**12.0**	**26,592**

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 17.870 ac, 24.90% Impervious, Inflow Depth > 5.07" for 100-yr event
Inflow = 112.82 cfs @ 12.08 hrs, Volume= 7.547 af
Outflow = 27.04 cfs @ 12.42 hrs, Volume= 7.388 af, Atten= 76%, Lag= 20.4 min
Primary = 27.04 cfs @ 12.42 hrs, Volume= 7.388 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 446.00' @ 12.42 hrs Surf.Area= 38,156 sf Storage= 121,348 cf

Plug-Flow detention time= 59.7 min calculated for 7.388 af (98% of inflow)
Center-of-Mass det. time= 47.3 min (870.8 - 823.6)

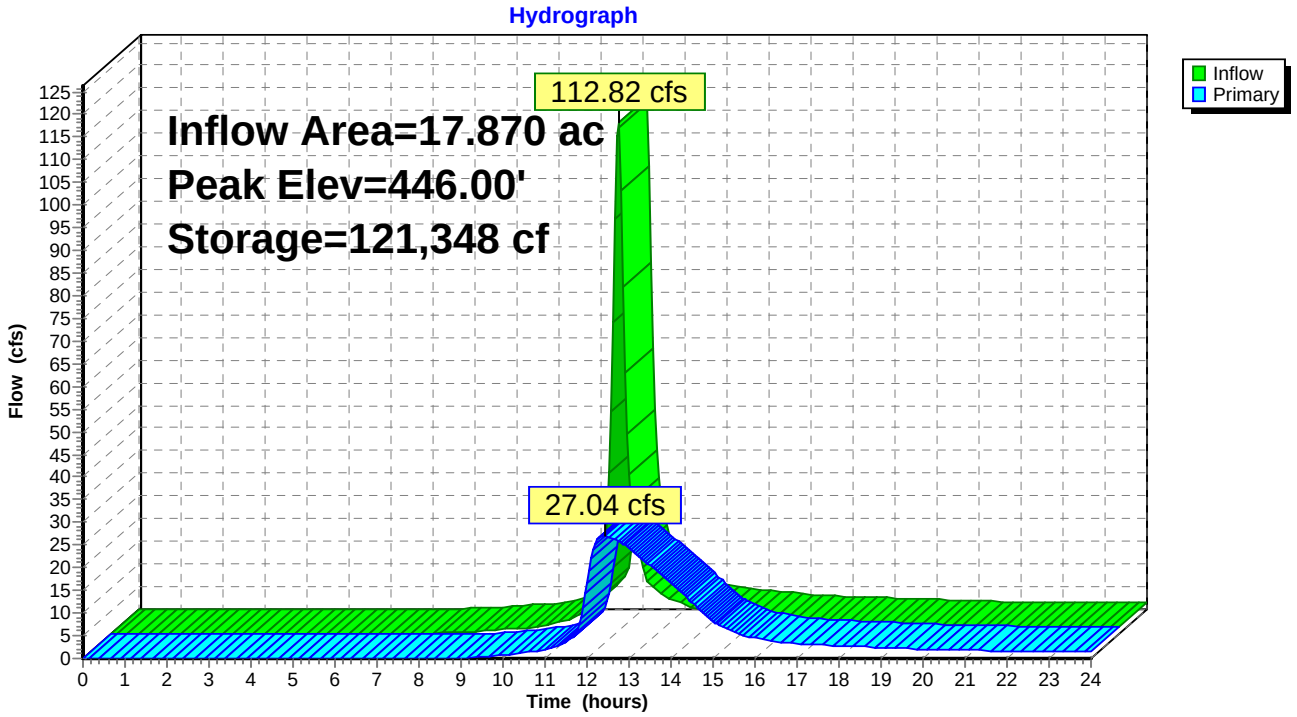
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" x 64.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600

Primary OutFlow Max=27.03 cfs @ 12.42 hrs HW=445.99' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 27.03 cfs @ 8.60 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes < 81.81 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 42.10 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



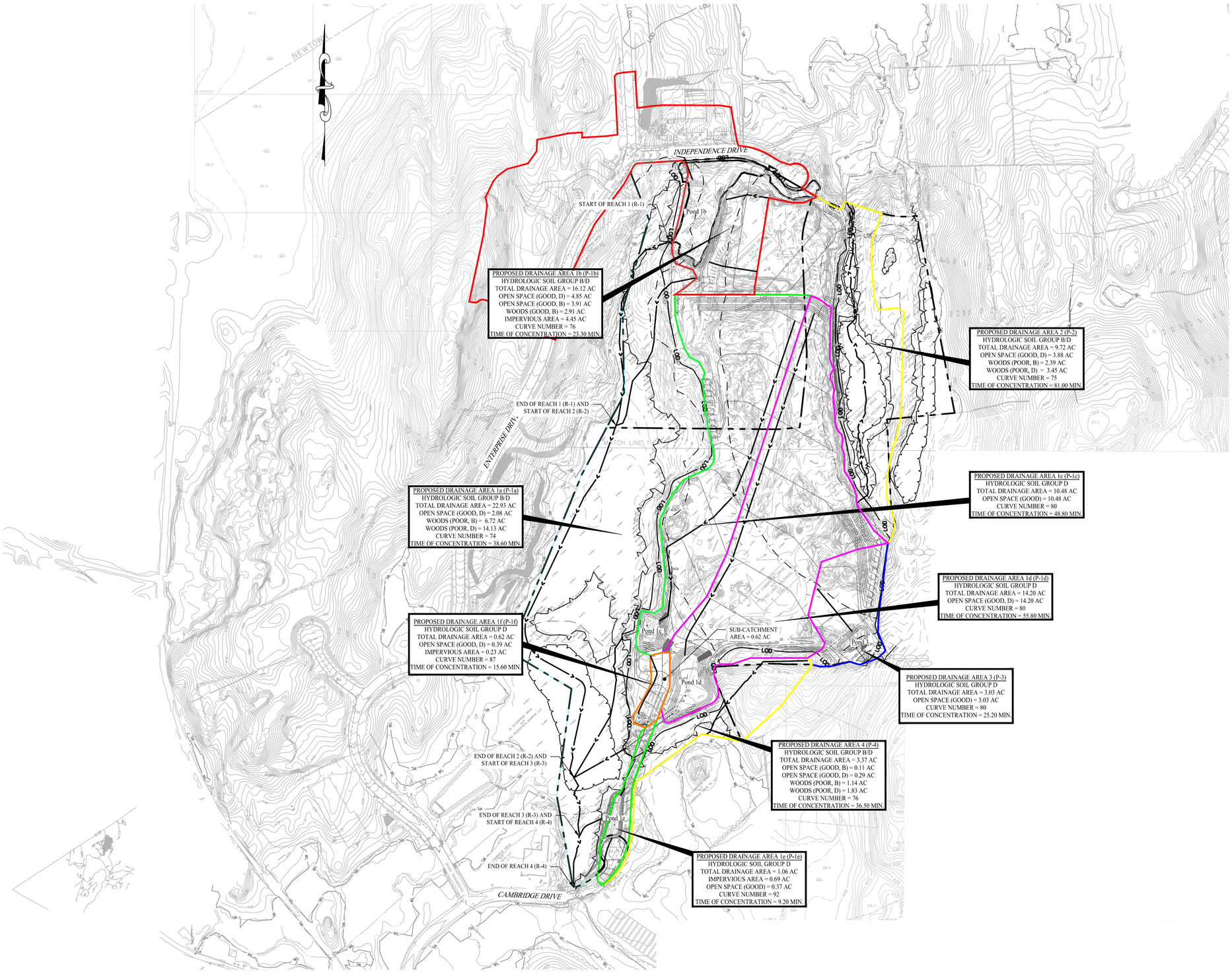
Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.62	13.79	445.74	25.94	447.86	34.03
441.54	0.00	443.66	14.14	445.78	26.11	447.90	34.16
441.58	0.00	443.70	14.47	445.82	26.29	447.94	34.29
441.62	0.00	443.74	14.77	445.86	26.46	447.98	34.43
441.66	0.00	443.78	15.03	445.90	26.63	448.02	34.56
441.70	0.00	443.82	15.28	445.94	26.80	448.06	34.69
441.74	0.00	443.86	15.57	445.98	26.97	448.10	34.82
441.78	0.00	443.90	15.87	446.02	27.14	448.14	34.96
441.82	0.00	443.94	16.15	446.06	27.31	448.18	35.09
441.86	0.02	443.98	16.43	446.10	27.48	448.22	35.22
441.90	0.06	444.02	16.71	446.14	27.65	448.26	35.35
441.94	0.12	444.06	16.98	446.18	27.81	448.30	35.48
441.98	0.20	444.10	17.25	446.22	27.97	448.34	35.60
442.02	0.30	444.14	17.51	446.26	28.14	448.38	35.73
442.06	0.42	444.18	17.77	446.30	28.30	448.42	35.86
442.10	0.55	444.22	18.03	446.34	28.46	448.46	35.99
442.14	0.70	444.26	18.28	446.38	28.62	448.50	36.11
442.18	0.87	444.30	18.53	446.42	28.78	448.54	36.24
442.22	1.06	444.34	18.77	446.46	28.94	448.58	36.37
442.26	1.26	444.38	19.01	446.50	29.10	448.62	36.49
442.30	1.48	444.42	19.25	446.54	29.25	448.66	36.62
442.34	1.71	444.46	19.49	446.58	29.41	448.70	36.74
442.38	1.96	444.50	19.72	446.62	29.56	448.74	36.87
442.42	2.22	444.54	19.95	446.66	29.72	448.78	36.99
442.46	2.50	444.58	20.18	446.70	29.87	448.82	37.11
442.50	2.79	444.62	20.41	446.74	30.03	448.86	37.24
442.54	3.09	444.66	20.63	446.78	30.18	448.90	37.36
442.58	3.41	444.70	20.85	446.82	30.33	448.94	37.48
442.62	3.74	444.74	21.07	446.86	30.48	448.98	37.60
442.66	4.08	444.78	21.29	446.90	30.63	449.02	37.73
442.70	4.43	444.82	21.50	446.94	30.78	449.06	37.85
442.74	4.79	444.86	21.71	446.98	30.93	449.10	37.97
442.78	5.16	444.90	21.92	447.02	31.07	449.14	38.09
442.82	5.54	444.94	22.13	447.06	31.22	449.18	38.21
442.86	5.93	444.98	22.33	447.10	31.37	449.22	38.33
442.90	6.32	445.02	22.54	447.14	31.51	449.26	38.45
442.94	6.72	445.06	22.74	447.18	31.66	449.30	38.57
442.98	7.13	445.10	22.94	447.22	31.80	449.34	38.68
443.02	7.55	445.14	23.14	447.26	31.95	449.38	38.80
443.06	7.97	445.18	23.34	447.30	32.09	449.42	38.92
443.10	8.39	445.22	23.53	447.34	32.23	449.46	39.04
443.14	8.82	445.26	23.73	447.38	32.37	449.50	**39.15**
443.18	9.25	445.30	23.92	447.42	32.51		
443.22	9.68	445.34	24.11	447.46	32.65		
443.26	10.11	445.38	24.30	447.50	32.79		
443.30	10.54	445.42	24.48	447.54	32.93		
443.34	10.97	445.46	24.67	447.58	33.07		
443.38	11.39	445.50	24.86	447.62	33.21		
443.42	11.81	445.54	25.04	447.66	33.35		
443.46	12.23	445.58	25.22	447.70	33.48		
443.50	12.63	445.62	25.40	447.74	33.62		
443.54	13.03	445.66	25.58	447.78	33.76		
443.58	13.42	445.70	25.76	447.82	33.89		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234

Proposed Drainage Area Map (DA-2)



GENERAL NOTES

1. THE STORMWATER MANAGEMENT PLAN AND DESIGN IS INTENDED TO BE IN COMPLIANCE WITH THE 2000 CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT) DRAINAGE MANUAL AND THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL.
2. STORMWATER RUNOFF ANALYSIS WAS CALCULATED USING THE SCS TR-55 METHODOLOGY.

LEGEND

- PROPERTY LINE
- LIMITS OF EXISTING DRAINAGE AREA
- FLOW PATH

Rev. #:	Date	Description
2	06/16/21	Inland Wetlands RTC
1	06/02/21	Inland Wetlands RTC

Graphic Scale: 200 0 200 400

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	AWC
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 200'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

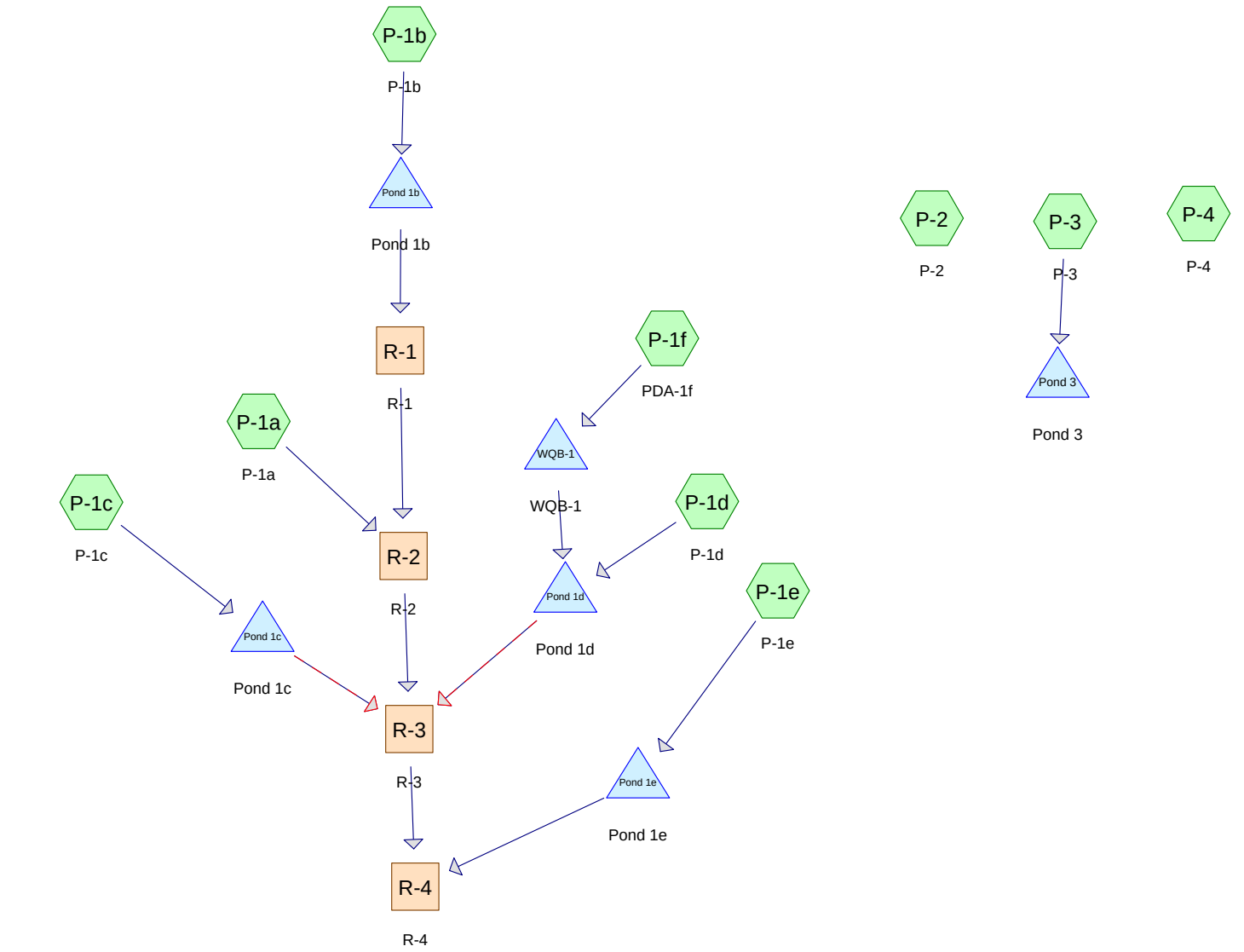
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: PROPOSED DRAINAGE AREA MAP

Sheet #: DA-2

Jun 17, 2021 - 1:22pm oschroder
X:\SE Files\Project Data\2019\1903601 - 64 Cambridge Drive - Monroe\Cadd Data\WC Remediation\1903601-DA Maps.dwg

Proposed HydroCAD Report



Routing Diagram for 1903601 - Proposed Hydrology

Prepared by {enter your company name here}, Printed 6/16/2021

HydroCAD® 10.10-6a s/n 10621 © 2020 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>1.27"
Flow Length=777' Tc=38.6 min CN=74 Runoff=20.30 cfs 2.419 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>1.40"
Flow Length=209' Tc=23.3 min CN=76 Runoff=22.43 cfs 1.880 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>1.66"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=10.76 cfs 1.451 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>1.66"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=13.24 cfs 1.961 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>2.69"
Tc=9.2 min CN=92 Runoff=4.25 cfs 0.238 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>2.23"
Flow Length=274' Tc=15.6 min CN=87 Runoff=1.73 cfs 0.115 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>1.31"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=5.27 cfs 1.060 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>1.67"
Flow Length=234' Tc=25.2 min CN=80 Runoff=4.89 cfs 0.422 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>1.39"
Flow Length=590' Tc=36.5 min CN=76 Runoff=3.48 cfs 0.391 af

Reach R-1: R-1 Avg. Flow Depth=0.43' Max Vel=3.70 fps Inflow=9.46 cfs 1.790 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=9.40 cfs 1.780 af

Reach R-2: R-2 Avg. Flow Depth=1.13' Max Vel=1.68 fps Inflow=28.25 cfs 4.198 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=23.14 cfs 4.092 af

Reach R-3: R-3 Avg. Flow Depth=1.74' Max Vel=1.31 fps Inflow=29.61 cfs 6.216 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=29.31 cfs 6.178 af

Reach R-4: R-4 Avg. Flow Depth=1.84' Max Vel=1.23 fps Inflow=29.31 cfs 6.199 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=29.13 cfs 6.167 af

Pond Pond 1b: Pond 1b Peak Elev=443.20' Storage=24,569 cf Inflow=22.43 cfs 1.880 af
Outflow=9.46 cfs 1.790 af

Pond Pond 1c: Pond 1c Peak Elev=412.02' Storage=21,610 cf Inflow=10.76 cfs 1.451 af
Primary=5.91 cfs 1.385 af Secondary=0.00 cfs 0.000 af Outflow=5.91 cfs 1.385 af

Pond Pond 1d: Pond 1d Peak Elev=412.06' Storage=59,701 cf Inflow=13.52 cfs 2.015 af
Primary=0.83 cfs 0.739 af Secondary=0.00 cfs 0.000 af Outflow=0.83 cfs 0.739 af

Pond Pond 1e: Pond 1e Peak Elev=406.36' Storage=9,484 cf Inflow=4.25 cfs 0.238 af
Outflow=0.05 cfs 0.020 af

Pond Pond 3: Pond 3 Peak Elev=424.22' Storage=5,703 cf Inflow=4.89 cfs 0.422 af
Primary=1.96 cfs 0.407 af Secondary=0.00 cfs 0.000 af Outflow=1.96 cfs 0.407 af

Pond WQB-1: WQB-1 Peak Elev=412.05' Storage=2,718 cf Inflow=1.73 cfs 0.115 af
Outflow=0.46 cfs 0.054 af

Summary for Subcatchment P-1a: P-1a

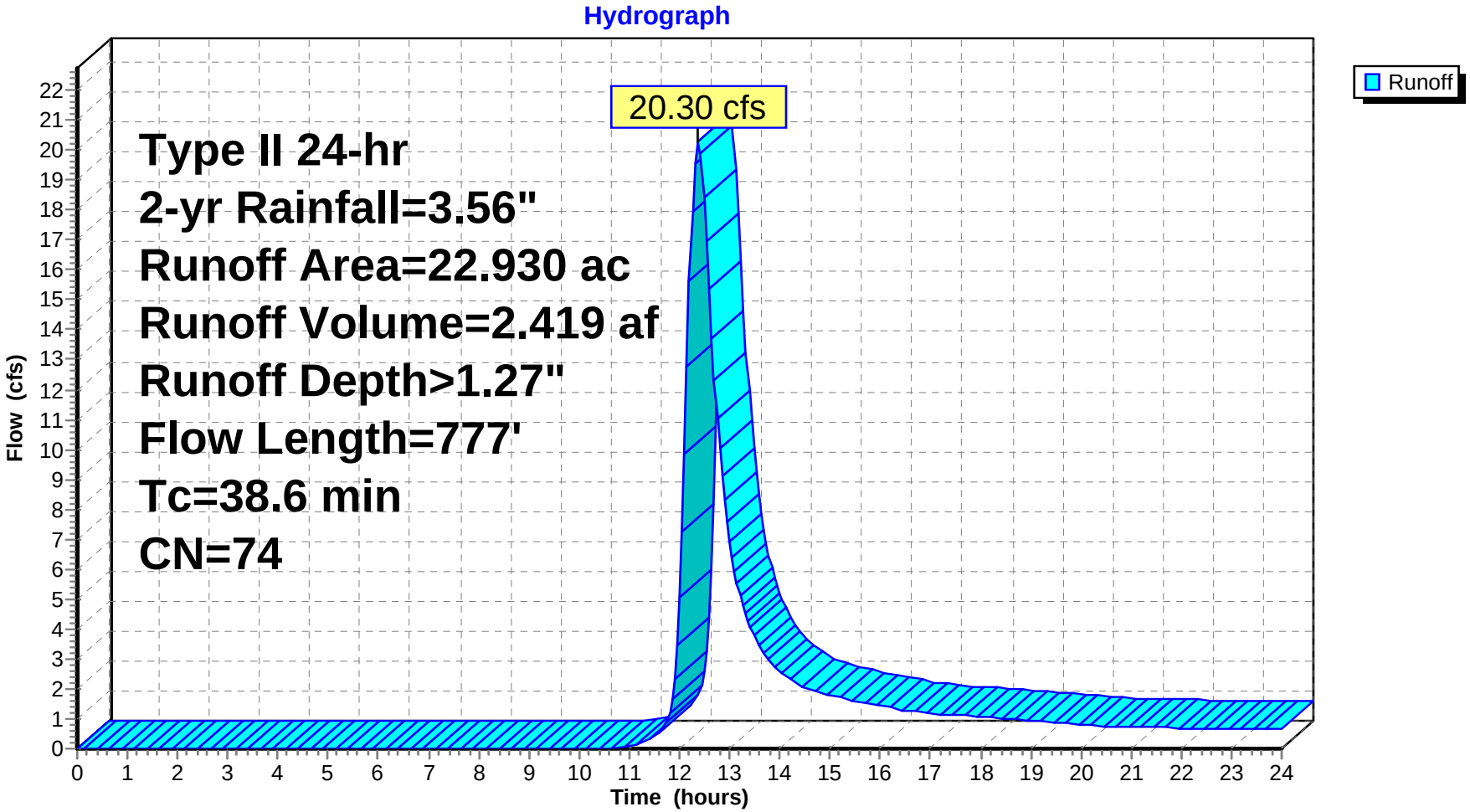
Runoff = 20.30 cfs @ 12.37 hrs, Volume= 2.419 af, Depth> 1.27"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

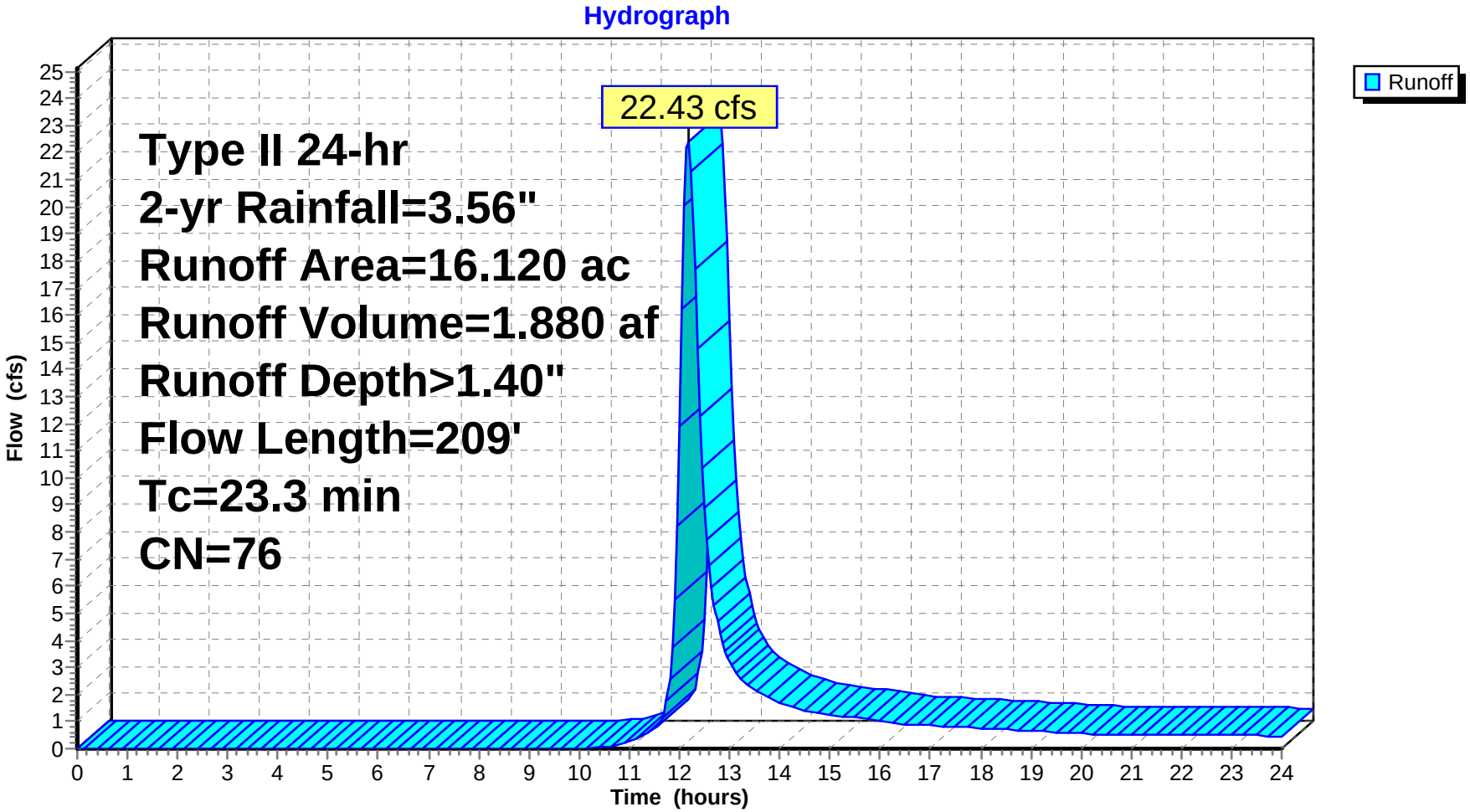
Runoff = 22.43 cfs @ 12.17 hrs, Volume= 1.880 af, Depth> 1.40"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

Runoff = 10.76 cfs @ 12.49 hrs, Volume= 1.451 af, Depth> 1.66"
Routed to Pond Pond 1c : Pond 1c

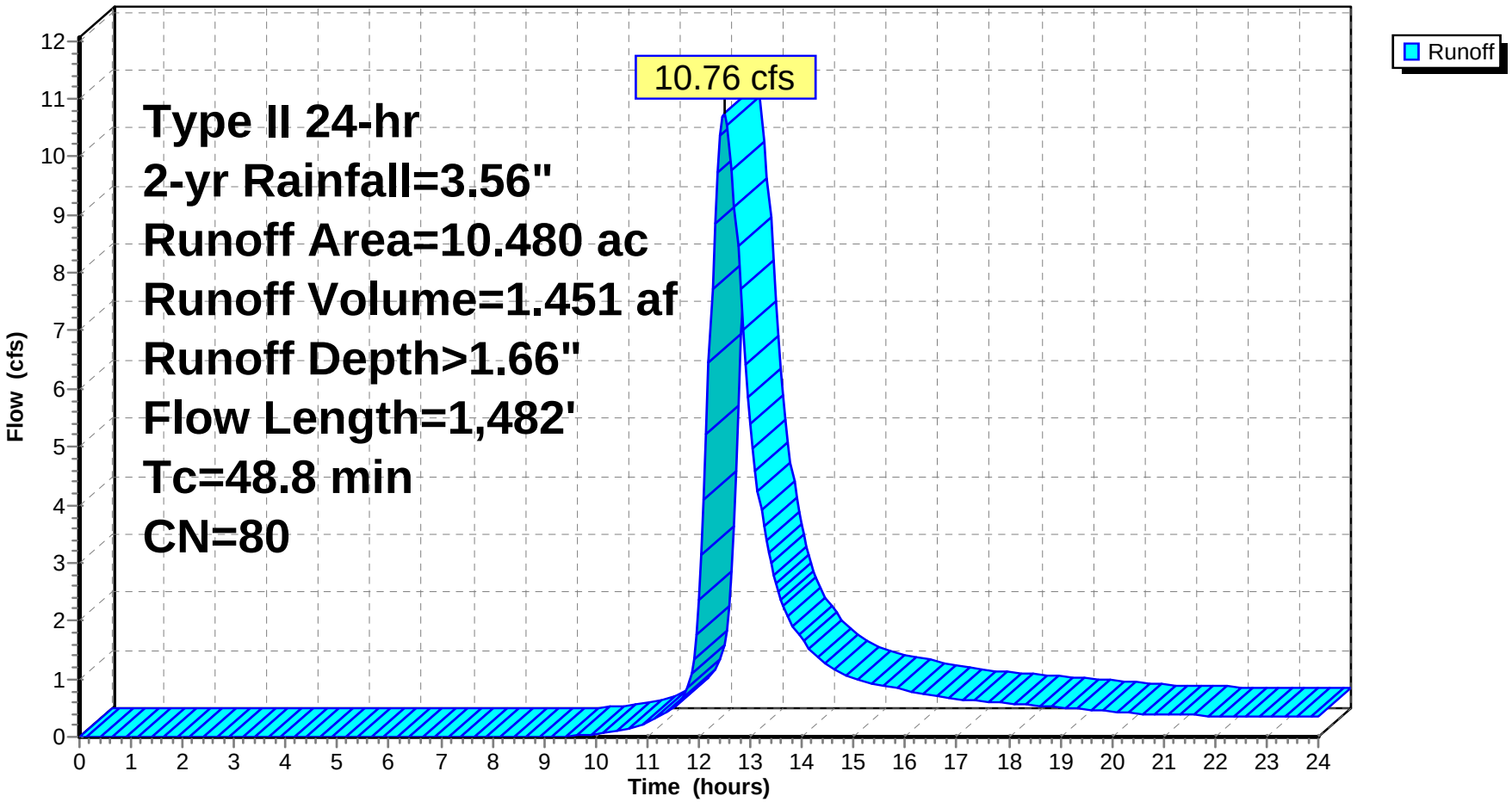
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c

Hydrograph



Summary for Subcatchment P-1d: P-1d

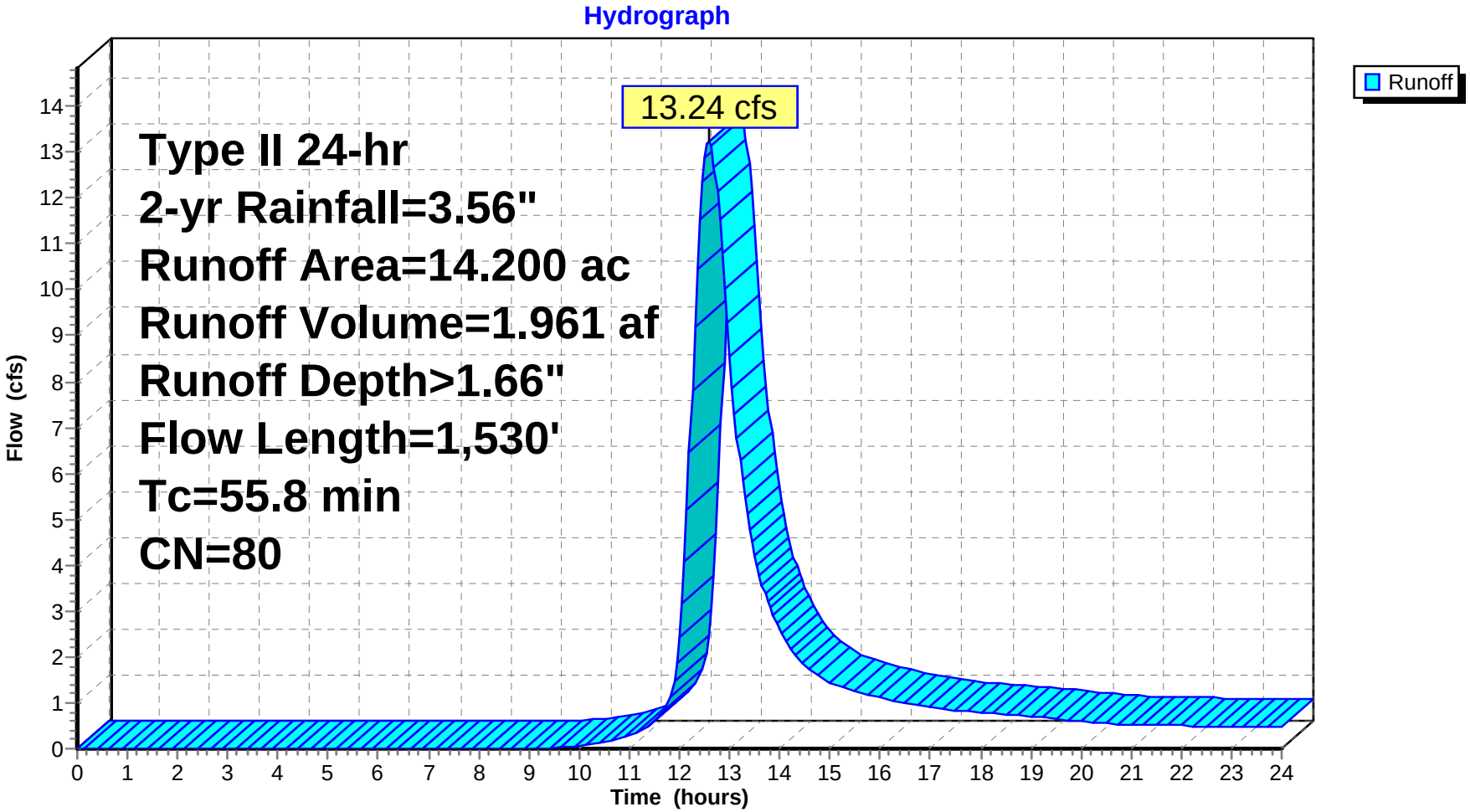
Runoff = 13.24 cfs @ 12.59 hrs, Volume= 1.961 af, Depth> 1.66"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

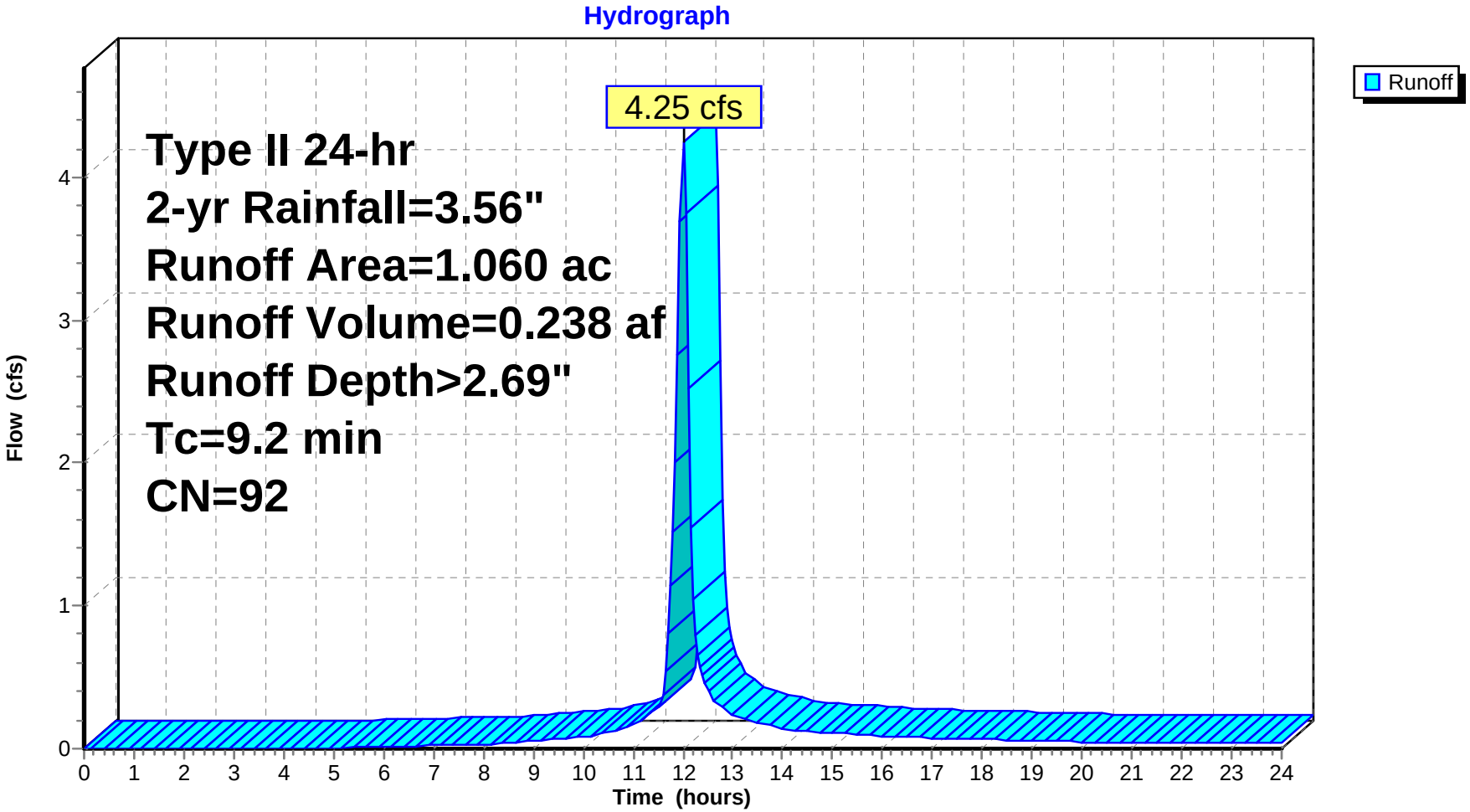
Runoff = 4.25 cfs @ 12.00 hrs, Volume= 0.238 af, Depth> 2.69"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

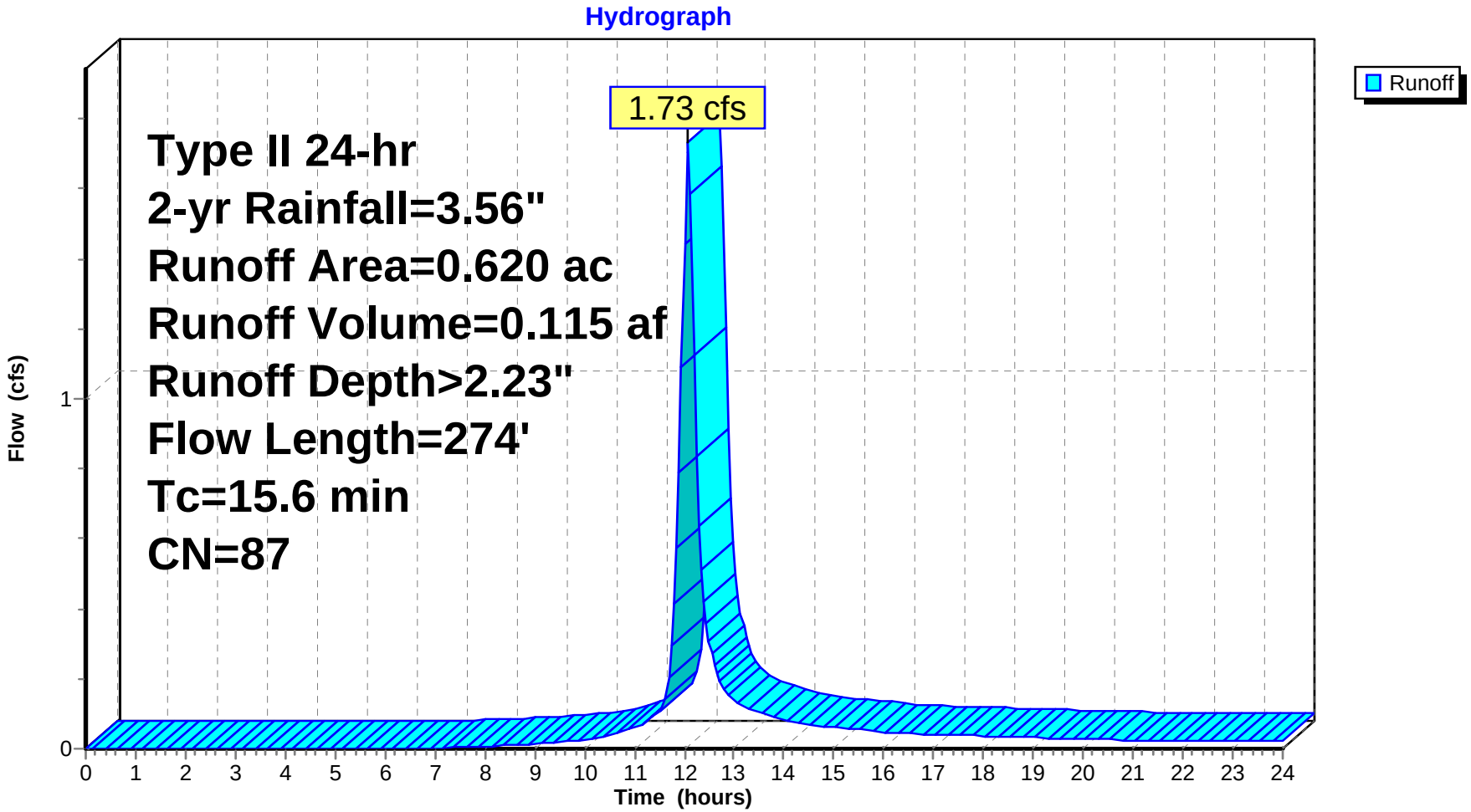
Runoff = 1.73 cfs @ 12.08 hrs, Volume= 0.115 af, Depth> 2.23"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

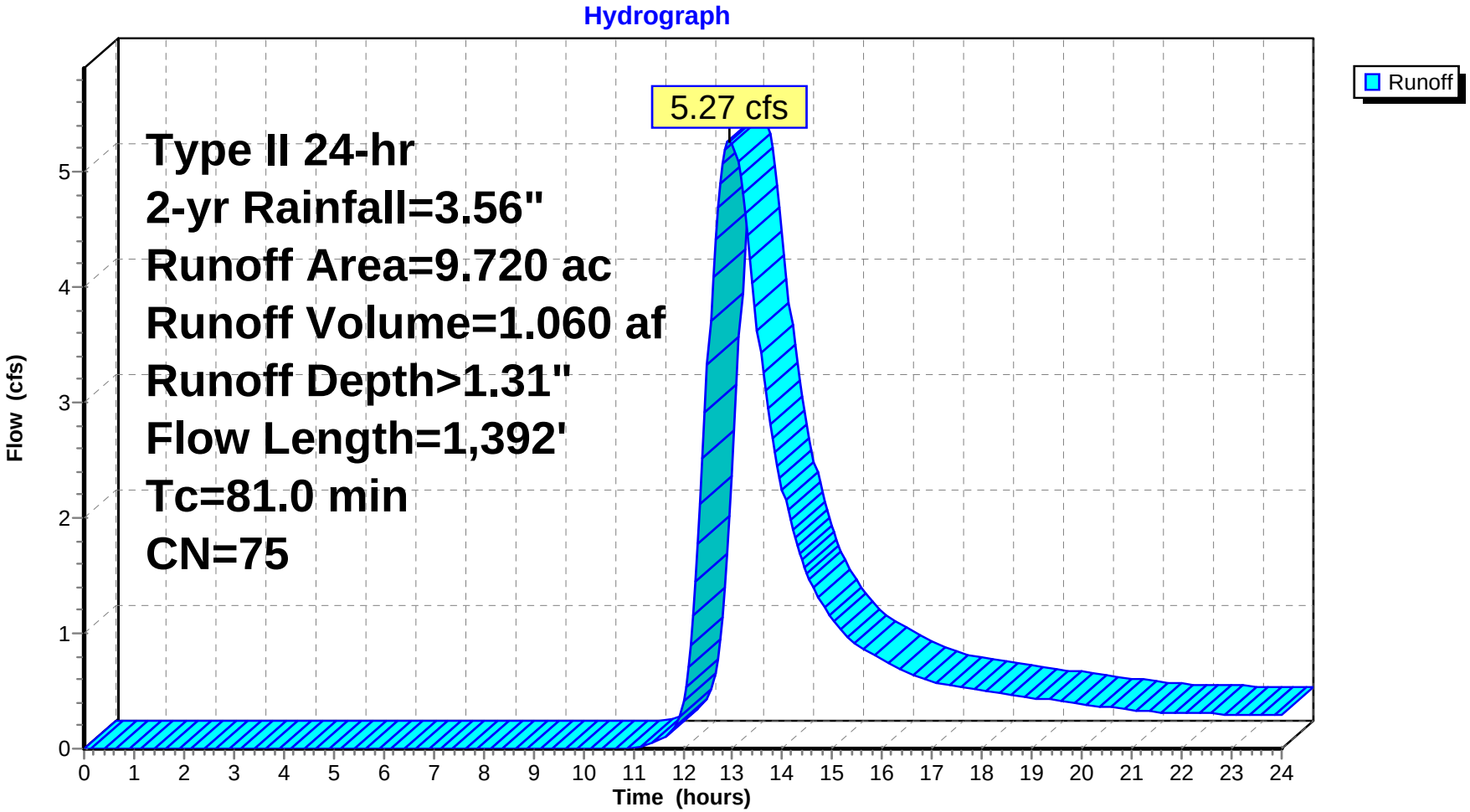
Runoff = 5.27 cfs @ 12.94 hrs, Volume= 1.060 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

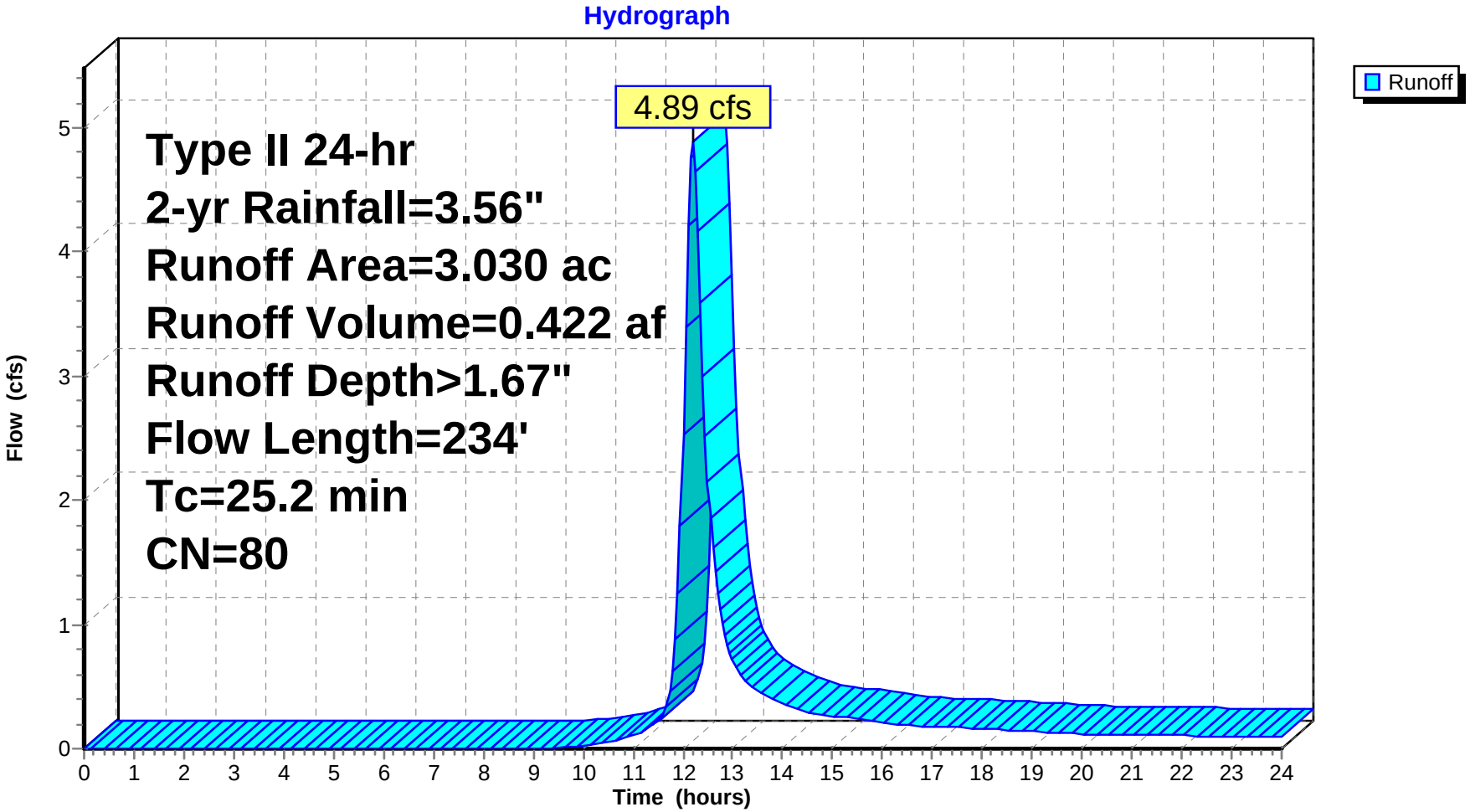
Runoff = 4.89 cfs @ 12.19 hrs, Volume= 0.422 af, Depth> 1.67"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

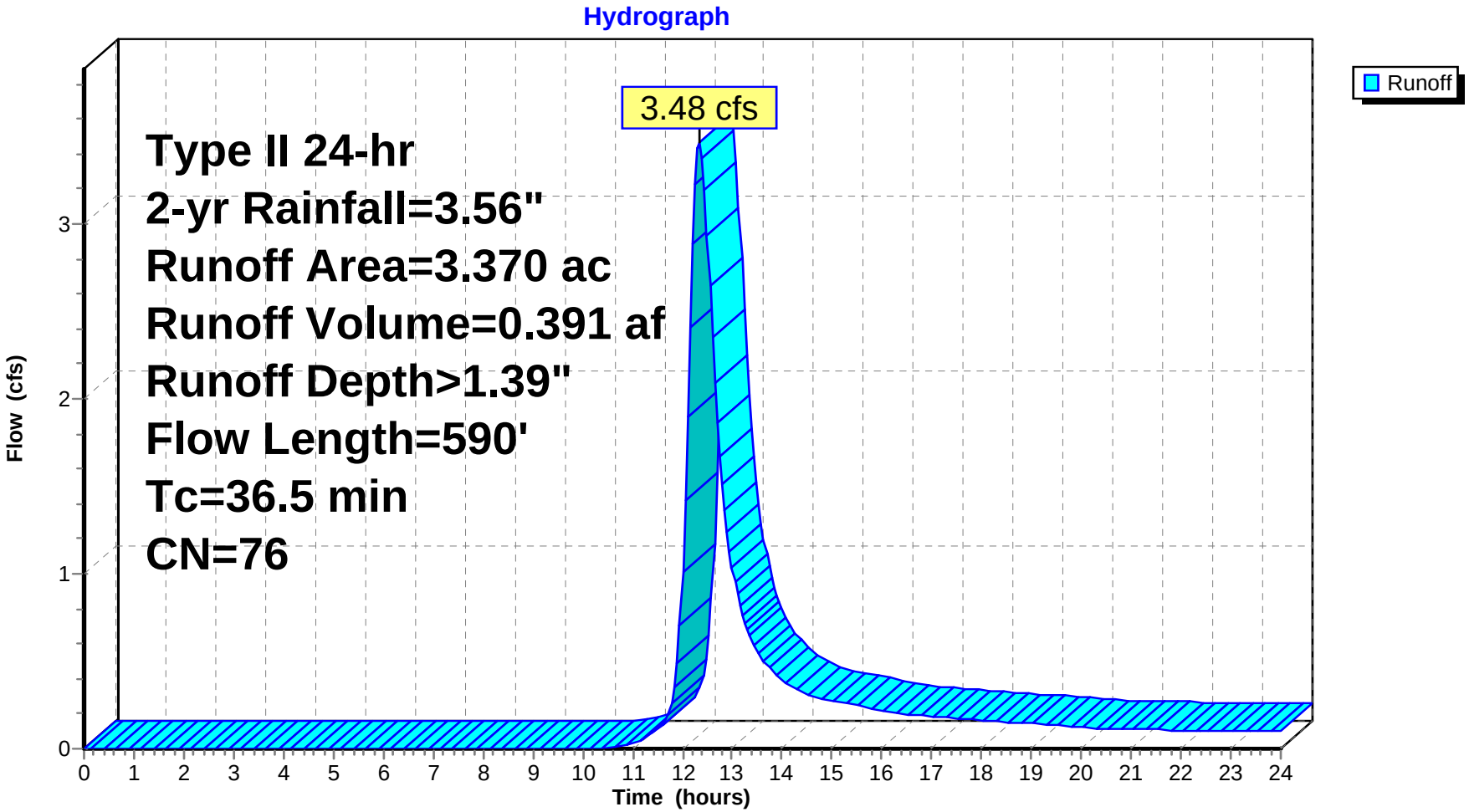
Runoff = 3.48 cfs @ 12.34 hrs, Volume= 0.391 af, Depth> 1.39"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC**
					Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 1.33" for 2-yr event
Inflow = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af
Outflow = 9.40 cfs @ 12.60 hrs, Volume= 1.780 af, Atten= 1%, Lag= 7.3 min
Routed to Reach R-2 : R-2

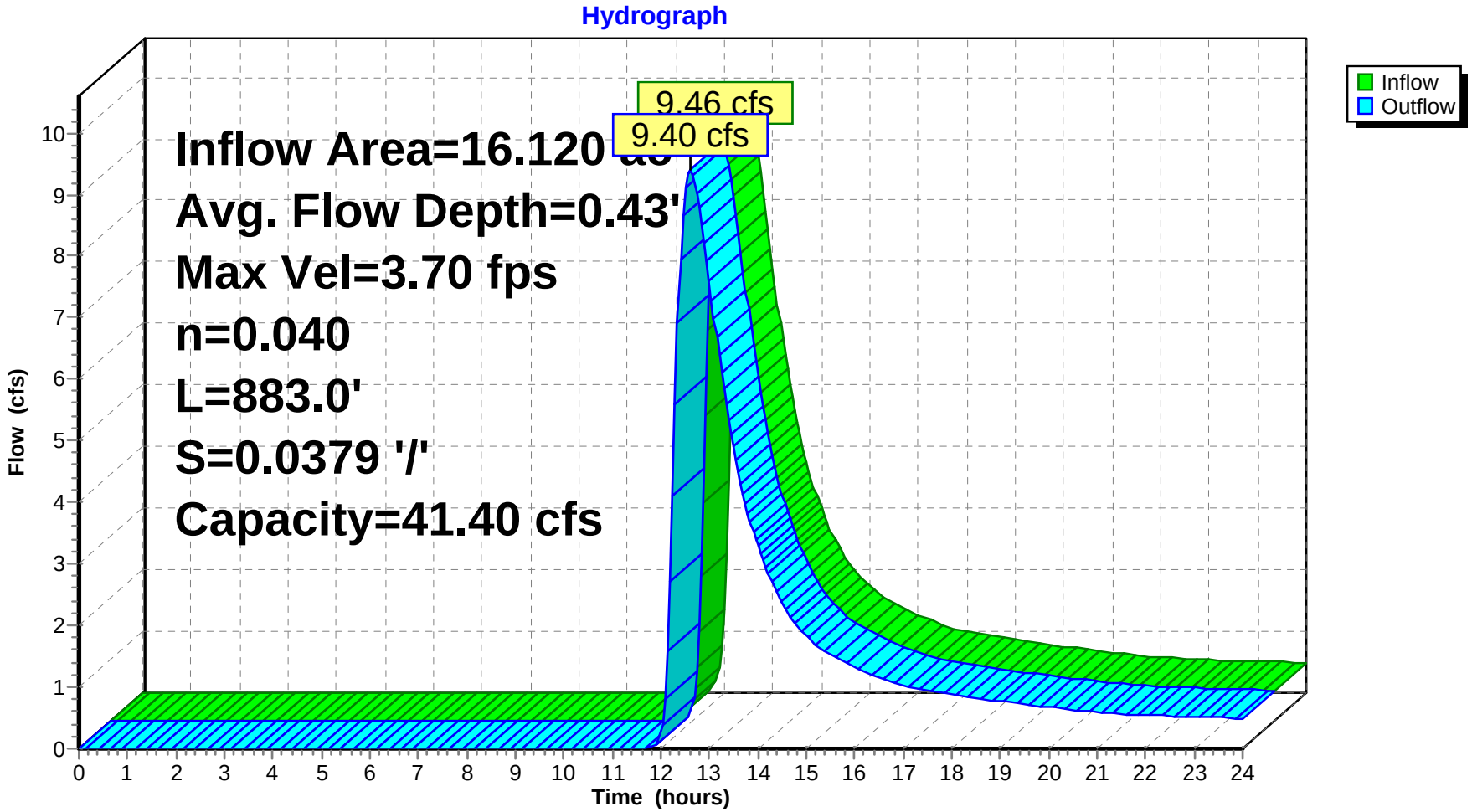
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 8.2 min

Peak Storage= 2,244 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 6.73'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
Inflow
Outflow
9.46 cfs
9.40 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.43'
Max Vel=3.70 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
0 1 2 3 4 5 6 7 8 9 10

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 1.29" for 2-yr event
Inflow = 28.25 cfs @ 12.43 hrs, Volume= 4.198 af
Outflow = 23.14 cfs @ 12.93 hrs, Volume= 4.092 af, Atten= 18%, Lag= 30.5 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 17.0 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 37.8 min

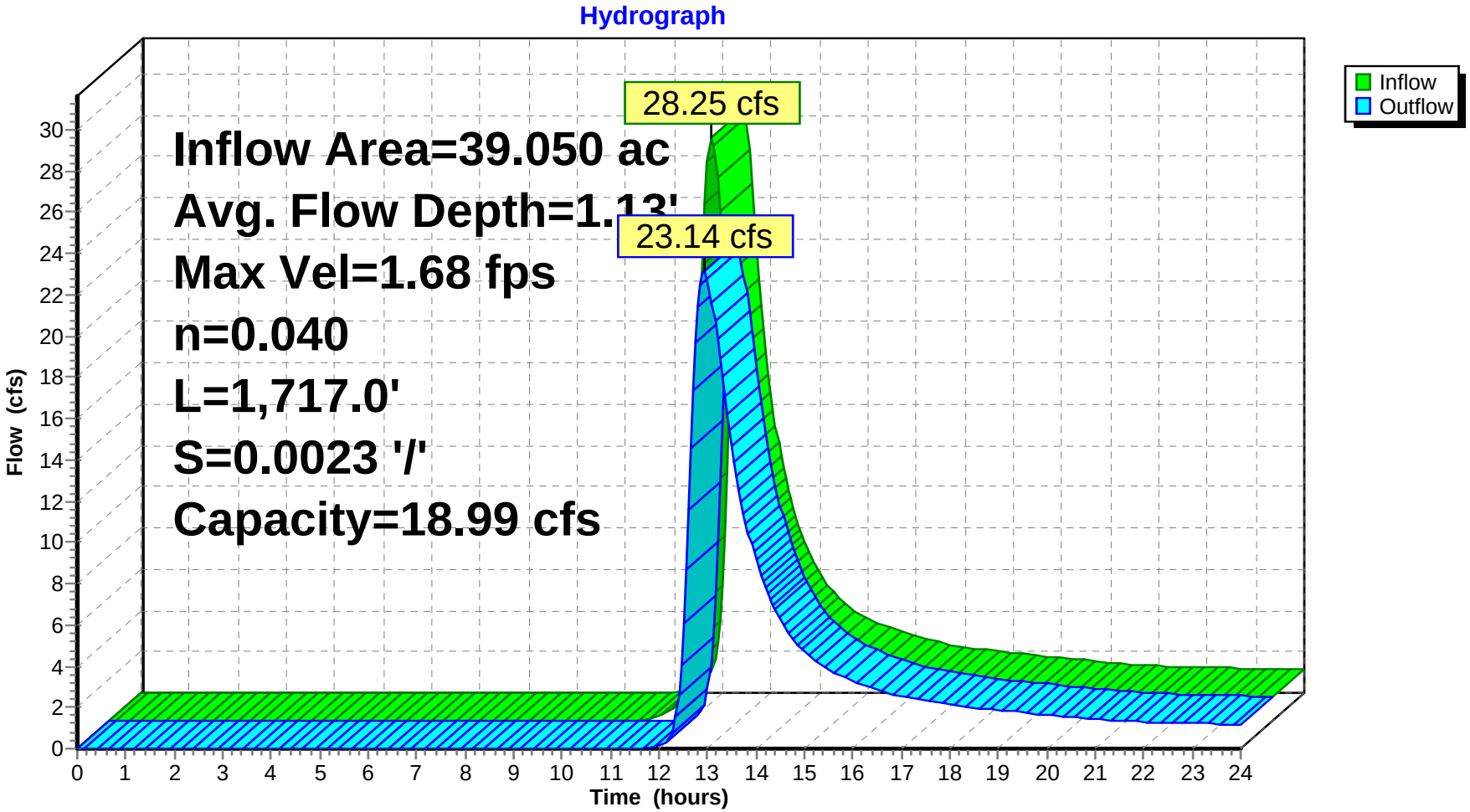
Peak Storage= 23,665 cf @ 12.65 hrs
Average Depth at Peak Storage= 1.13' , Surface Width= 14.51'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
28.25 cfs
23.14 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=1.13'
Max Vel=1.68 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 1.16" for 2-yr event
Inflow = 29.61 cfs @ 12.94 hrs, Volume= 6.216 af
Outflow = 29.31 cfs @ 13.06 hrs, Volume= 6.178 af, Atten= 1%, Lag= 6.9 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.31 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.65 fps, Avg. Travel Time= 7.2 min

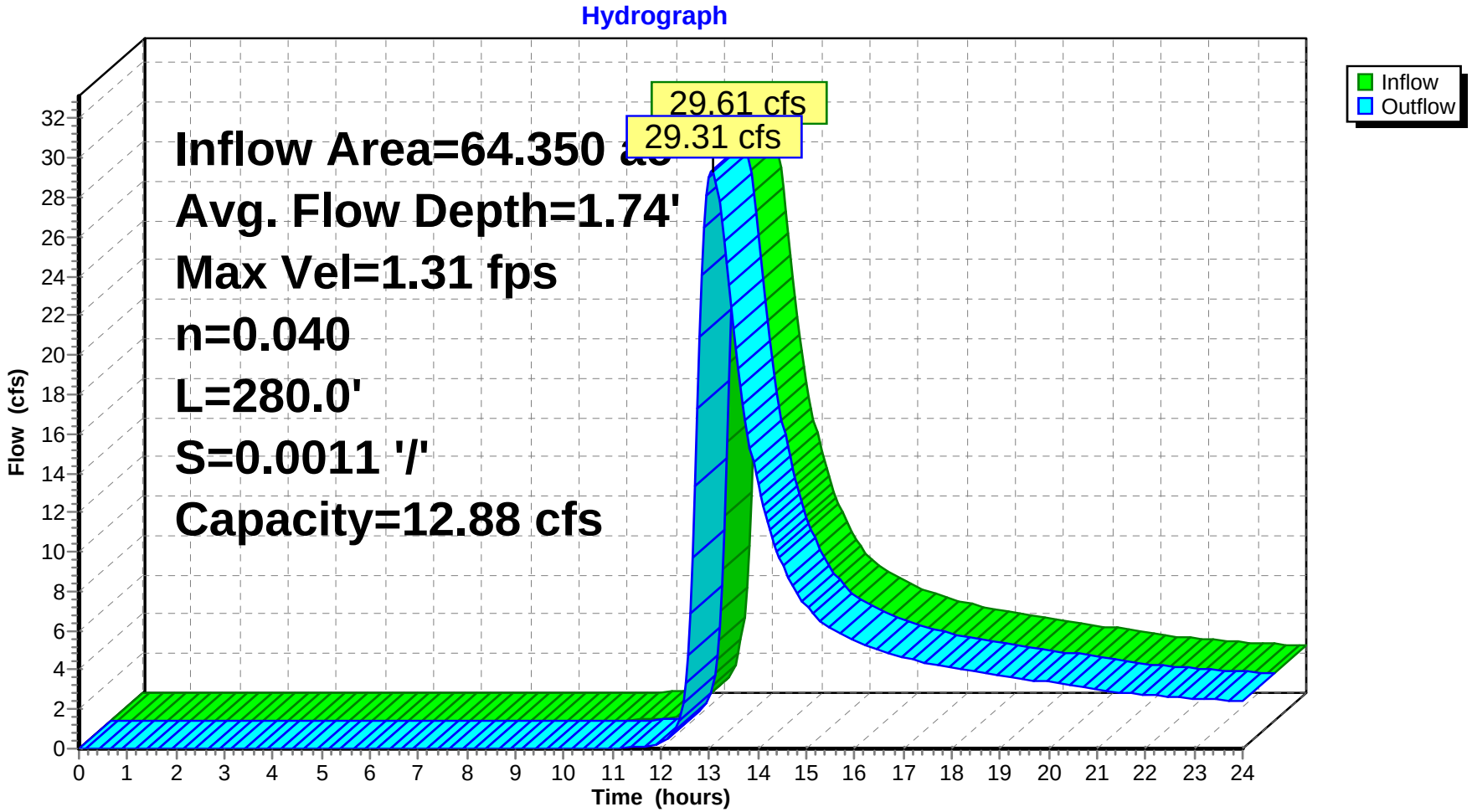
Peak Storage= 6,250 cf @ 13.00 hrs
Average Depth at Peak Storage= 1.74' , Surface Width= 16.95'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
Inflow
Outflow
29.61 cfs
29.31 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=1.74'
Max Vel=1.31 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 1.14" for 2-yr event
Inflow = 29.31 cfs @ 13.06 hrs, Volume= 6.199 af
Outflow = 29.13 cfs @ 13.15 hrs, Volume= 6.167 af, Atten= 1%, Lag= 5.7 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.23 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.62 fps, Avg. Travel Time= 5.9 min

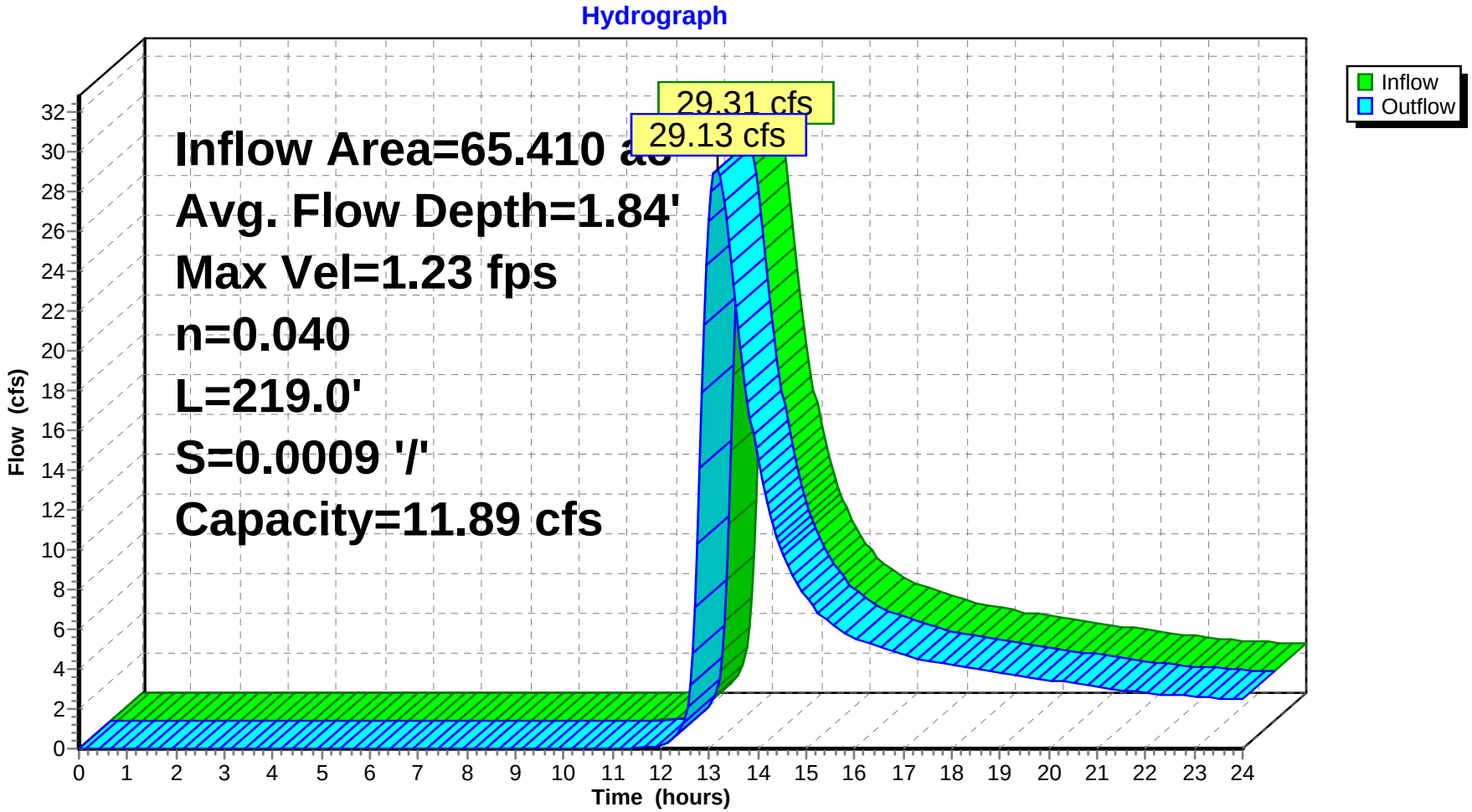
Peak Storage= 5,192 cf @ 13.10 hrs
Average Depth at Peak Storage= 1.84' , Surface Width= 17.35'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
29.31 cfs
29.13 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=1.84'
Max Vel=1.23 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 1.40" for 2-yr event
Inflow = 22.43 cfs @ 12.17 hrs, Volume= 1.880 af
Outflow = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af, Atten= 58%, Lag= 18.4 min
Primary = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.20' @ 12.48 hrs Surf.Area= 25,187 sf Storage= 24,569 cf

Plug-Flow detention time= 64.3 min calculated for 1.790 af (95% of inflow)
Center-of-Mass det. time= 38.6 min (896.7 - 858.1)

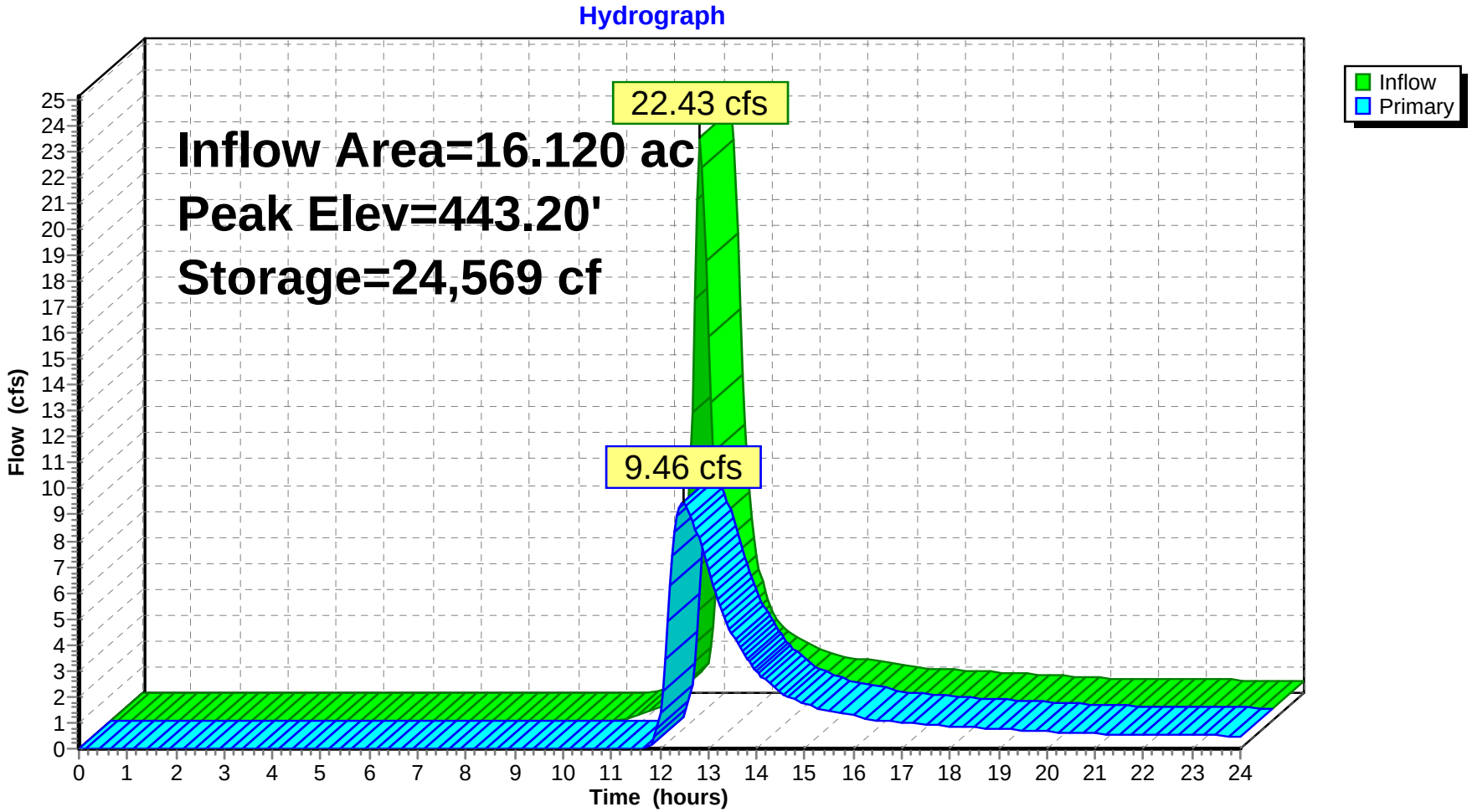
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.45 cfs @ 12.48 hrs HW=443.20' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 9.45 cfs @ 4.03 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 9.45 cfs of 15.20 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234
449.60	40,718	141,234
449.70	40,718	141,234
449.80	40,718	141,234
449.90	40,718	141,234
450.00	40,718	141,234
450.10	40,718	141,234
450.20	40,718	141,234
450.30	40,718	141,234
450.40	40,718	141,234
450.50	40,718	141,234

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 1.66" for 2-yr event
Inflow = 10.76 cfs @ 12.49 hrs, Volume= 1.451 af
Outflow = 5.91 cfs @ 12.95 hrs, Volume= 1.385 af, Atten= 45%, Lag= 27.4 min
Primary = 5.91 cfs @ 12.95 hrs, Volume= 1.385 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.02' @ 12.95 hrs Surf.Area= 8,753 sf Storage= 21,610 cf

Plug-Flow detention time= 122.2 min calculated for 1.382 af (95% of inflow)
Center-of-Mass det. time= 98.2 min (963.7 - 865.5)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

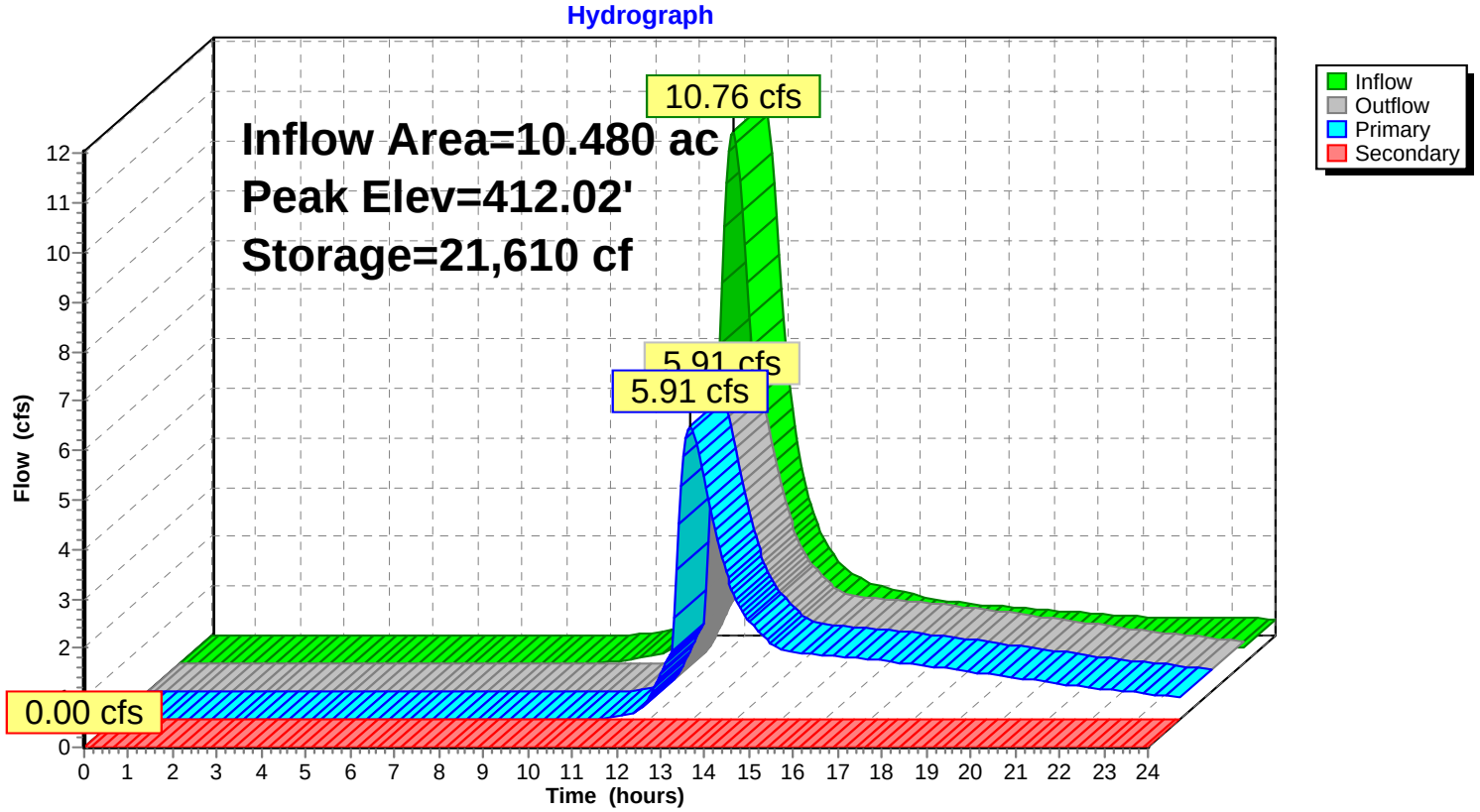
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=5.91 cfs @ 12.95 hrs HW=412.02' (Free Discharge)
└─**1=Culvert** (Passes 5.91 cfs of 26.28 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.57 cfs @ 8.01 fps)
  ├─**3=Sharp-Crested Rectangular Weir** (Weir Controls 4.34 cfs @ 3.26 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 1.63" for 2-yr event
Inflow = 13.52 cfs @ 12.58 hrs, Volume= 2.015 af
Outflow = 0.83 cfs @ 17.95 hrs, Volume= 0.739 af, Atten= 94%, Lag= 322.2 min
Primary = 0.83 cfs @ 17.95 hrs, Volume= 0.739 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.06' @ 17.95 hrs Surf.Area= 24,459 sf Storage= 59,701 cf

Plug-Flow detention time= 356.1 min calculated for 0.739 af (37% of inflow)
Center-of-Mass det. time= 226.0 min (1,098.8 - 872.8)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

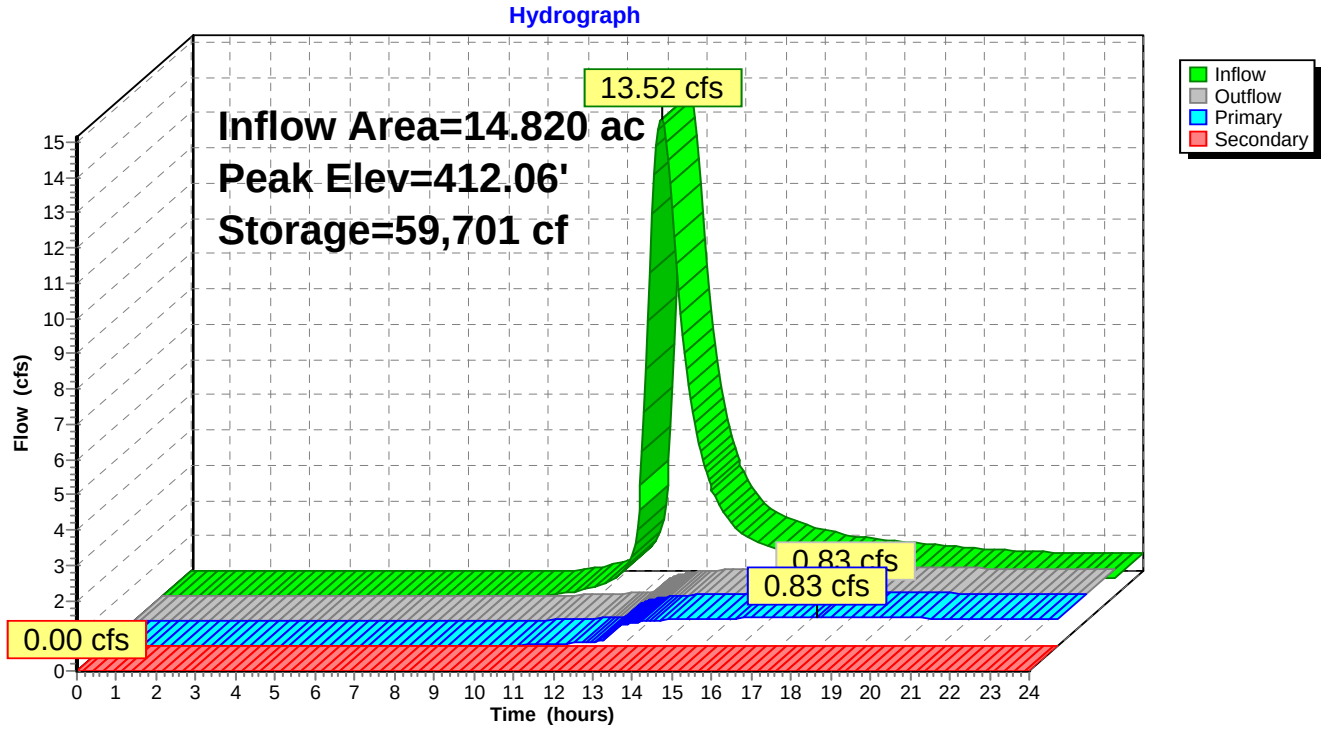
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=0.83 cfs @ 17.95 hrs HW=412.06' (Free Discharge)
- **1=Culvert** (Passes 0.83 cfs of 26.44 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.21 cfs @ 9.60 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.58 cfs @ 6.62 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 0.04 cfs @ 0.77 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 2.69" for 2-yr event
Inflow = 4.25 cfs @ 12.00 hrs, Volume= 0.238 af
Outflow = 0.05 cfs @ 19.59 hrs, Volume= 0.020 af, Atten= 99%, Lag= 455.2 min
Primary = 0.05 cfs @ 19.59 hrs, Volume= 0.020 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.36' @ 19.59 hrs Surf.Area= 7,868 sf Storage= 9,484 cf

Plug-Flow detention time= 734.5 min calculated for 0.020 af (8% of inflow)
Center-of-Mass det. time= 483.6 min (1,276.3 - 792.7)

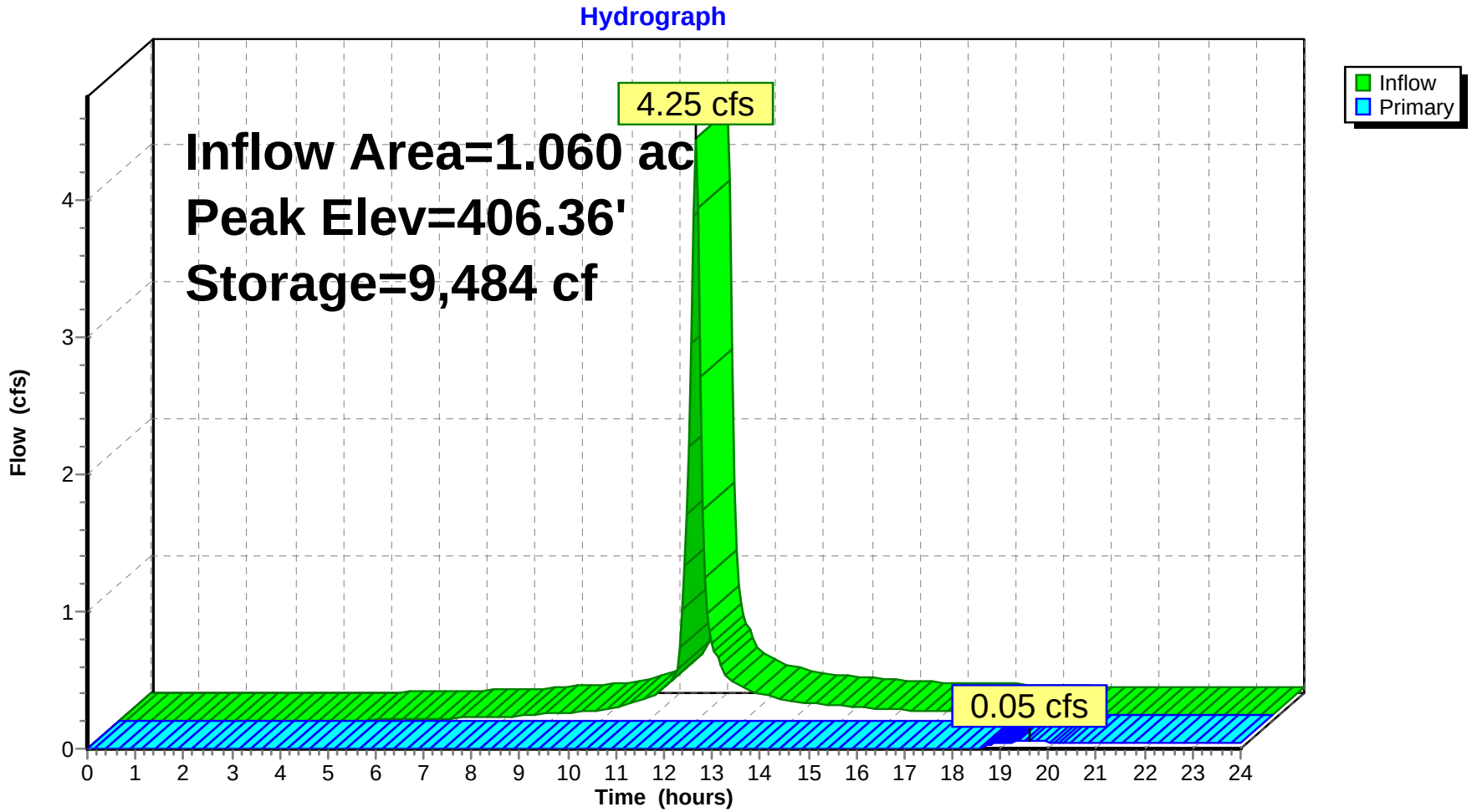
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.04 cfs @ 19.59 hrs HW=406.36' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.23 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0
405.02	6,127	122
405.04	6,153	245
405.06	6,179	368
405.08	6,205	492
405.10	6,230	617
405.12	6,256	741
405.14	6,282	867
405.16	6,308	993
405.18	6,334	1,119
405.20	6,360	1,246
405.22	6,386	1,374
405.24	6,412	1,502
405.26	6,437	1,630
405.28	6,463	1,759
405.30	6,489	1,889
405.32	6,515	2,019
405.34	6,541	2,149
405.36	6,567	2,280
405.38	6,593	2,412
405.40	6,619	2,544
405.42	6,644	2,677
405.44	6,670	2,810
405.46	6,696	2,943
405.48	6,722	3,078
405.50	6,748	3,212
405.52	6,774	3,347
405.54	6,800	3,483
405.56	6,826	3,619
405.58	6,852	3,756
405.60	6,877	3,894
405.62	6,903	4,031
405.64	6,929	4,170
405.66	6,955	4,308
405.68	6,981	4,448
405.70	7,007	4,588
405.72	7,033	4,728
405.74	7,059	4,869
405.76	7,084	5,010
405.78	7,110	5,152
405.80	7,136	5,295
405.82	7,162	5,438
405.84	7,188	5,581
405.86	7,214	5,725
405.88	7,240	5,870
405.90	7,266	6,015
405.92	7,291	6,161
405.94	7,317	6,307
405.96	7,343	6,453
405.98	7,369	6,600
406.00	7,395	6,748
406.02	7,421	6,896
406.04	7,448	7,045
406.06	7,474	7,194
406.08	7,501	7,344
406.10	7,527	7,494
406.12	7,553	7,645
406.14	7,580	7,796
406.16	7,606	7,948
406.18	7,633	8,100
406.20	7,659	8,253
406.22	7,685	8,407
406.24	7,712	8,561
406.26	7,738	8,715
406.28	7,765	8,870
406.30	7,791	9,026
406.32	7,817	9,182
406.34	7,844	9,339
406.36	7,870	9,496
406.38	7,897	9,653
406.40	7,924	9,812
406.42	7,951	9,970
406.44	7,978	10,130
406.46	8,005	10,289
406.48	8,032	10,450
406.50	8,058	10,611
406.52	8,085	10,772
406.54	8,112	10,934
406.56	8,139	11,097
406.58	8,166	11,260
406.60	8,193	11,423
406.62	8,219	11,587
406.64	8,246	11,752
406.66	8,273	11,917
406.68	8,300	12,083
406.70	8,327	12,249
406.72	8,354	12,416
406.74	**8,381**	**12,583**

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 1.67" for 2-yr event
Inflow = 4.89 cfs @ 12.19 hrs, Volume= 0.422 af
Outflow = 1.96 cfs @ 12.53 hrs, Volume= 0.407 af, Atten= 60%, Lag= 20.5 min
Primary = 1.96 cfs @ 12.53 hrs, Volume= 0.407 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 424.22' @ 12.53 hrs Surf.Area= 5,234 sf Storage= 5,703 cf

Plug-Flow detention time= 58.9 min calculated for 0.407 af (96% of inflow)
Center-of-Mass det. time= 38.4 min (886.2 - 847.8)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

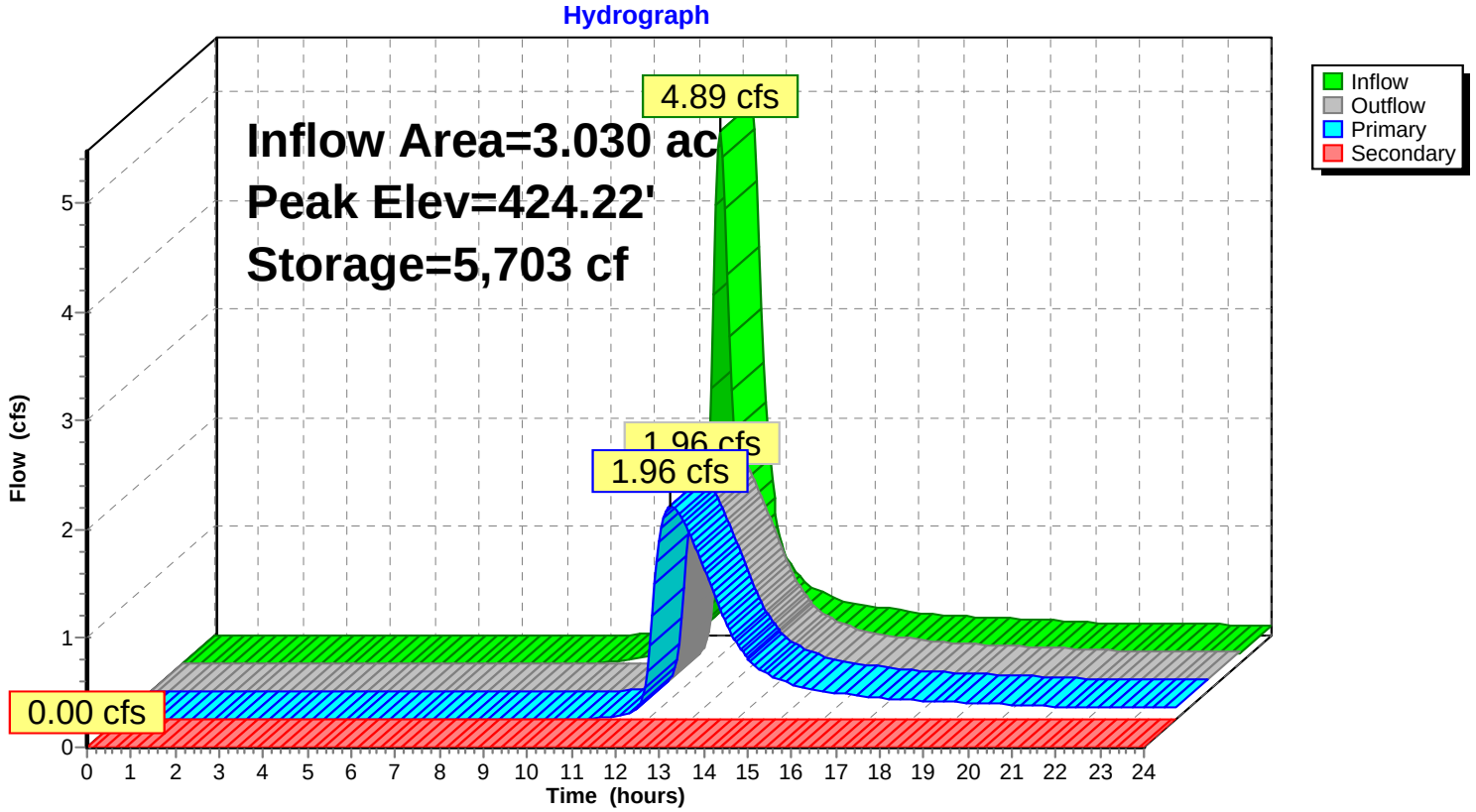
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=1.96 cfs @ 12.53 hrs HW=424.22' (Free Discharge)
└─**1=Culvert** (Passes 1.96 cfs of 5.81 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.96 cfs @ 4.43 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 2.23" for 2-yr event
Inflow = 1.73 cfs @ 12.08 hrs, Volume= 0.115 af
Outflow = 0.46 cfs @ 12.40 hrs, Volume= 0.054 af, Atten= 74%, Lag= 19.5 min
Primary = 0.46 cfs @ 12.40 hrs, Volume= 0.054 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.05' @ 12.40 hrs Surf.Area= 1,445 sf Storage= 2,718 cf

Plug-Flow detention time= 243.0 min calculated for 0.054 af (47% of inflow)
Center-of-Mass det. time= 128.0 min (946.1 - 818.1)

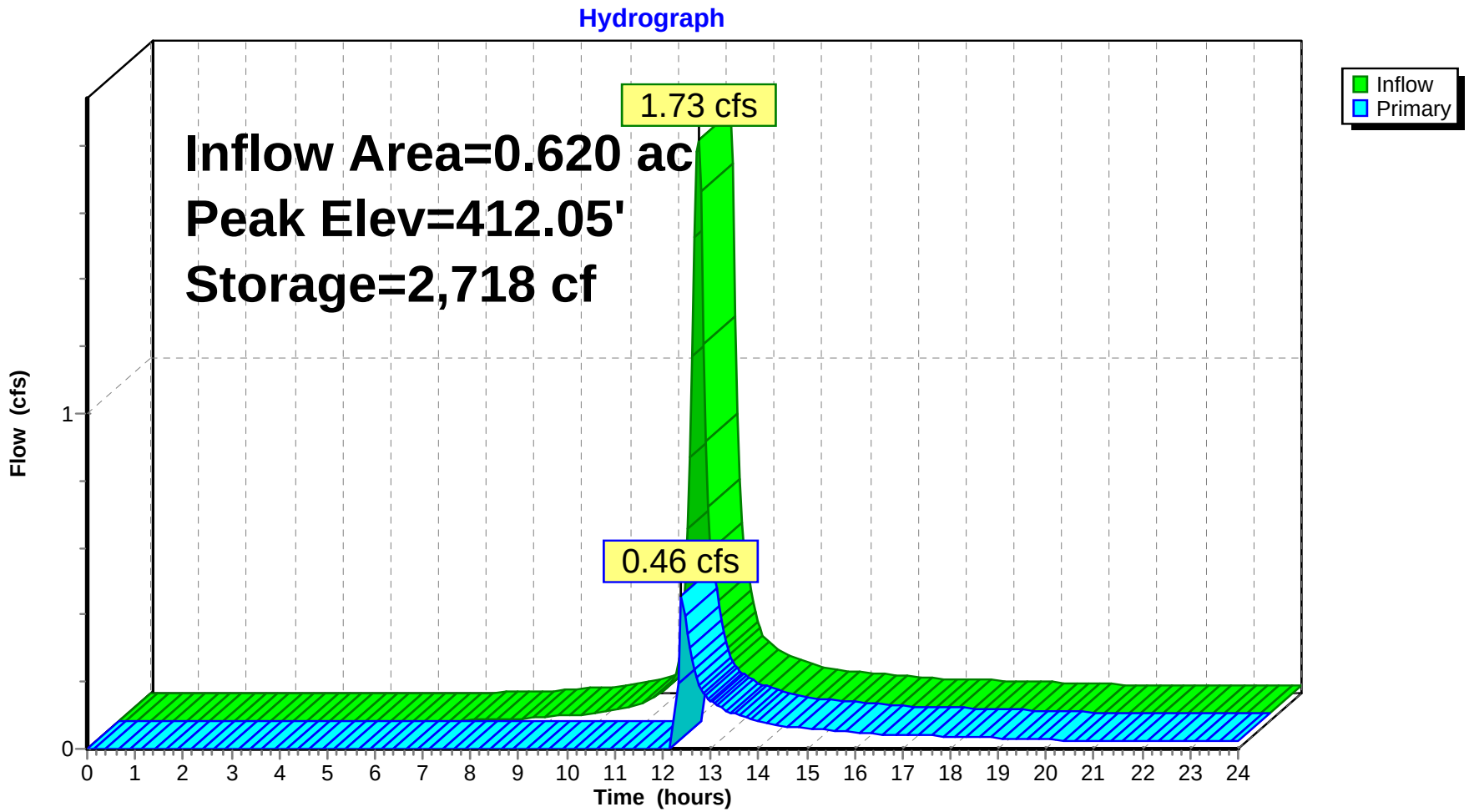
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.45 cfs @ 12.40 hrs HW=412.05' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.45 cfs @ 0.53 fps)

Pond WQB-1: WQB-1



Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>2.04"
Flow Length=777' Tc=38.6 min CN=74 Runoff=33.89 cfs 3.902 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>2.21"
Flow Length=209' Tc=23.3 min CN=76 Runoff=36.16 cfs 2.972 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>2.53"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=16.61 cfs 2.211 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>2.53"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=20.45 cfs 2.990 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>3.71"
Tc=9.2 min CN=92 Runoff=5.76 cfs 0.328 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>3.20"
Flow Length=274' Tc=15.6 min CN=87 Runoff=2.46 cfs 0.165 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>2.09"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=8.70 cfs 1.696 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>2.55"
Flow Length=234' Tc=25.2 min CN=80 Runoff=7.51 cfs 0.643 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>2.20"
Flow Length=590' Tc=36.5 min CN=76 Runoff=5.64 cfs 0.619 af

Reach R-1: R-1 Avg. Flow Depth=0.56' Max Vel=4.29 fps Inflow=14.79 cfs 2.866 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=14.75 cfs 2.853 af

Reach R-2: R-2 Avg. Flow Depth=1.63' Max Vel=1.91 fps Inflow=47.23 cfs 6.755 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=39.64 cfs 6.622 af

Reach R-3: R-3 Avg. Flow Depth=2.75' Max Vel=1.42 fps Inflow=52.48 cfs 10.422 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=51.96 cfs 10.375 af

Reach R-4: R-4 Avg. Flow Depth=2.95' Max Vel=1.33 fps Inflow=52.31 cfs 10.485 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=51.95 cfs 10.446 af

Pond Pond 1b: Pond 1b Peak Elev=443.75' Storage=40,079 cf Inflow=36.16 cfs 2.972 af
Outflow=14.79 cfs 2.866 af

Pond Pond 1c: Pond 1c Peak Elev=412.56' Storage=26,575 cf Inflow=16.61 cfs 2.211 af
Primary=12.36 cfs 2.102 af Secondary=0.00 cfs 0.000 af Outflow=12.36 cfs 2.102 af

Pond Pond 1d: Pond 1d Peak Elev=412.84' Storage=79,512 cf Inflow=20.82 cfs 3.094 af
Primary=3.11 cfs 1.697 af Secondary=0.00 cfs 0.000 af Outflow=3.11 cfs 1.697 af

Pond Pond 1e: Pond 1e Peak Elev=406.39' Storage=9,707 cf Inflow=5.76 cfs 0.328 af
Outflow=0.36 cfs 0.110 af

Pond Pond 3: Pond 3 Peak Elev=424.88' Storage=9,333 cf Inflow=7.51 cfs 0.643 af
Primary=2.61 cfs 0.625 af Secondary=0.00 cfs 0.000 af Outflow=2.61 cfs 0.625 af

Pond WQB-1: WQB-1 Peak Elev=412.15' Storage=2,867 cf Inflow=2.46 cfs 0.165 af
Outflow=2.46 cfs 0.104 af

Summary for Subcatchment P-1a: P-1a

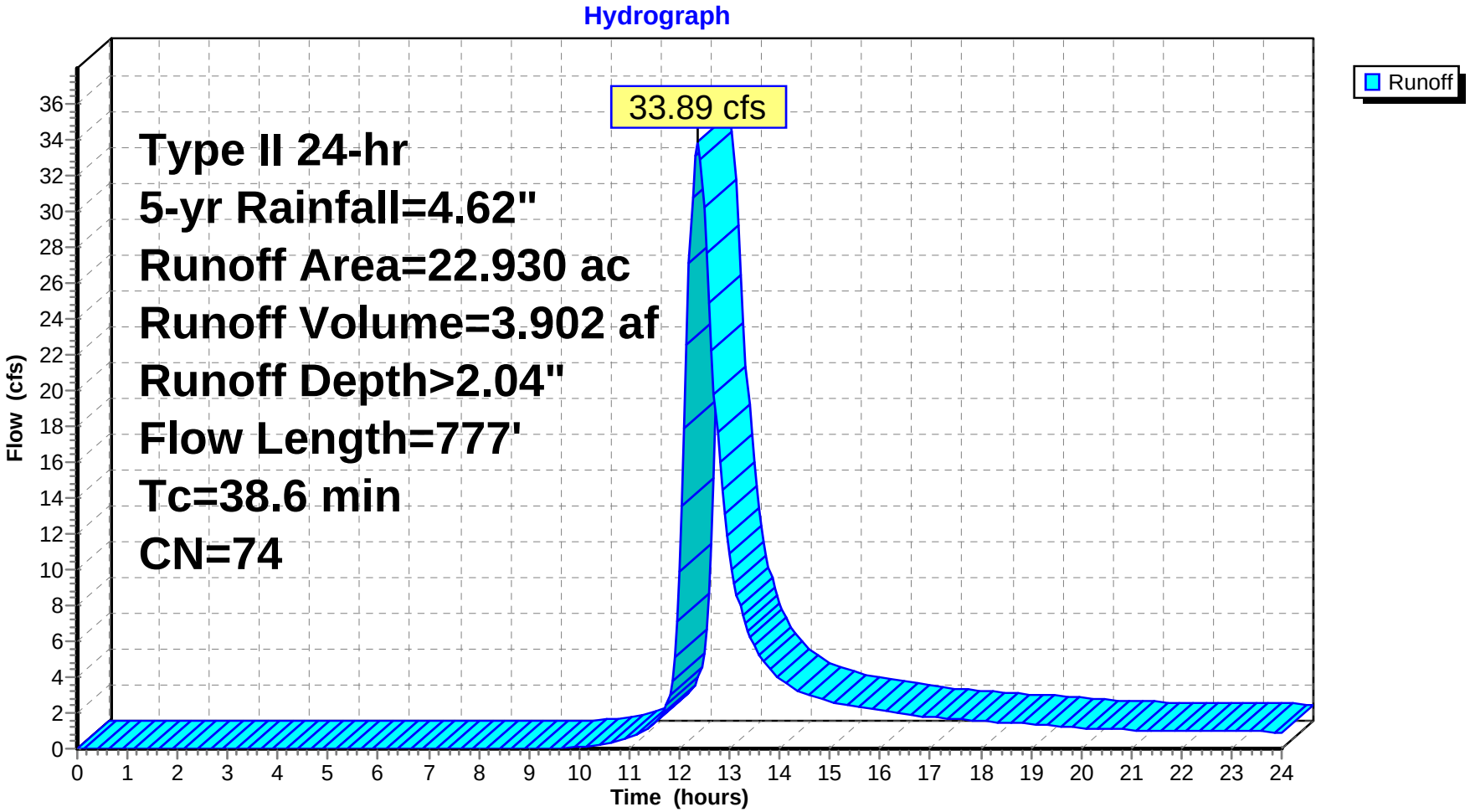
Runoff = 33.89 cfs @ 12.36 hrs, Volume= 3.902 af, Depth> 2.04"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

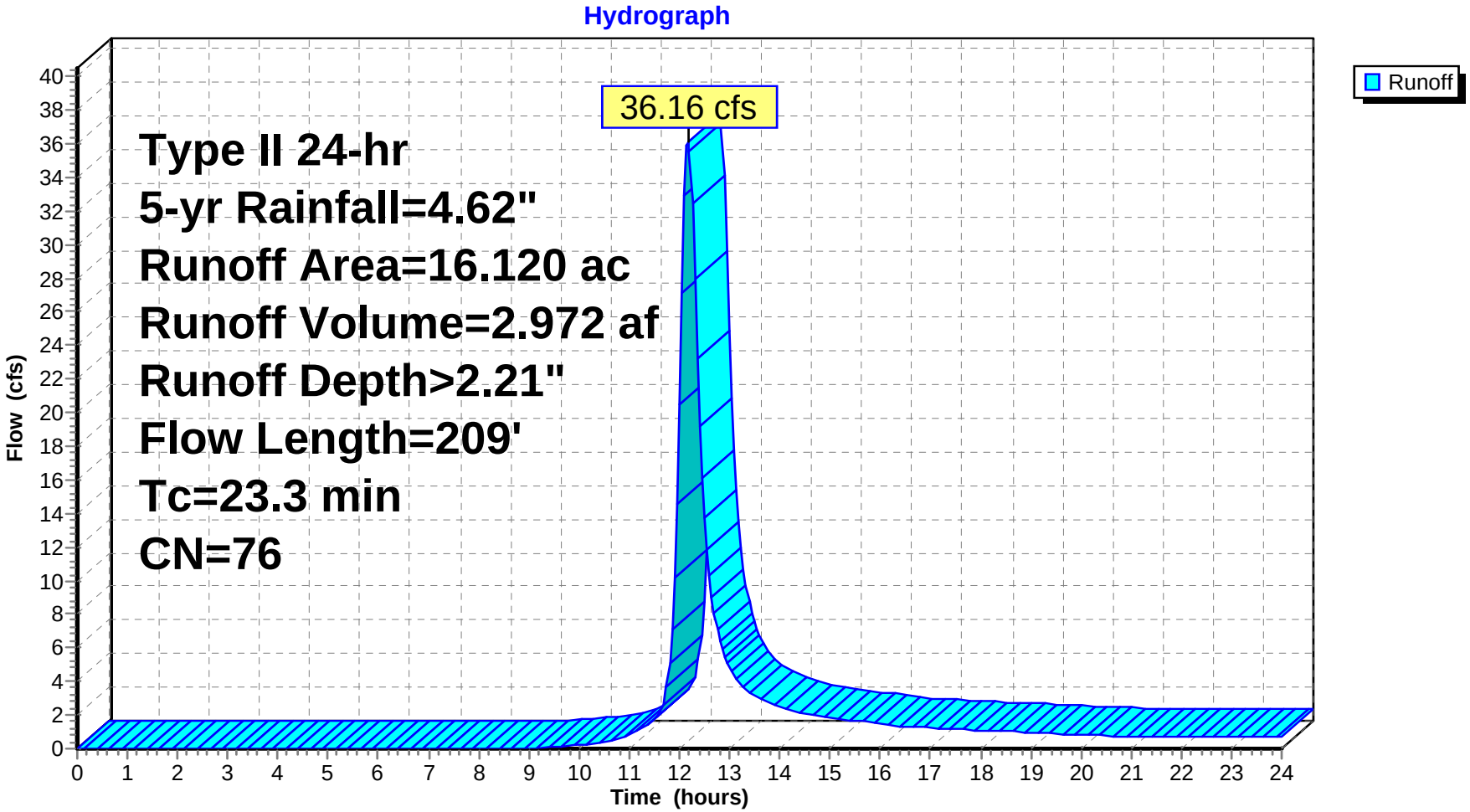
Runoff = 36.16 cfs @ 12.17 hrs, Volume= 2.972 af, Depth> 2.21"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

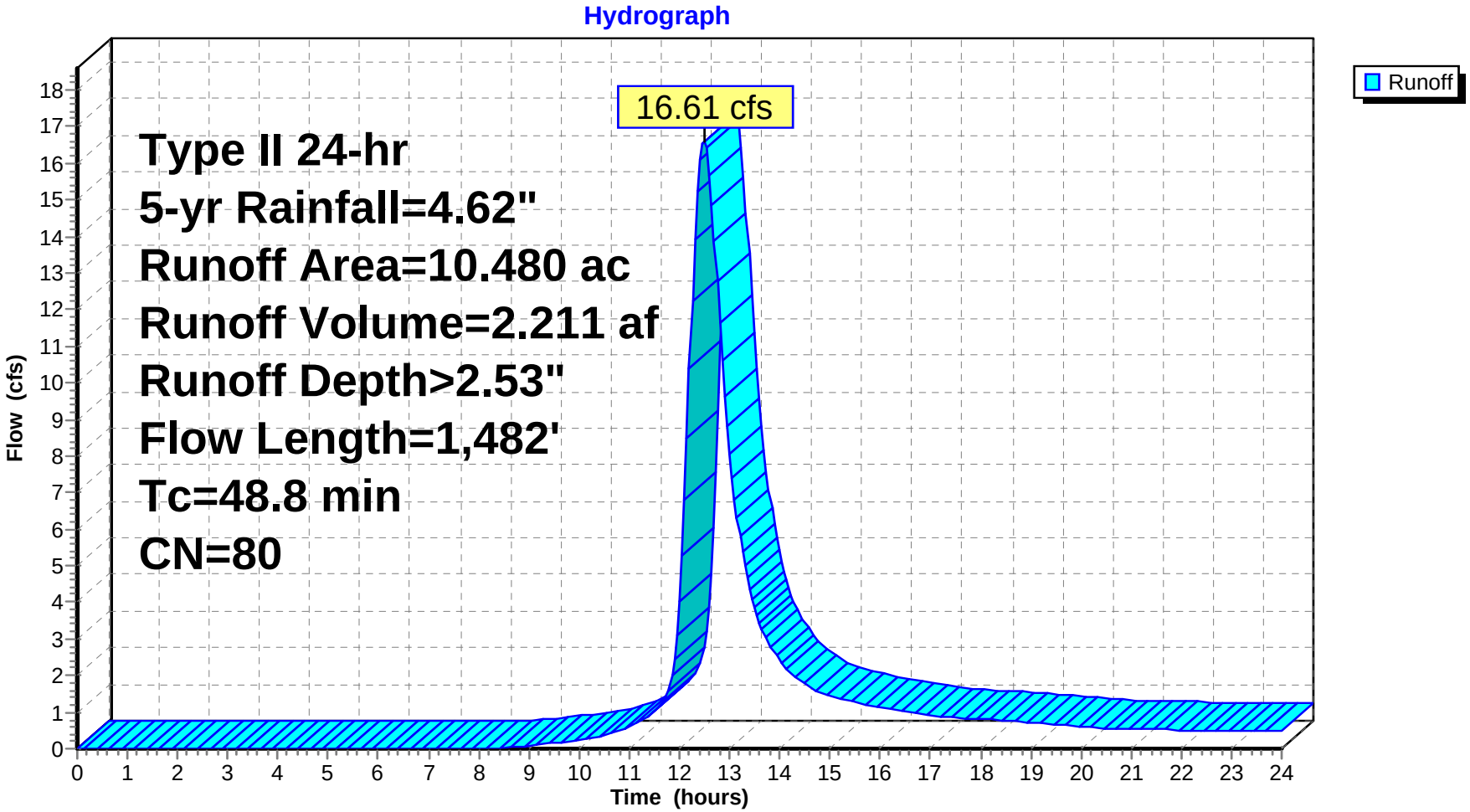
Runoff = 16.61 cfs @ 12.48 hrs, Volume= 2.211 af, Depth> 2.53"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

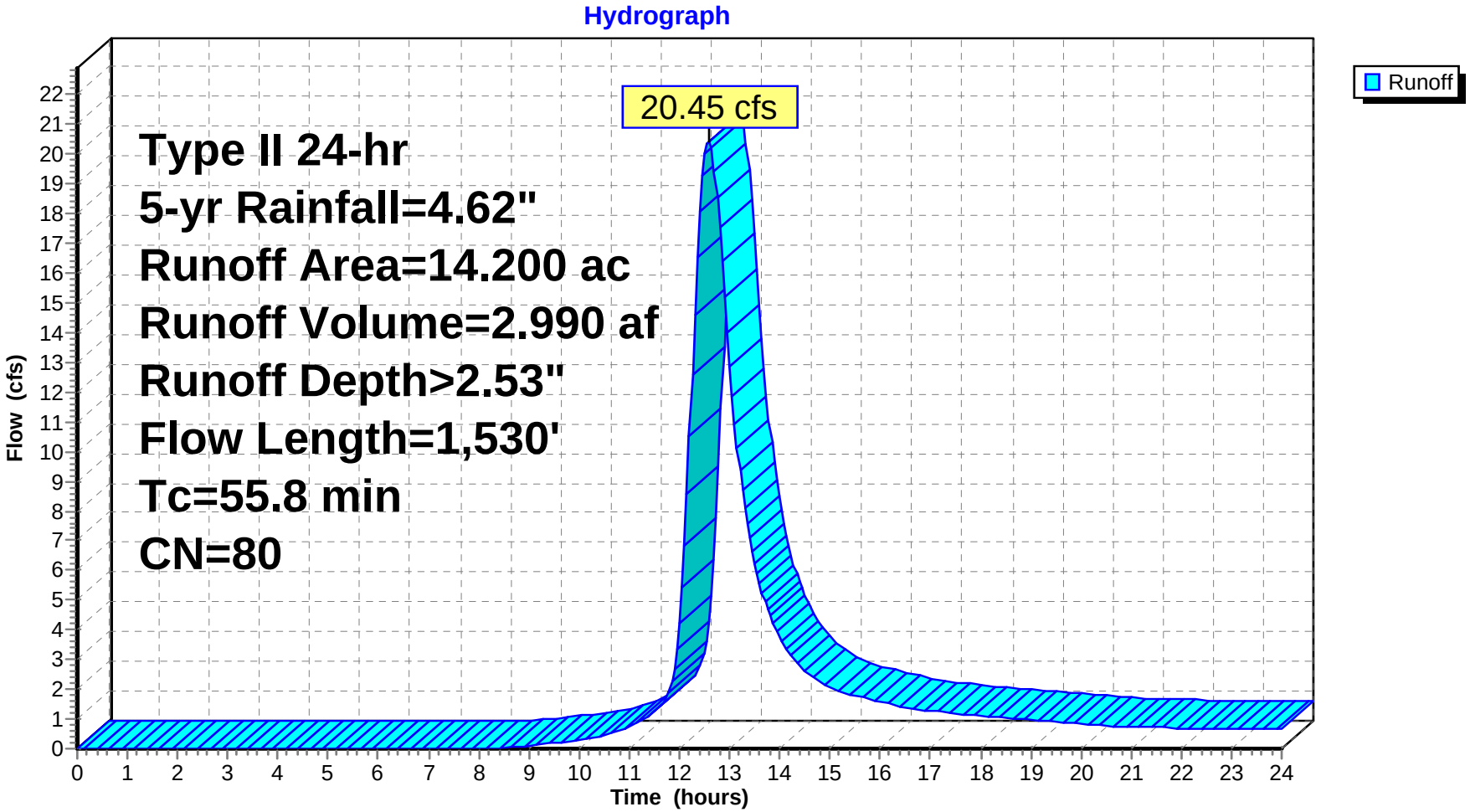
Runoff = 20.45 cfs @ 12.58 hrs, Volume= 2.990 af, Depth> 2.53"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

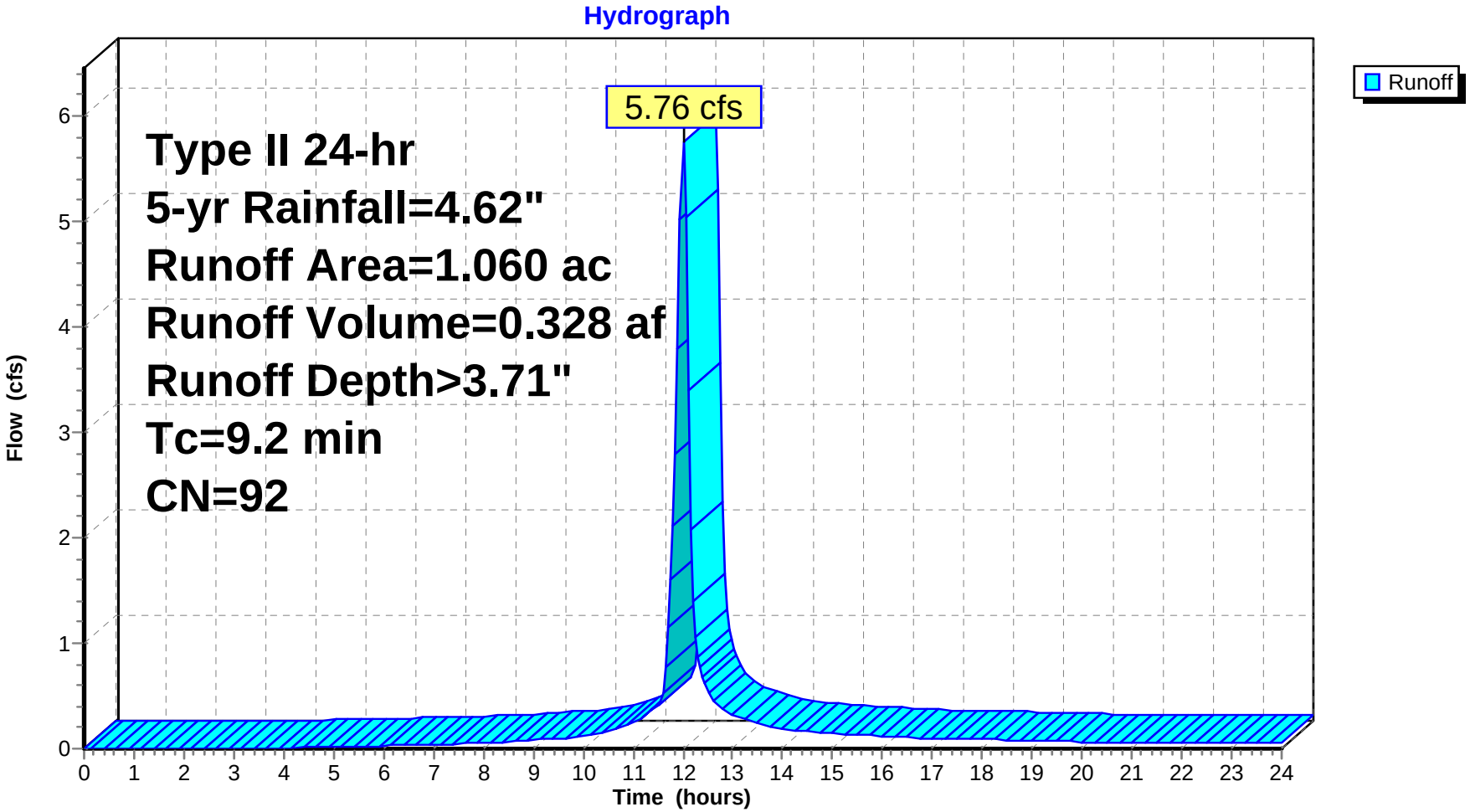
Runoff = 5.76 cfs @ 12.00 hrs, Volume= 0.328 af, Depth> 3.71"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

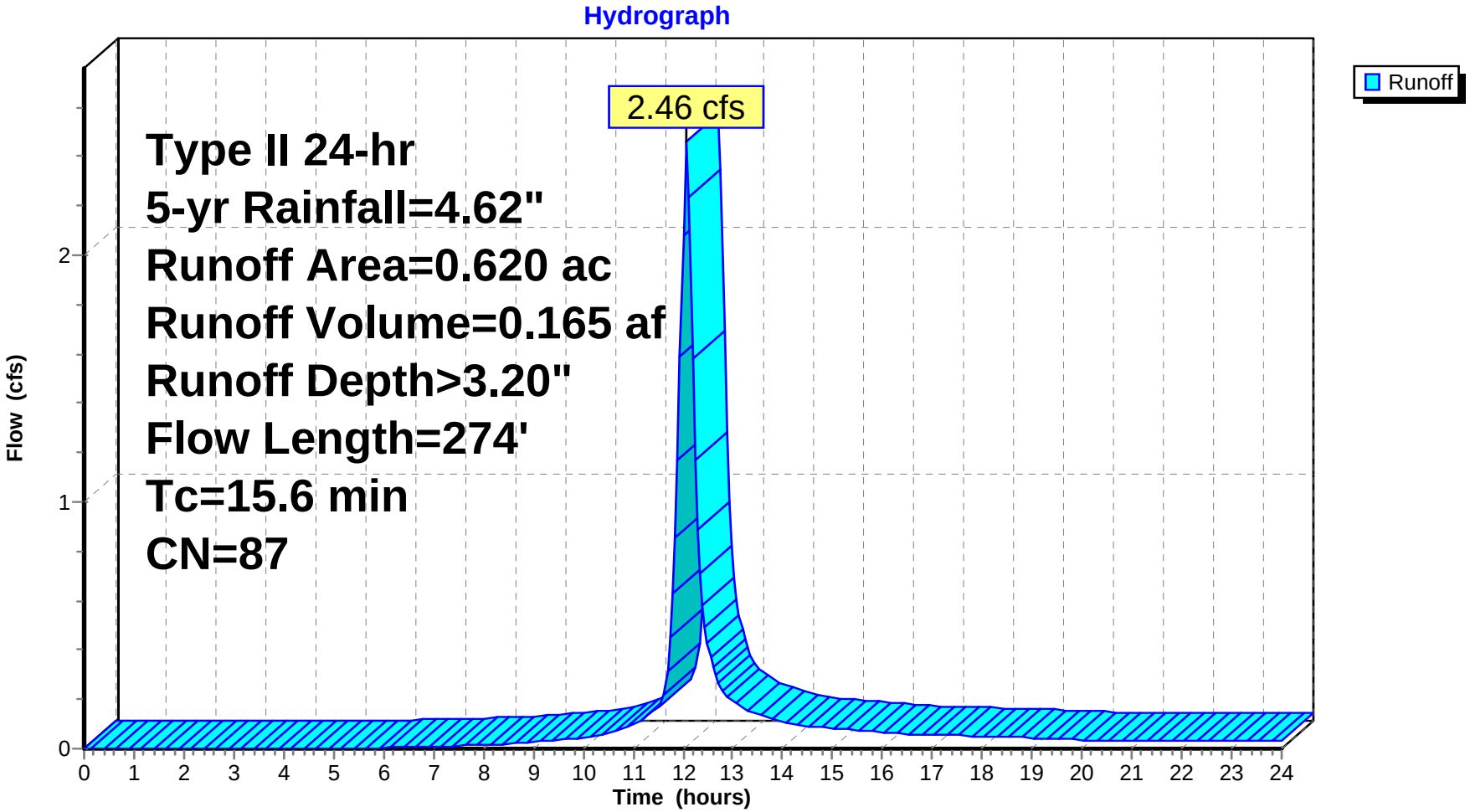
Runoff = 2.46 cfs @ 12.07 hrs, Volume= 0.165 af, Depth> 3.20"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

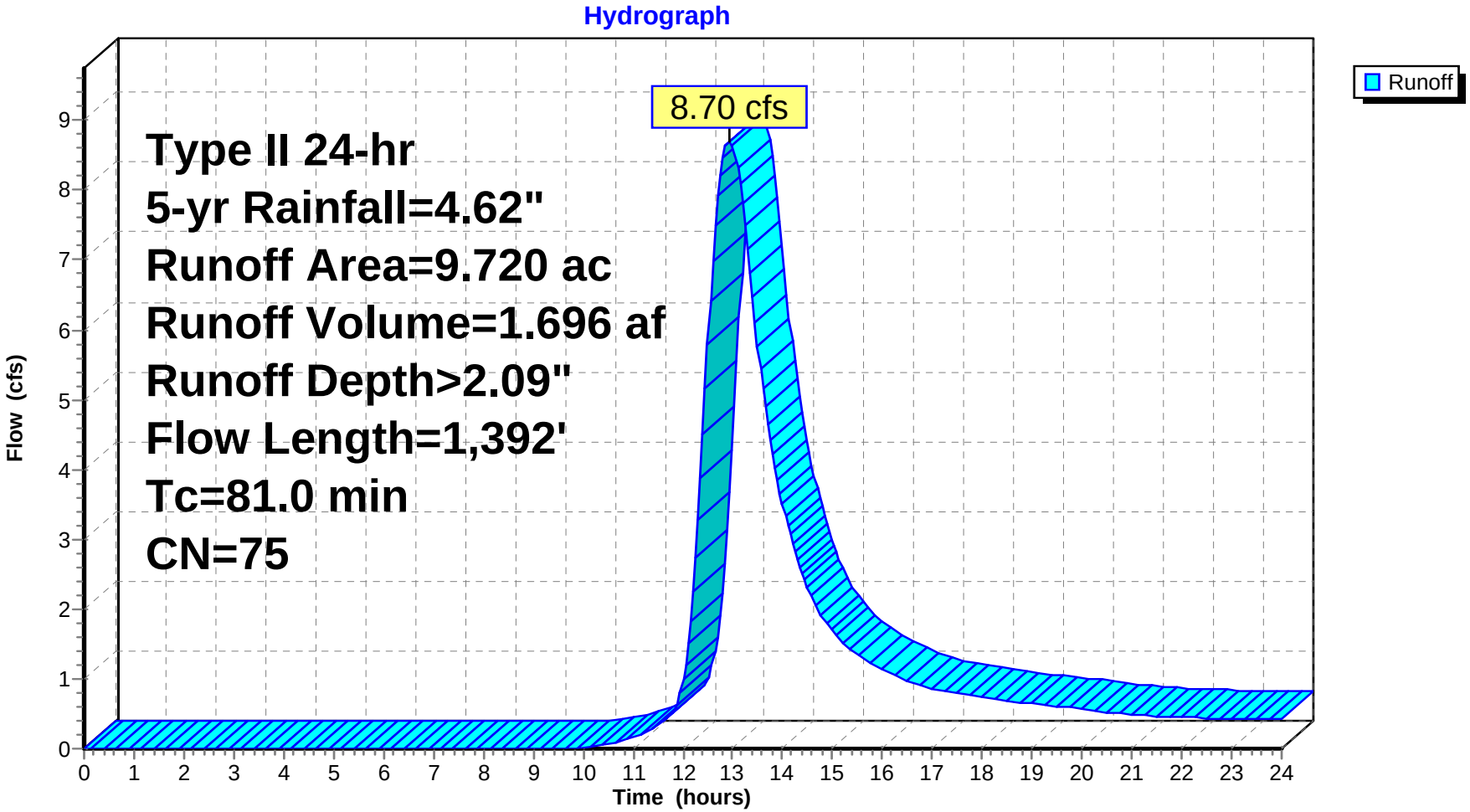
Runoff = 8.70 cfs @ 12.91 hrs, Volume= 1.696 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

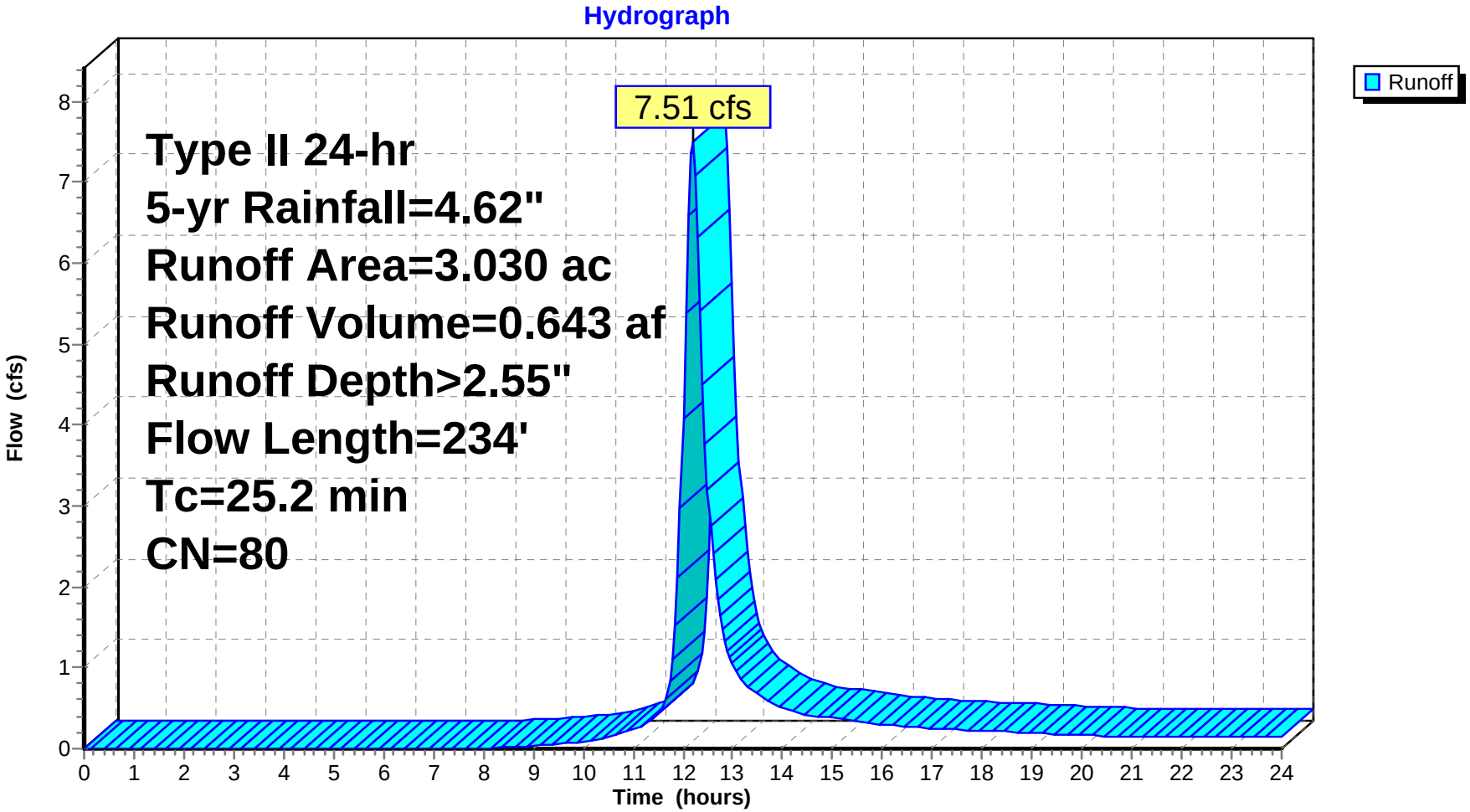
Runoff = 7.51 cfs @ 12.19 hrs, Volume= 0.643 af, Depth> 2.55"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

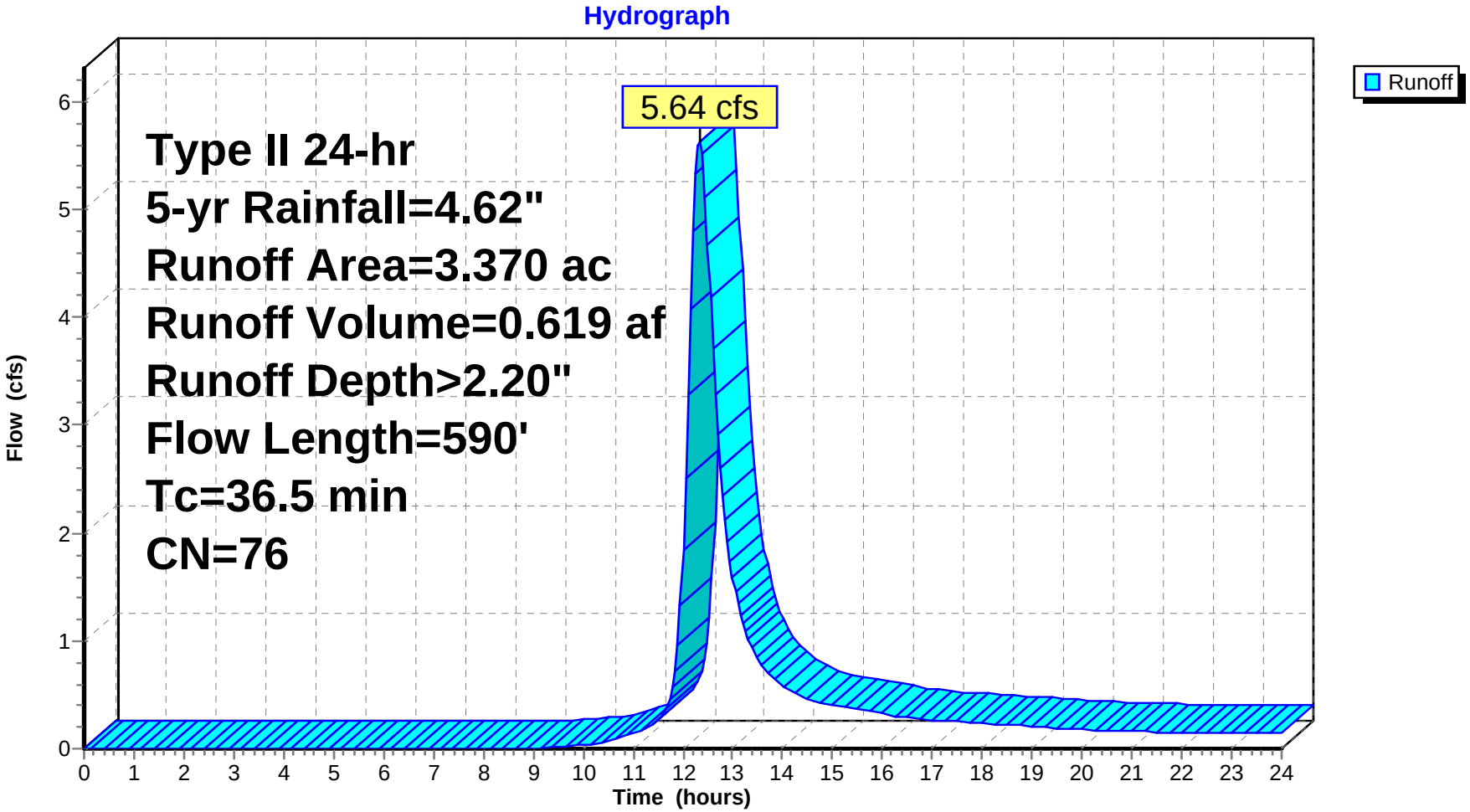
Runoff = 5.64 cfs @ 12.33 hrs, Volume= 0.619 af, Depth> 2.20"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC**
					Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.13" for 5-yr event
Inflow = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af
Outflow = 14.75 cfs @ 12.58 hrs, Volume= 2.853 af, Atten= 0%, Lag= 6.2 min
Routed to Reach R-2 : R-2

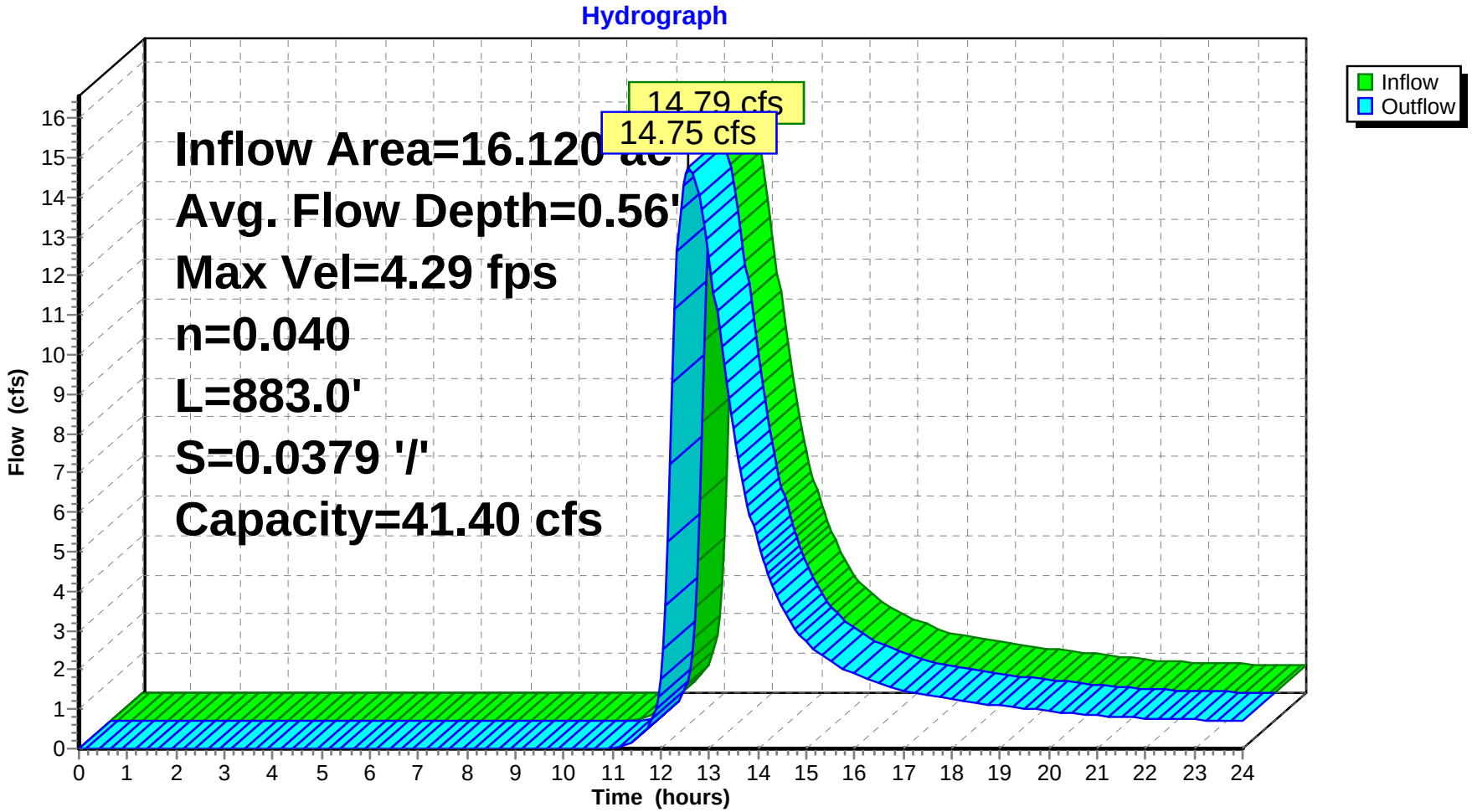
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.29 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 7.3 min

Peak Storage= 3,033 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 7.24'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
Inflow
Outflow
14.79 cfs
14.75 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.56'
Max Vel=4.29 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 2.08" for 5-yr event
Inflow = 47.23 cfs @ 12.40 hrs, Volume= 6.755 af
Outflow = 39.64 cfs @ 12.85 hrs, Volume= 6.622 af, Atten= 16%, Lag= 27.2 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.91 fps, Min. Travel Time= 15.0 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 34.2 min

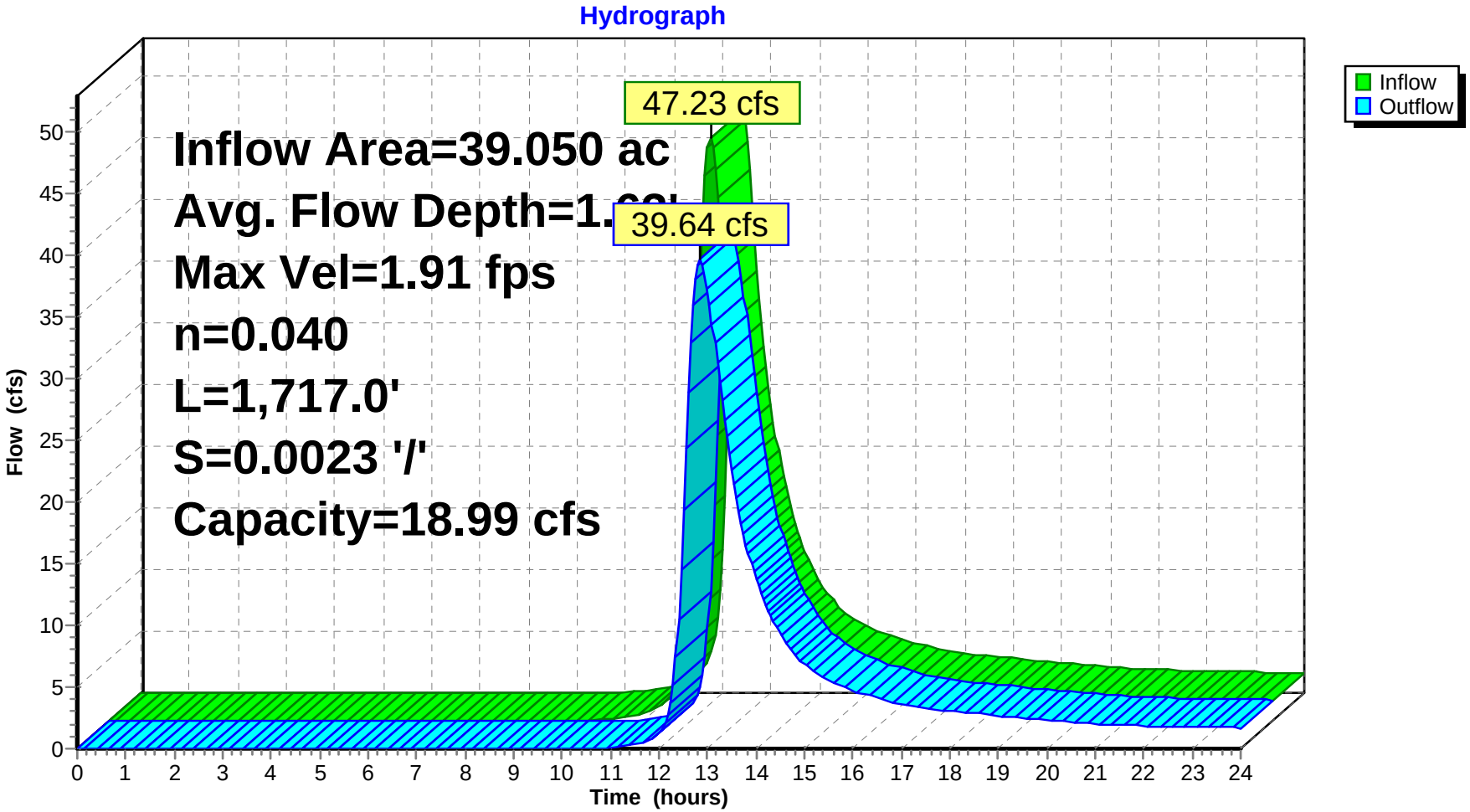
Peak Storage= 35,679 cf @ 12.60 hrs
Average Depth at Peak Storage= 1.63' , Surface Width= 16.51'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
47.23 cfs
39.64 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=1.
Max Vel=1.91 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0
5
10
15
20
25
30
35
40
45
50
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 1.94" for 5-yr event
Inflow = 52.48 cfs @ 12.83 hrs, Volume= 10.422 af
Outflow = 51.96 cfs @ 12.94 hrs, Volume= 10.375 af, Atten= 1%, Lag= 6.6 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 6.5 min

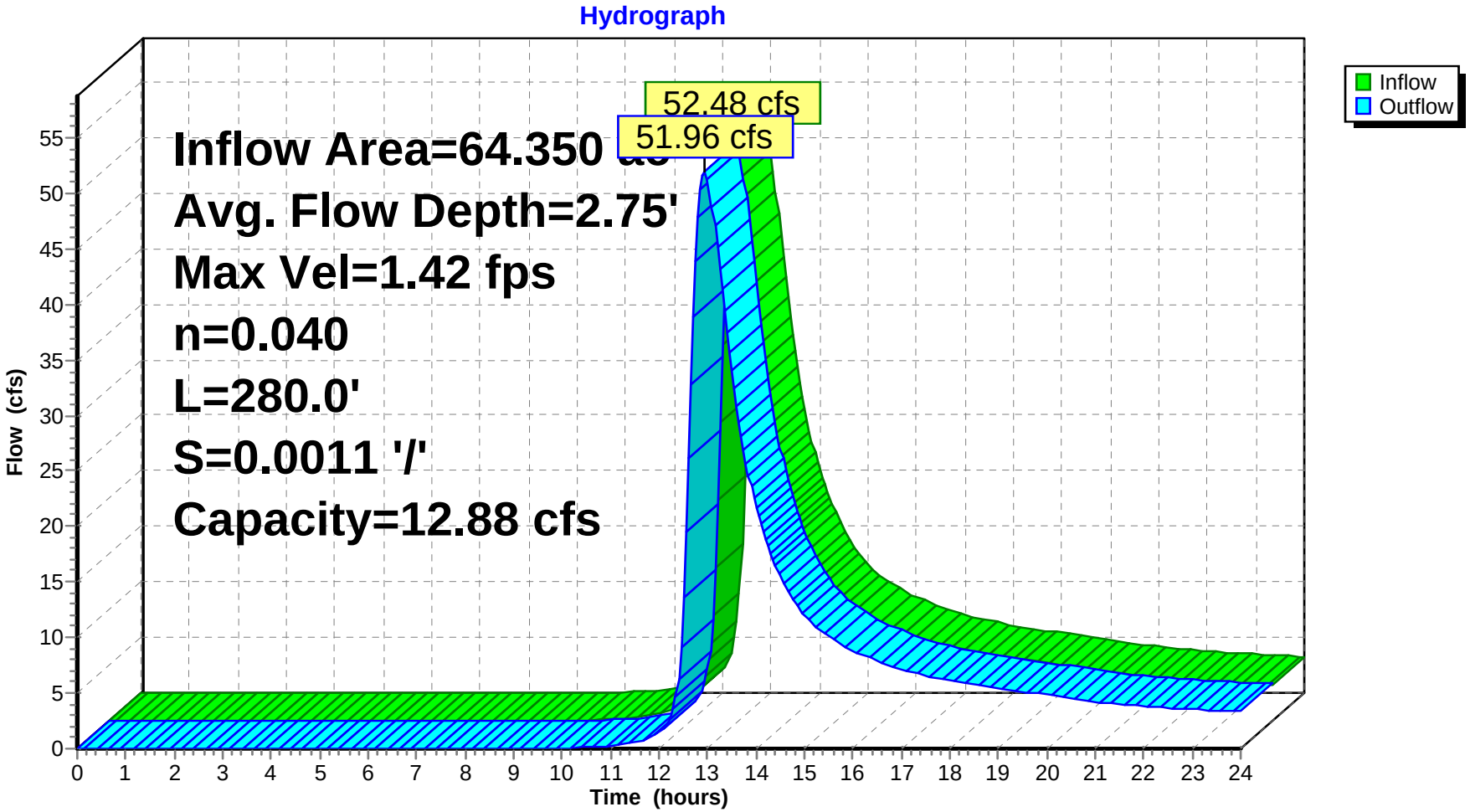
Peak Storage= 10,226 cf @ 12.89 hrs
Average Depth at Peak Storage= 2.75' , Surface Width= 21.02'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
Inflow
Outflow
52.48 cfs
51.96 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=2.75'
Max Vel=1.42 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 1.92" for 5-yr event
Inflow = 52.31 cfs @ 12.94 hrs, Volume= 10.485 af
Outflow = 51.95 cfs @ 13.03 hrs, Volume= 10.446 af, Atten= 1%, Lag= 5.5 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.33 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.68 fps, Avg. Travel Time= 5.4 min

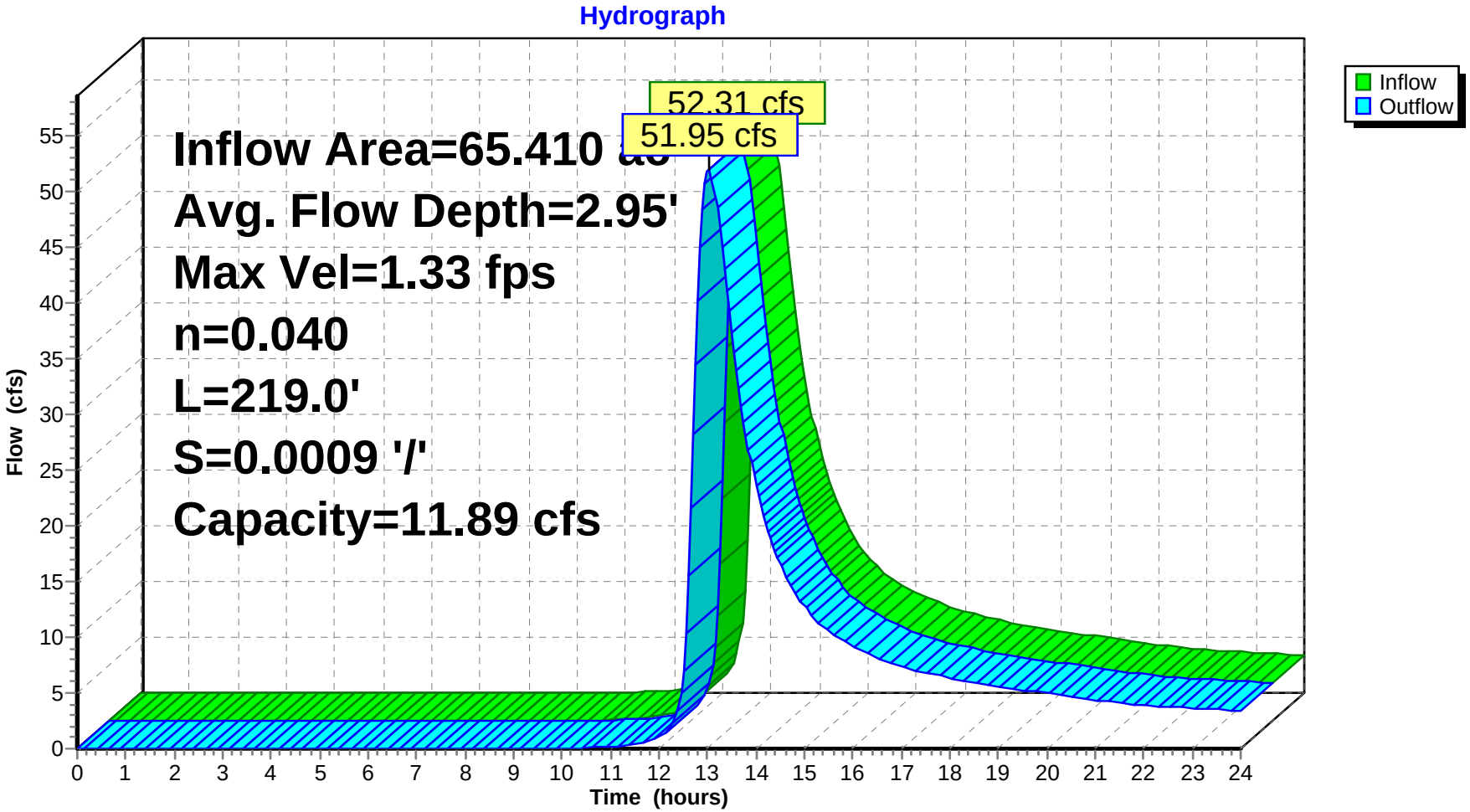
Peak Storage= 8,590 cf @ 12.99 hrs
Average Depth at Peak Storage= 2.95' , Surface Width= 21.79'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
52.31 cfs
51.95 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=2.95'
Max Vel=1.33 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.21" for 5-yr event
Inflow = 36.16 cfs @ 12.17 hrs, Volume= 2.972 af
Outflow = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af, Atten= 59%, Lag= 18.5 min
Primary = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.75' @ 12.48 hrs Surf.Area= 31,733 sf Storage= 40,079 cf

Plug-Flow detention time= 57.1 min calculated for 2.866 af (96% of inflow)
Center-of-Mass det. time= 37.2 min (882.4 - 845.1)

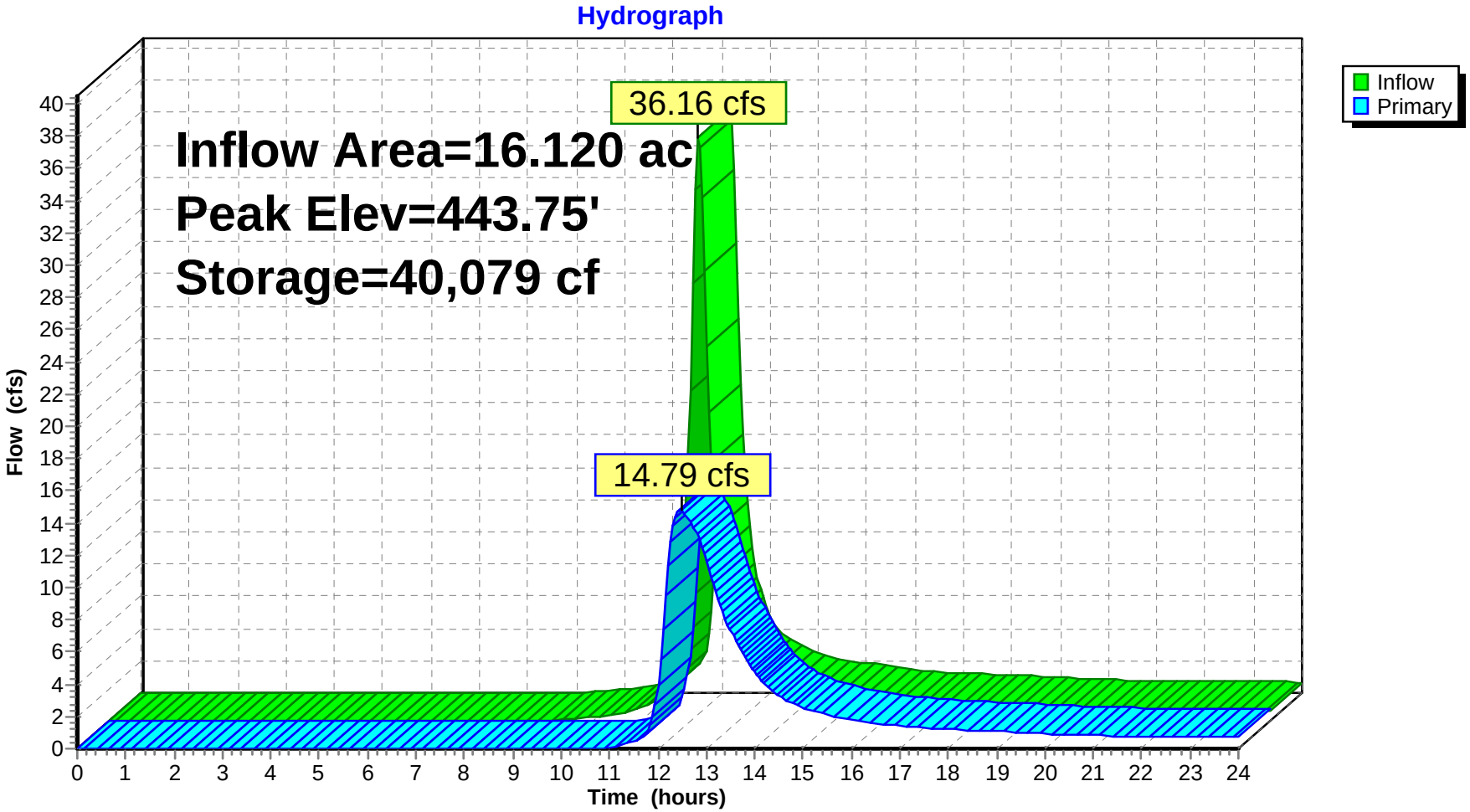
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=14.79 cfs @ 12.48 hrs HW=443.74' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 14.79 cfs @ 4.75 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 14.79 cfs of 24.68 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0	445.20	36,815	91,523	448.90	40,718	141,234
441.60	3,108	215	445.30	36,984	95,213	449.00	40,718	141,234
441.70	5,024	622	445.40	37,152	98,919	449.10	40,718	141,234
441.80	6,940	1,220	445.50	37,321	102,643	449.20	40,718	141,234
441.90	8,856	2,010	445.60	37,489	106,384	449.30	40,718	141,234
442.00	10,772	2,991	445.70	37,658	110,141	449.40	40,718	141,234
442.10	11,973	4,128	445.80	37,826	113,915	449.50	40,718	141,234
442.20	13,174	5,386	445.90	37,995	117,706	449.60	40,718	141,234
442.30	14,375	6,763	446.00	38,163	121,514	449.70	40,718	141,234
442.40	15,576	8,261	446.10	38,674	125,356	449.80	40,718	141,234
442.50	16,778	9,878	446.20	39,185	129,249	449.90	40,718	141,234
442.60	17,979	11,616	446.30	39,696	133,193	450.00	40,718	141,234
442.70	19,180	13,474	446.40	40,207	137,188	450.10	40,718	141,234
442.80	20,381	15,452	446.50	**40,718**	**141,234**	450.20	40,718	141,234
442.90	21,582	17,550	446.60	40,718	141,234	450.30	40,718	141,234
443.00	22,783	19,769	446.70	40,718	141,234	450.40	40,718	141,234
443.10	23,984	22,107	446.80	40,718	141,234	450.50	40,718	141,234
443.20	25,185	24,565	446.90	40,718	141,234			
443.30	26,386	27,144	447.00	40,718	141,234			
443.40	27,587	29,843	447.10	40,718	141,234			
443.50	28,789	32,661	447.20	40,718	141,234			
443.60	29,990	35,600	447.30	40,718	141,234			
443.70	31,191	38,659	447.40	40,718	141,234			
443.80	32,392	41,838	447.50	40,718	141,234			
443.90	33,593	45,138	447.60	40,718	141,234			
444.00	34,794	48,557	447.70	40,718	141,234			
444.10	34,962	52,045	447.80	40,718	141,234			
444.20	35,131	55,549	447.90	40,718	141,234			
444.30	35,299	59,071	448.00	40,718	141,234			
444.40	35,468	62,609	448.10	40,718	141,234			
444.50	35,636	66,165	448.20	40,718	141,234			
444.60	35,805	69,737	448.30	40,718	141,234			
444.70	35,973	73,326	448.40	40,718	141,234			
444.80	36,142	76,931	448.50	40,718	141,234			
444.90	36,310	80,554	448.60	40,718	141,234			
445.00	36,479	84,193	448.70	40,718	141,234			
445.10	36,647	87,850	448.80	40,718	141,234			

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 2.53" for 5-yr event
Inflow = 16.61 cfs @ 12.48 hrs, Volume= 2.211 af
Outflow = 12.36 cfs @ 12.77 hrs, Volume= 2.102 af, Atten= 26%, Lag= 17.3 min
Primary = 12.36 cfs @ 12.77 hrs, Volume= 2.102 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.56' @ 12.77 hrs Surf.Area= 9,404 sf Storage= 26,575 cf

Plug-Flow detention time= 99.8 min calculated for 2.098 af (95% of inflow)
Center-of-Mass det. time= 73.8 min (927.8 - 854.1)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

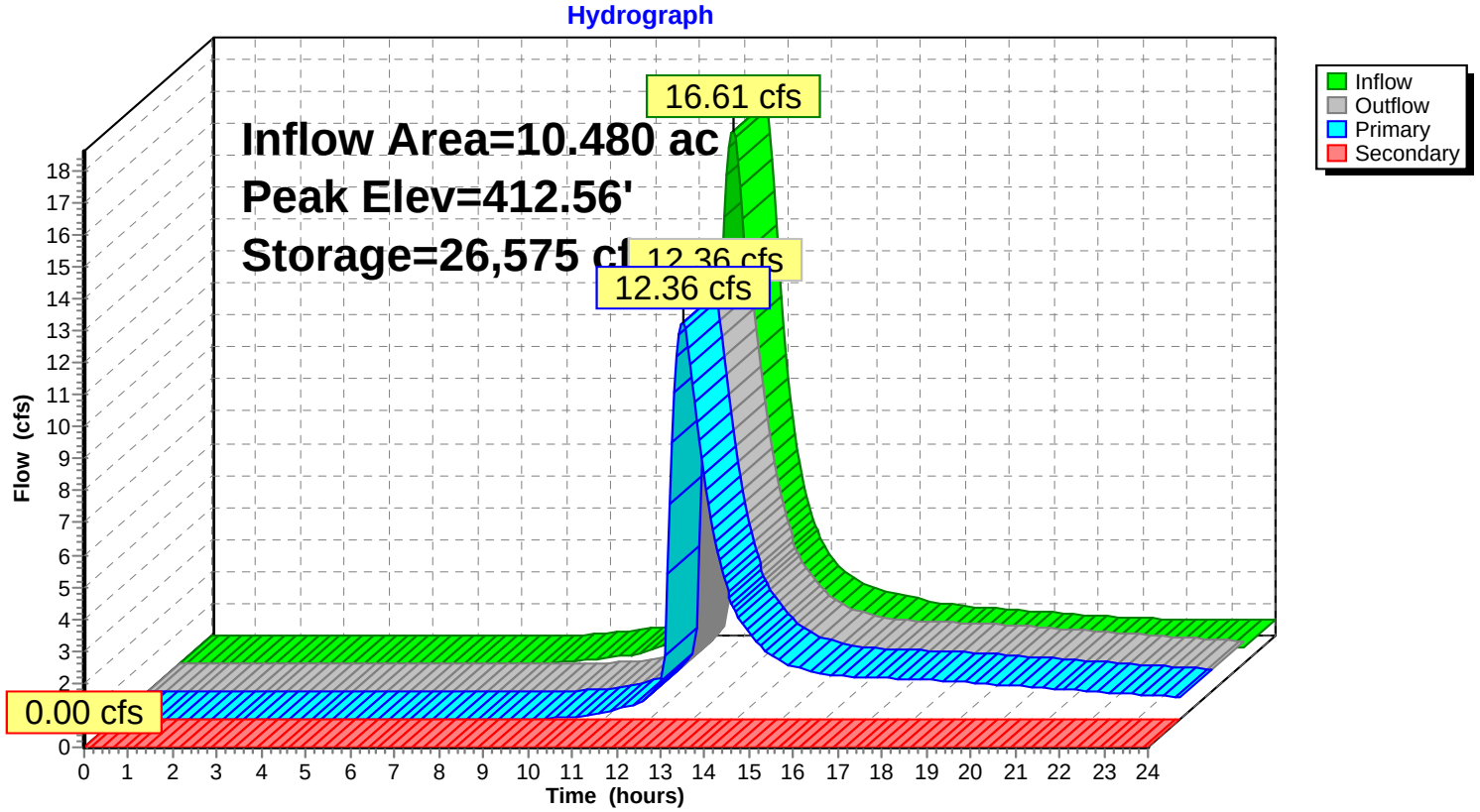
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=12.32 cfs @ 12.77 hrs HW=412.56' (Free Discharge)
└─**1=Culvert** (Passes 12.32 cfs of 28.55 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.72 cfs @ 8.76 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 10.60 cfs @ 4.81 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 2.51" for 5-yr event
Inflow = 20.82 cfs @ 12.57 hrs, Volume= 3.094 af
Outflow = 3.11 cfs @ 14.28 hrs, Volume= 1.697 af, Atten= 85%, Lag= 102.4 min
Primary = 3.11 cfs @ 14.28 hrs, Volume= 1.697 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.84' @ 14.28 hrs Surf.Area= 26,250 sf Storage= 79,512 cf

Plug-Flow detention time= 283.6 min calculated for 1.697 af (55% of inflow)
Center-of-Mass det. time= 171.7 min (1,031.9 - 860.2)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

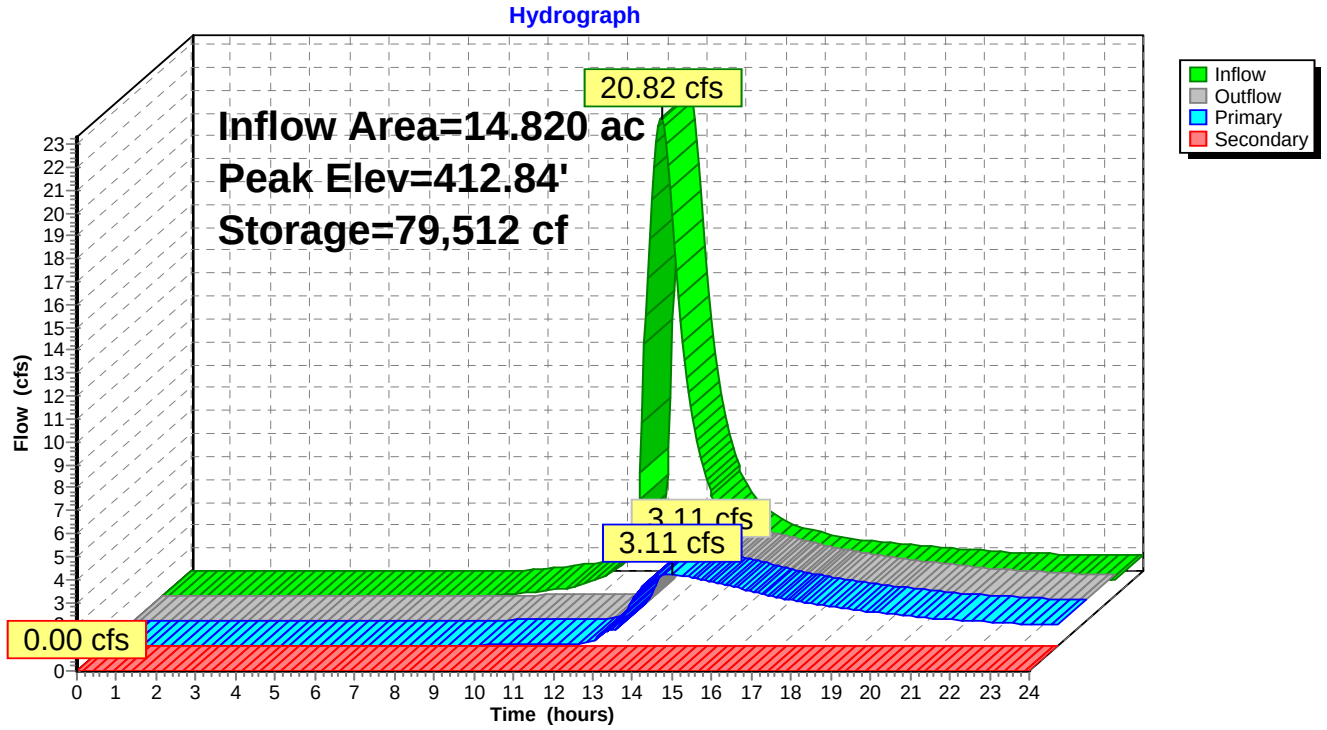
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=3.11 cfs @ 14.28 hrs HW=412.84' (Free Discharge)
- **1=Culvert** (Passes 3.11 cfs of 29.63 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.23 cfs @ 10.50 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.69 cfs @ 7.87 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 2.19 cfs @ 3.14 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 3.71" for 5-yr event
Inflow = 5.76 cfs @ 12.00 hrs, Volume= 0.328 af
Outflow = 0.36 cfs @ 12.87 hrs, Volume= 0.110 af, Atten= 94%, Lag= 52.3 min
Primary = 0.36 cfs @ 12.87 hrs, Volume= 0.110 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.39' @ 12.87 hrs Surf.Area= 7,906 sf Storage= 9,707 cf

Plug-Flow detention time= 338.8 min calculated for 0.110 af (34% of inflow)
Center-of-Mass det. time= 202.6 min (986.4 - 783.9)

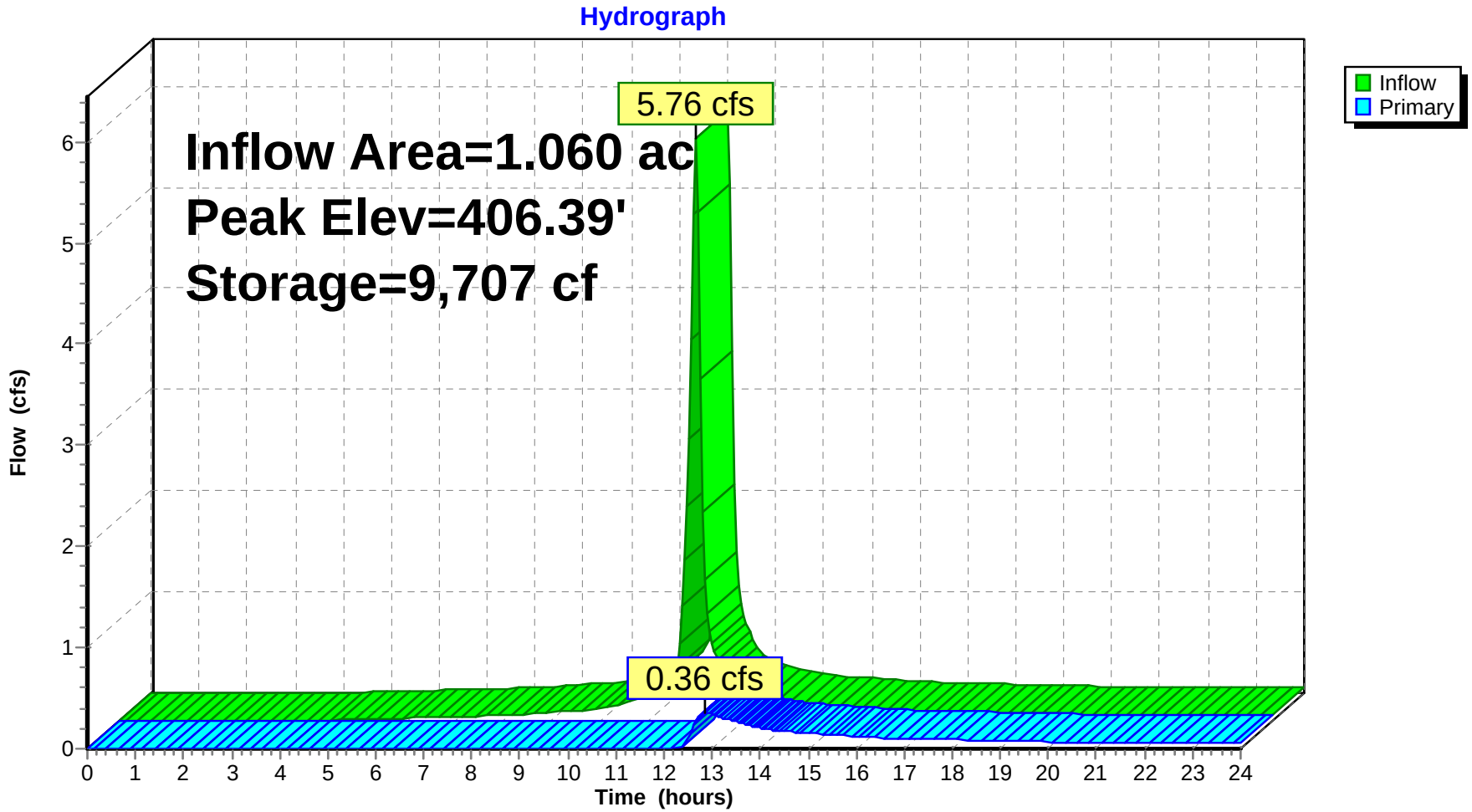
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.35 cfs @ 12.87 hrs HW=406.39' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.48 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0
405.02	6,127	122
405.04	6,153	245
405.06	6,179	368
405.08	6,205	492
405.10	6,230	617
405.12	6,256	741
405.14	6,282	867
405.16	6,308	993
405.18	6,334	1,119
405.20	6,360	1,246
405.22	6,386	1,374
405.24	6,412	1,502
405.26	6,437	1,630
405.28	6,463	1,759
405.30	6,489	1,889
405.32	6,515	2,019
405.34	6,541	2,149
405.36	6,567	2,280
405.38	6,593	2,412
405.40	6,619	2,544
405.42	6,644	2,677
405.44	6,670	2,810
405.46	6,696	2,943
405.48	6,722	3,078
405.50	6,748	3,212
405.52	6,774	3,347
405.54	6,800	3,483
405.56	6,826	3,619
405.58	6,852	3,756
405.60	6,877	3,894
405.62	6,903	4,031
405.64	6,929	4,170
405.66	6,955	4,308
405.68	6,981	4,448
405.70	7,007	4,588
405.72	7,033	4,728
405.74	7,059	4,869
405.76	7,084	5,010
405.78	7,110	5,152
405.80	7,136	5,295
405.82	7,162	5,438
405.84	7,188	5,581
405.86	7,214	5,725
405.88	7,240	5,870
405.90	7,266	6,015
405.92	7,291	6,161
405.94	7,317	6,307
405.96	7,343	6,453
405.98	7,369	6,600
406.00	7,395	6,748
406.02	7,421	6,896
406.04	7,448	7,045
406.06	7,474	7,194
406.08	7,501	7,344
406.10	7,527	7,494
406.12	7,553	7,645
406.14	7,580	7,796
406.16	7,606	7,948
406.18	7,633	8,100
406.20	7,659	8,253
406.22	7,685	8,407
406.24	7,712	8,561
406.26	7,738	8,715
406.28	7,765	8,870
406.30	7,791	9,026
406.32	7,817	9,182
406.34	7,844	9,339
406.36	7,870	9,496
406.38	7,897	9,653
406.40	7,924	9,812
406.42	7,951	9,970
406.44	7,978	10,130
406.46	8,005	10,289
406.48	8,032	10,450
406.50	8,058	10,611
406.52	8,085	10,772
406.54	8,112	10,934
406.56	8,139	11,097
406.58	8,166	11,260
406.60	8,193	11,423
406.62	8,219	11,587
406.64	8,246	11,752
406.66	8,273	11,917
406.68	8,300	12,083
406.70	8,327	12,249
406.72	8,354	12,416
406.74	**8,381**	**12,583**

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 2.55" for 5-yr event
Inflow = 7.51 cfs @ 12.19 hrs, Volume= 0.643 af
Outflow = 2.61 cfs @ 12.57 hrs, Volume= 0.625 af, Atten= 65%, Lag= 23.0 min
Primary = 2.61 cfs @ 12.57 hrs, Volume= 0.625 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 424.88' @ 12.57 hrs Surf.Area= 5,843 sf Storage= 9,333 cf

Plug-Flow detention time= 58.3 min calculated for 0.625 af (97% of inflow)
Center-of-Mass det. time= 41.6 min (877.7 - 836.1)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

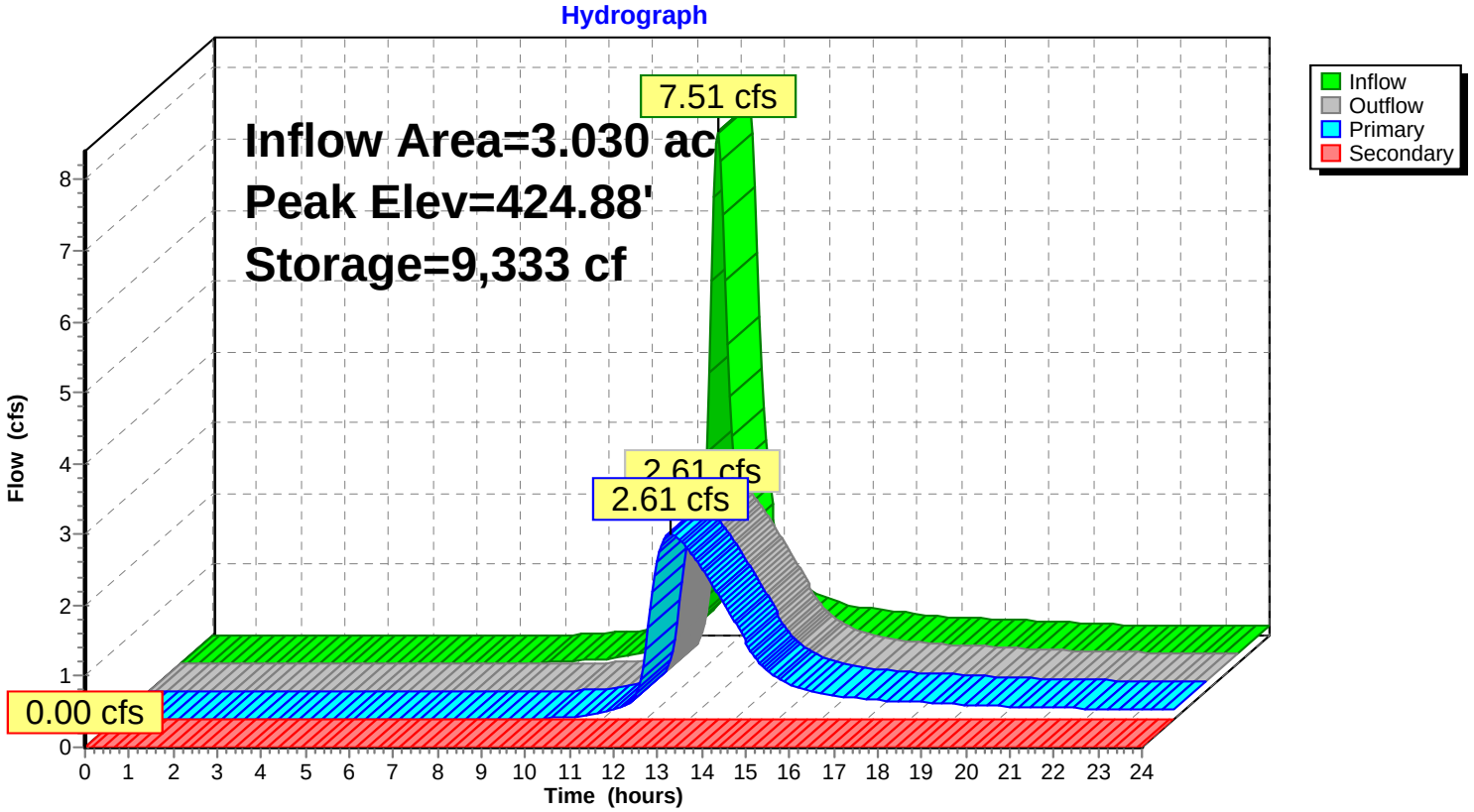
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=2.61 cfs @ 12.57 hrs HW=424.88' (Free Discharge)
└─**1=Culvert** (Passes 2.61 cfs of 9.04 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 2.61 cfs @ 5.90 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 3.20" for 5-yr event
Inflow = 2.46 cfs @ 12.07 hrs, Volume= 0.165 af
Outflow = 2.46 cfs @ 12.16 hrs, Volume= 0.104 af, Atten= 0%, Lag= 5.2 min
Primary = 2.46 cfs @ 12.16 hrs, Volume= 0.104 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.15' @ 12.16 hrs Surf.Area= 1,524 sf Storage= 2,867 cf

Plug-Flow detention time= 175.3 min calculated for 0.104 af (63% of inflow)
Center-of-Mass det. time= 74.1 min (882.0 - 807.9)

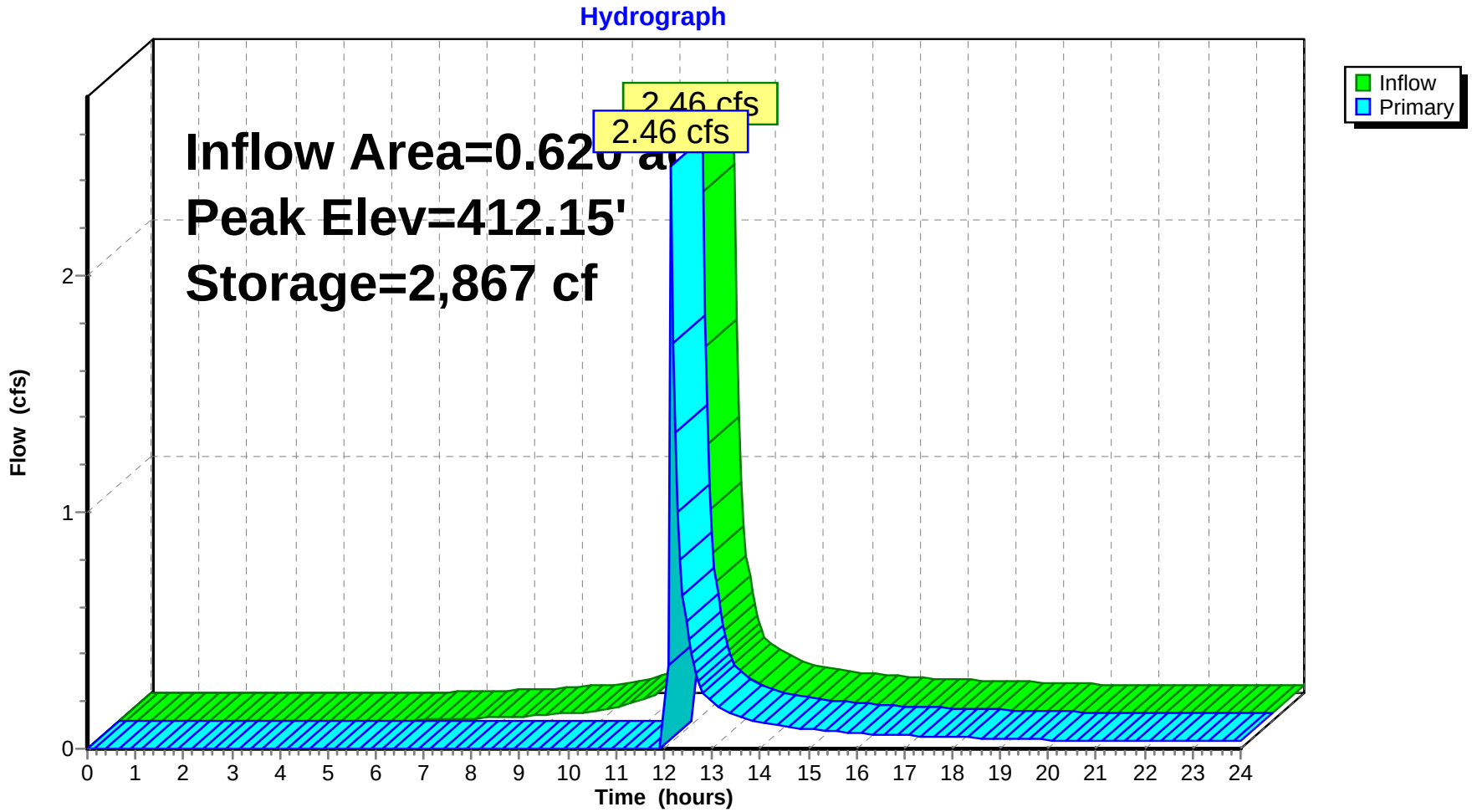
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=2.25 cfs @ 12.16 hrs HW=412.14' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 2.25 cfs @ 0.90 fps)

Pond WQB-1: WQB-1



Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>2.74"
Flow Length=777' Tc=38.6 min CN=74 Runoff=46.01 cfs 5.236 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>2.94"
Flow Length=209' Tc=23.3 min CN=76 Runoff=48.22 cfs 3.944 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>3.29"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=21.66 cfs 2.876 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>3.29"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=26.66 cfs 3.890 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>4.57"
Tc=9.2 min CN=92 Runoff=7.00 cfs 0.404 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>4.03"
Flow Length=274' Tc=15.6 min CN=87 Runoff=3.07 cfs 0.208 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>2.80"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=11.76 cfs 2.265 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>3.31"
Flow Length=234' Tc=25.2 min CN=80 Runoff=9.76 cfs 0.837 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=590' Tc=36.5 min CN=76 Runoff=7.55 cfs 0.821 af

Reach R-1: R-1 Avg. Flow Depth=0.63' Max Vel=4.57 fps Inflow=17.87 cfs 3.826 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=17.84 cfs 3.811 af

Reach R-2: R-2 Avg. Flow Depth=2.03' Max Vel=2.00 fps Inflow=62.27 cfs 9.048 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=52.68 cfs 8.893 af

Reach R-3: R-3 Avg. Flow Depth=3.61' Max Vel=1.47 fps Inflow=71.74 cfs 14.208 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=71.12 cfs 14.154 af

Reach R-4: R-4 Avg. Flow Depth=3.88' Max Vel=1.36 fps Inflow=71.60 cfs 14.339 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=71.14 cfs 14.294 af

Pond Pond 1b: Pond 1b Peak Elev=444.20' Storage=55,419 cf Inflow=48.22 cfs 3.944 af
Outflow=17.87 cfs 3.826 af

Pond Pond 1c: Pond 1c Peak Elev=412.93' Storage=30,105 cf Inflow=21.66 cfs 2.876 af
Primary=17.77 cfs 2.725 af Secondary=0.00 cfs 0.000 af Outflow=17.77 cfs 2.725 af

Pond Pond 1d: Pond 1d Peak Elev=413.49' Storage=97,224 cf Inflow=27.13 cfs 4.037 af
Primary=5.58 cfs 2.590 af Secondary=0.00 cfs 0.000 af Outflow=5.58 cfs 2.590 af

Pond Pond 1e: Pond 1e Peak Elev=406.46' Storage=10,264 cf Inflow=7.00 cfs 0.404 af
Outflow=1.74 cfs 0.186 af

Pond Pond 3: Pond 3 Peak Elev=425.31' Storage=11,943 cf Inflow=9.76 cfs 0.837 af
Primary=4.15 cfs 0.816 af Secondary=0.00 cfs 0.000 af Outflow=4.15 cfs 0.816 af

Pond WQB-1: WQB-1 Peak Elev=412.17' Storage=2,900 cf Inflow=3.07 cfs 0.208 af
Outflow=3.07 cfs 0.147 af

Summary for Subcatchment P-1a: P-1a

Runoff = 46.01 cfs @ 12.36 hrs, Volume= 5.236 af, Depth> 2.74"
Routed to Reach R-2 : R-2

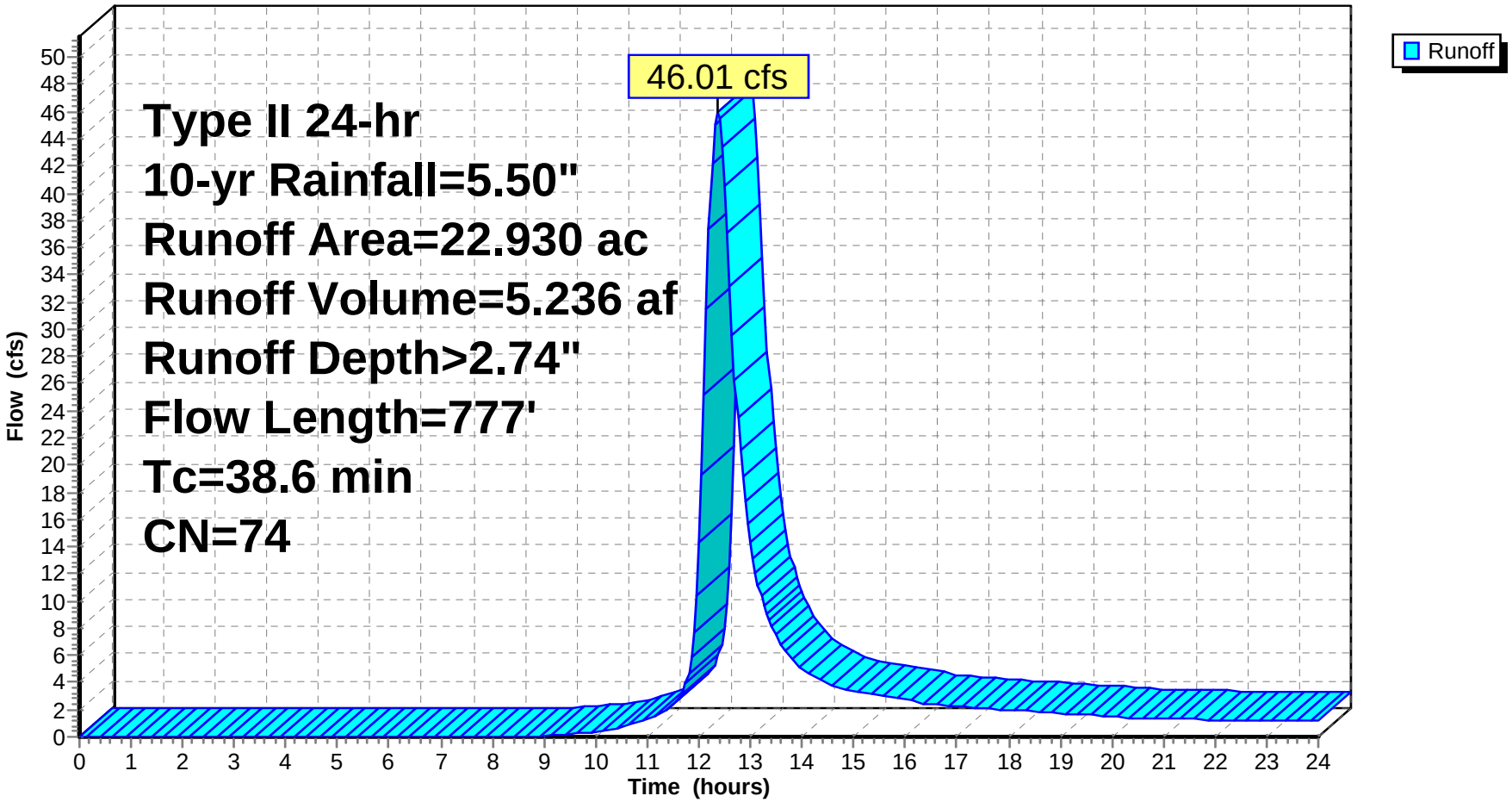
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a

Hydrograph



Summary for Subcatchment P-1b: P-1b

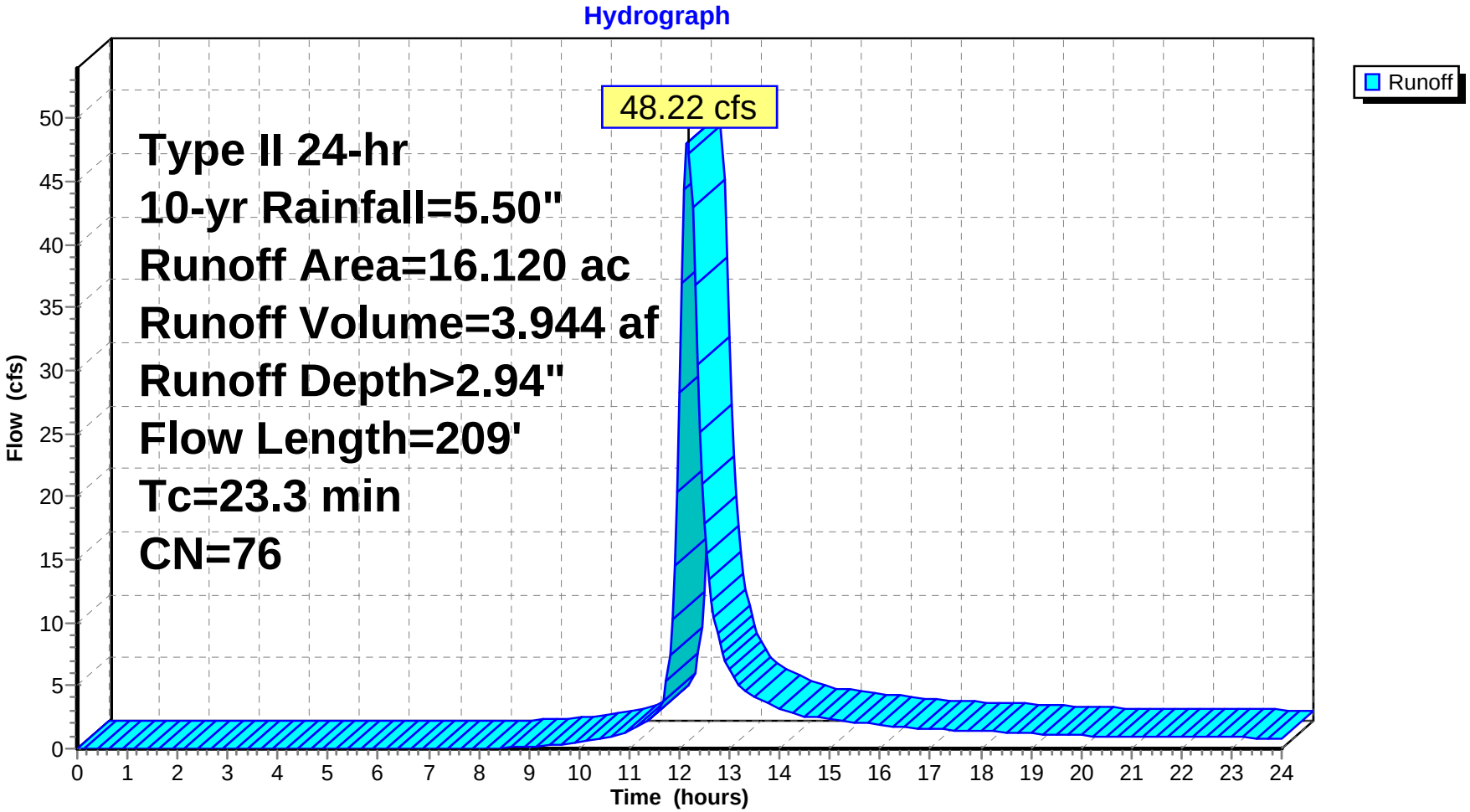
Runoff = 48.22 cfs @ 12.17 hrs, Volume= 3.944 af, Depth> 2.94"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

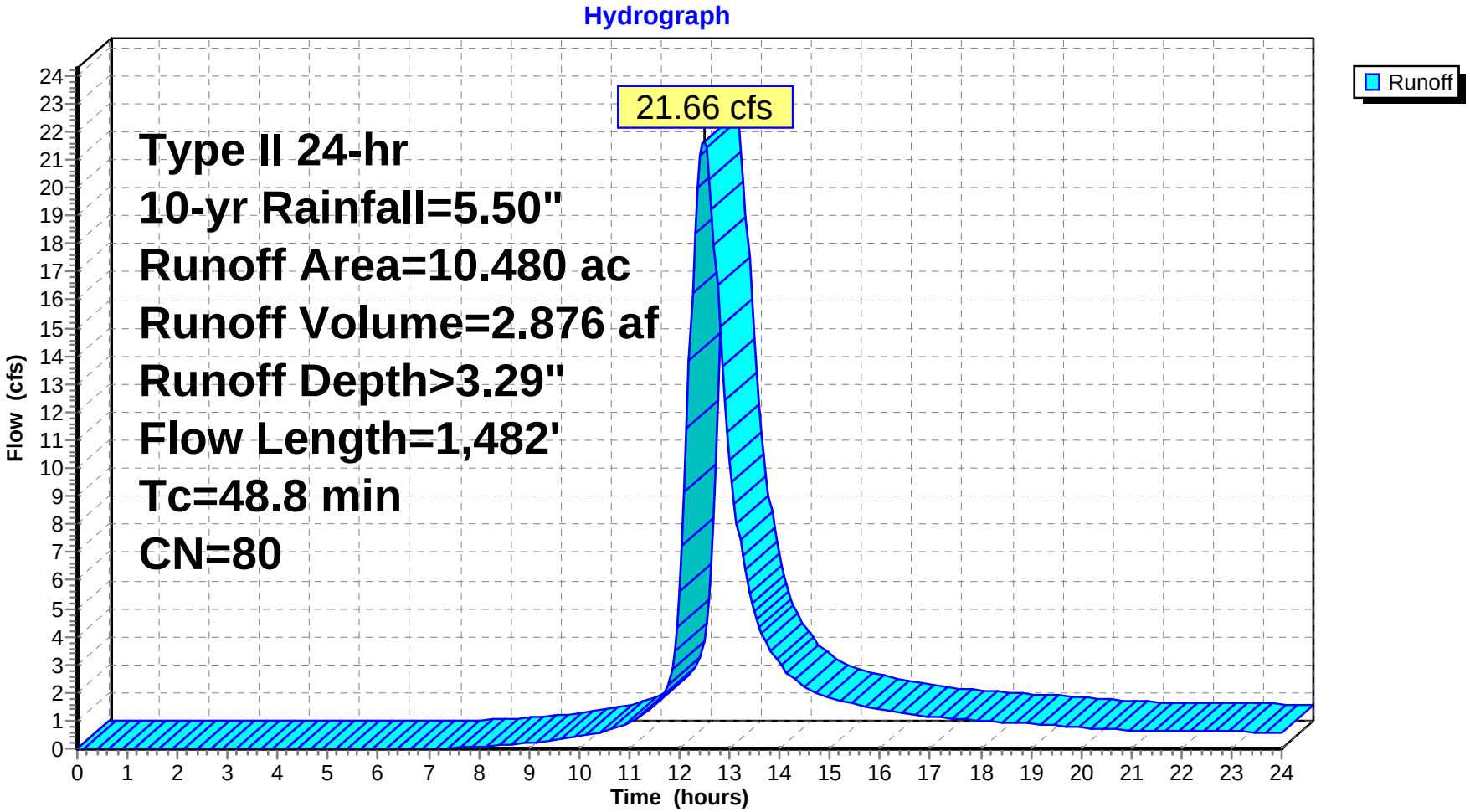
Runoff = 21.66 cfs @ 12.48 hrs, Volume= 2.876 af, Depth> 3.29"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

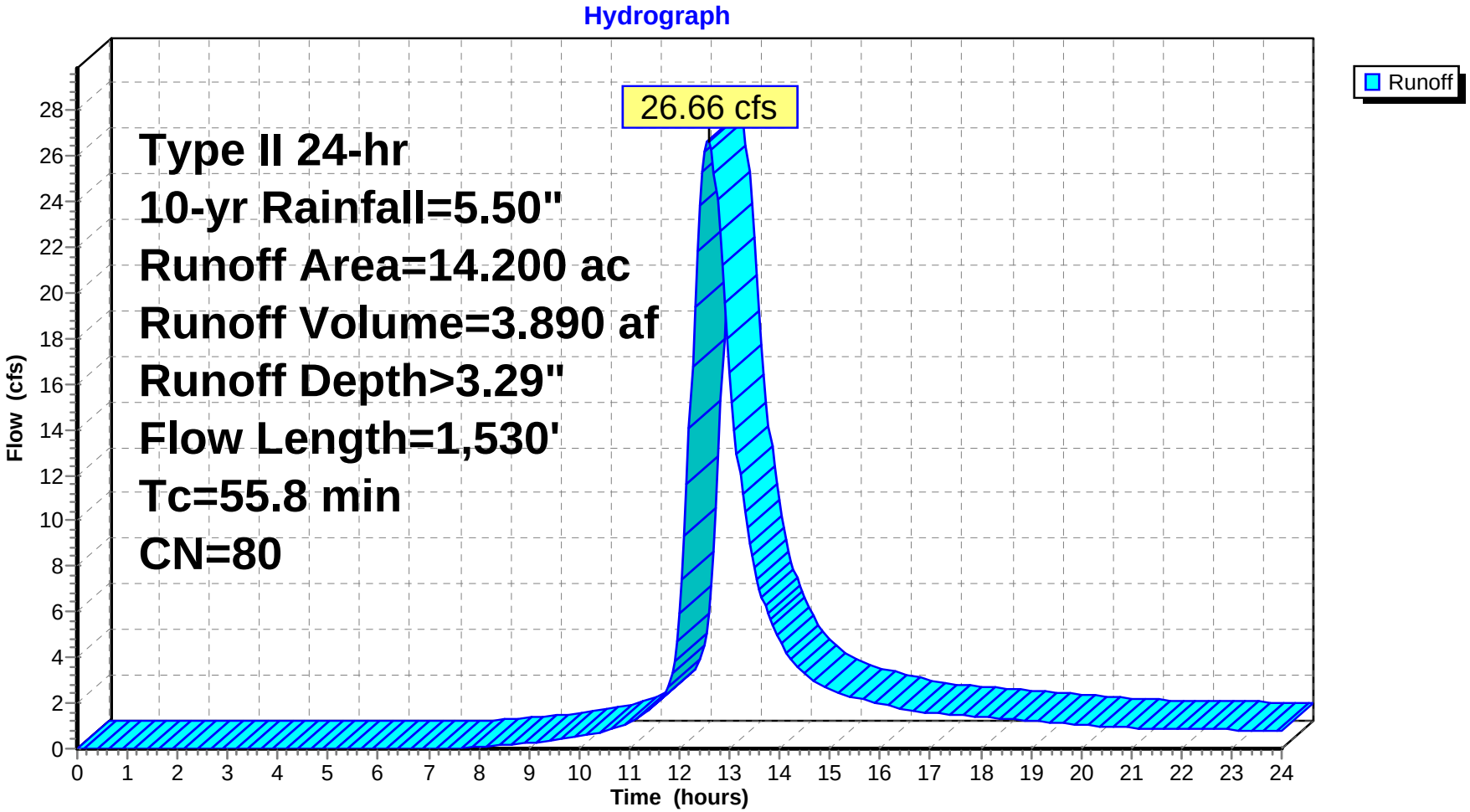
Runoff = 26.66 cfs @ 12.57 hrs, Volume= 3.890 af, Depth> 3.29"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

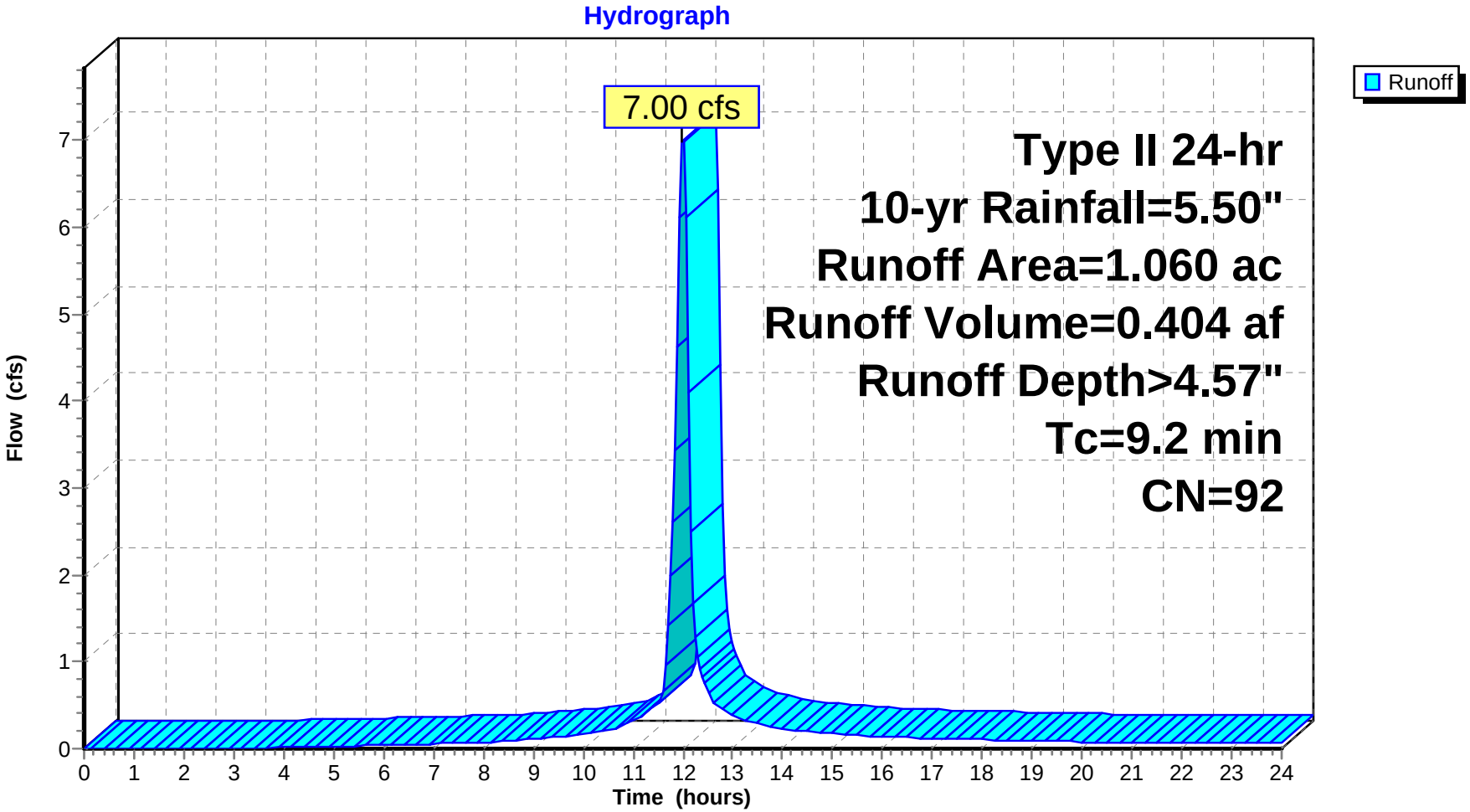
Runoff = 7.00 cfs @ 12.00 hrs, Volume= 0.404 af, Depth> 4.57"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

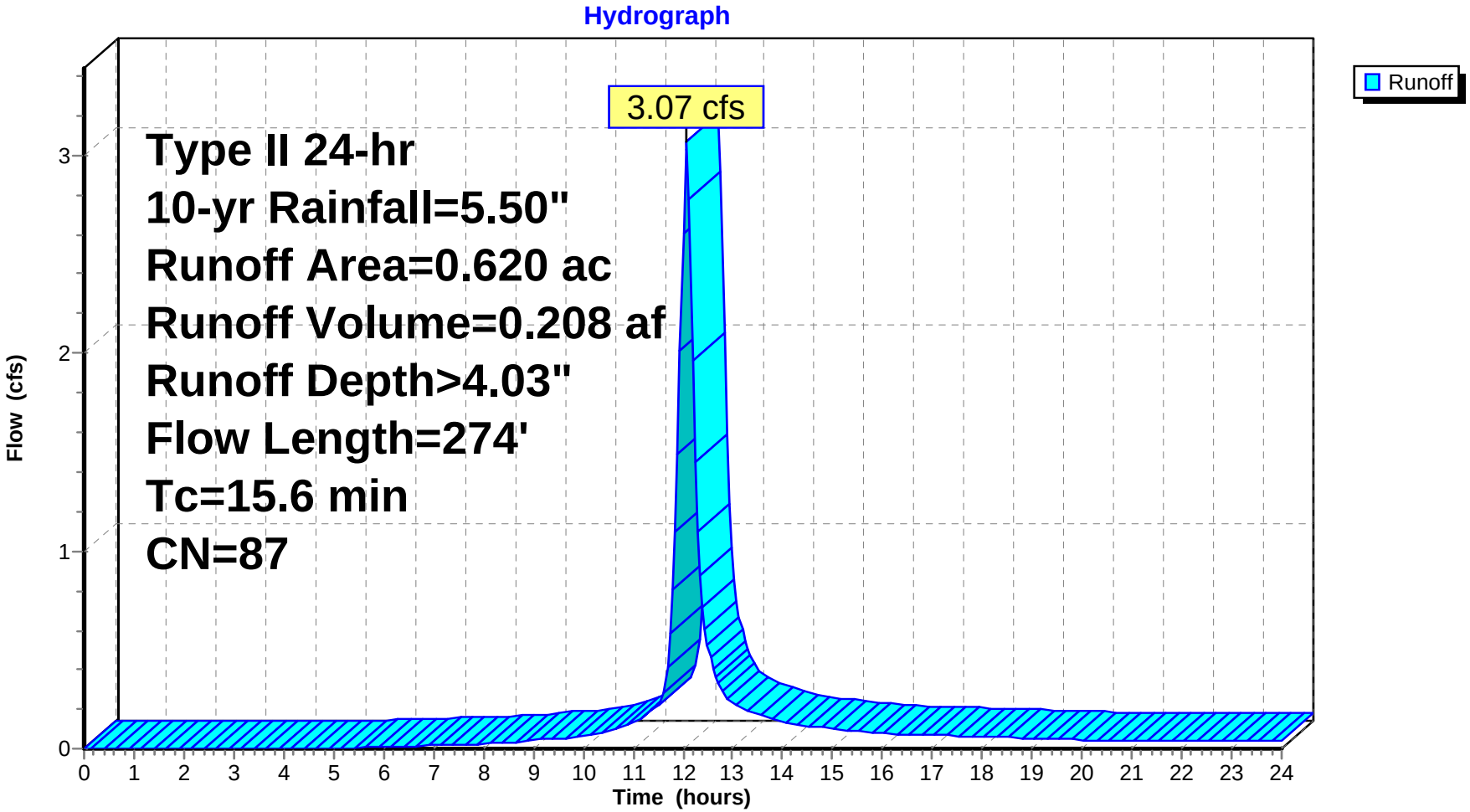
Runoff = 3.07 cfs @ 12.07 hrs, Volume= 0.208 af, Depth> 4.03"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

Runoff = 11.76 cfs @ 12.90 hrs, Volume= 2.265 af, Depth> 2.80"

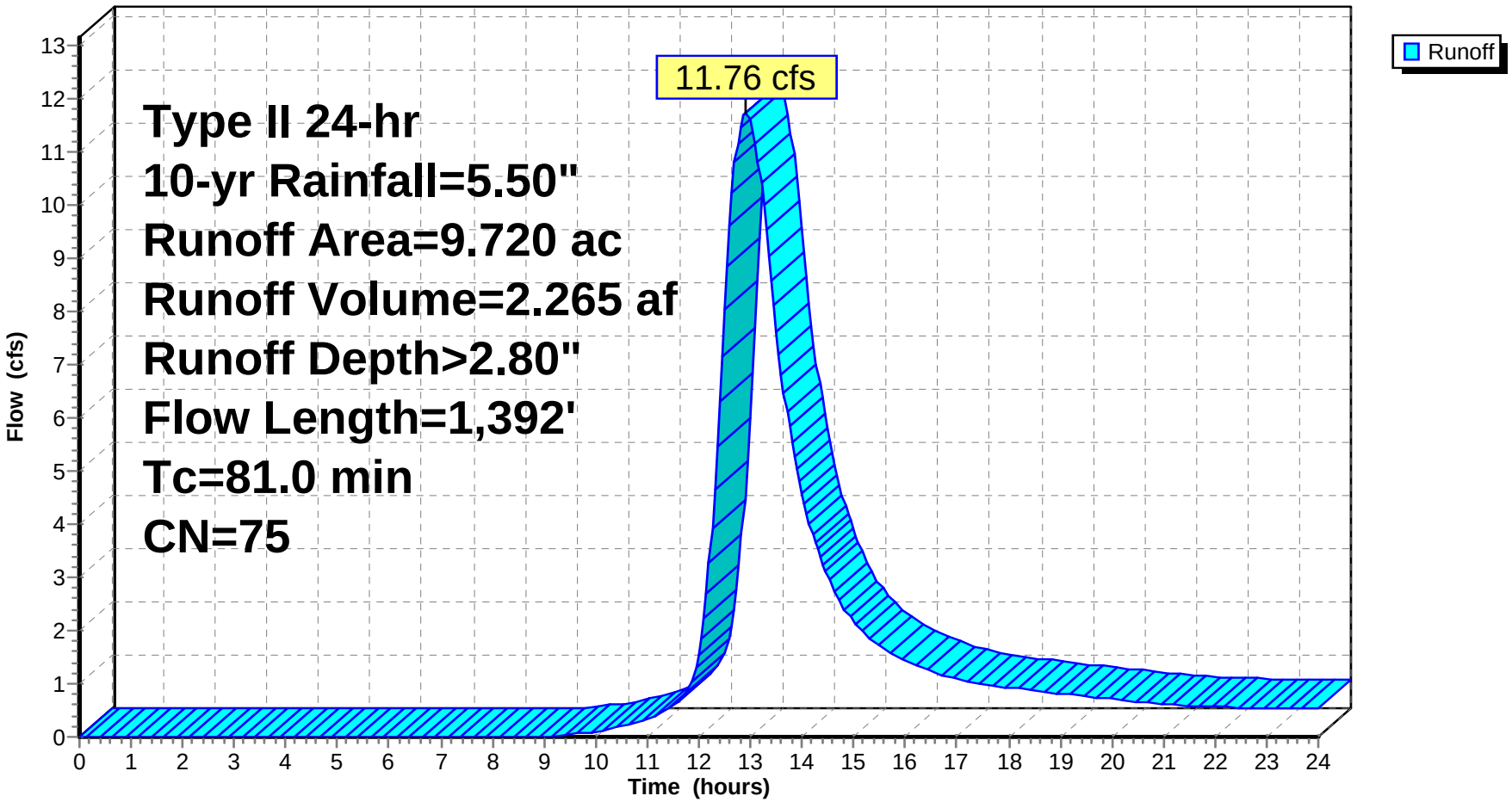
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2

Hydrograph



Summary for Subcatchment P-3: P-3

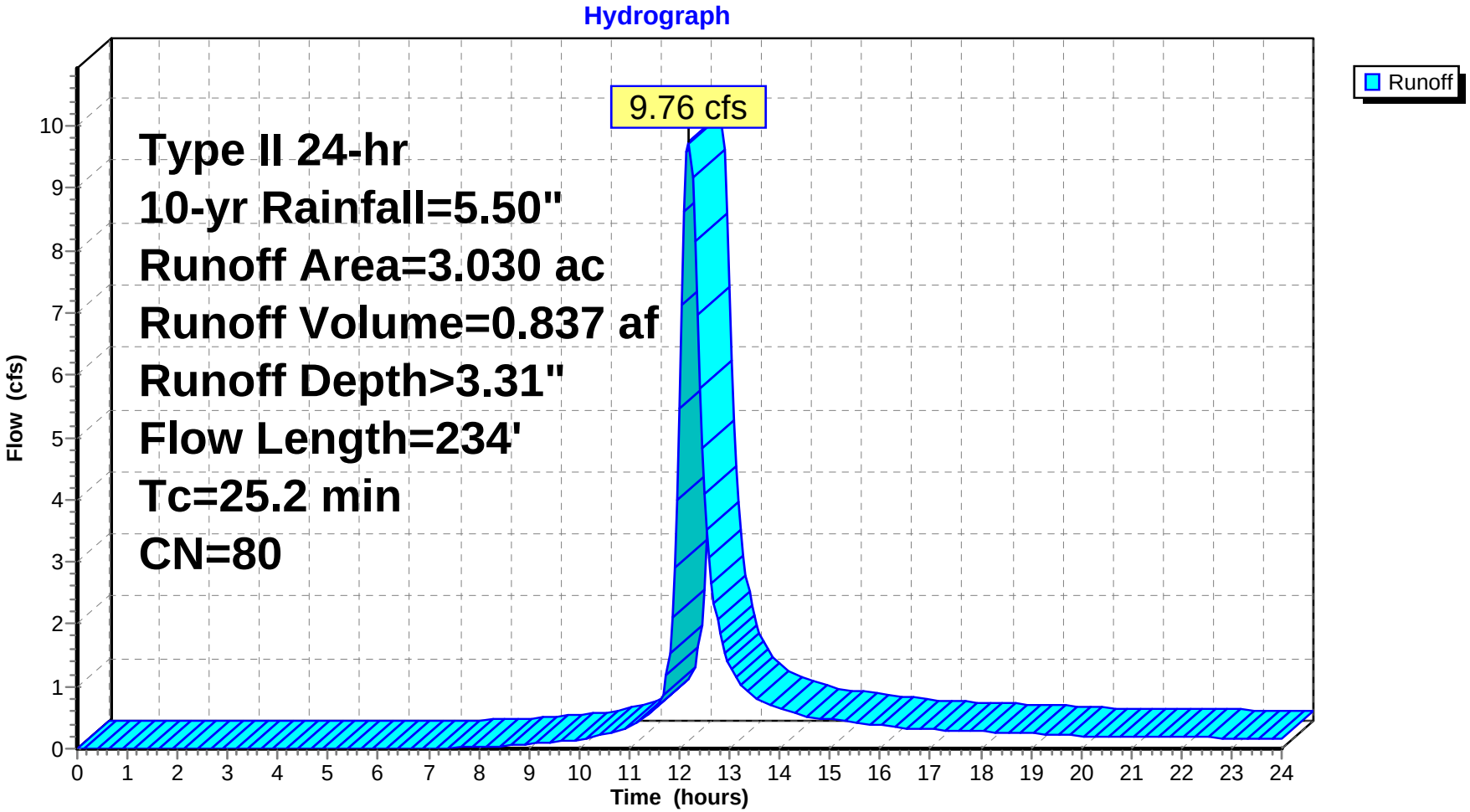
Runoff = 9.76 cfs @ 12.19 hrs, Volume= 0.837 af, Depth> 3.31"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

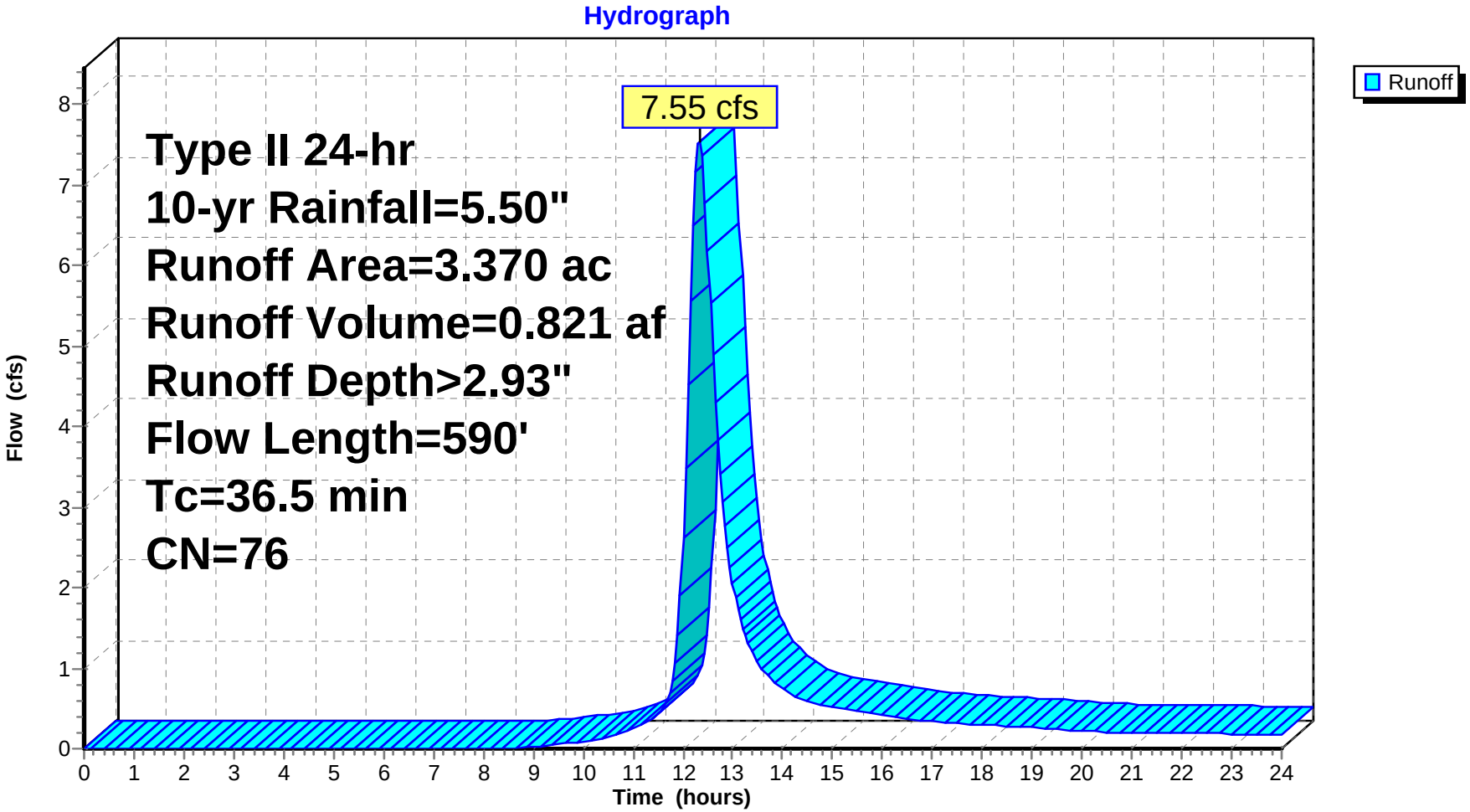
Runoff = 7.55 cfs @ 12.32 hrs, Volume= 0.821 af, Depth> 2.93"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.85" for 10-yr event
Inflow = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af
Outflow = 17.84 cfs @ 12.60 hrs, Volume= 3.811 af, Atten= 0%, Lag= 5.7 min
Routed to Reach R-2 : R-2

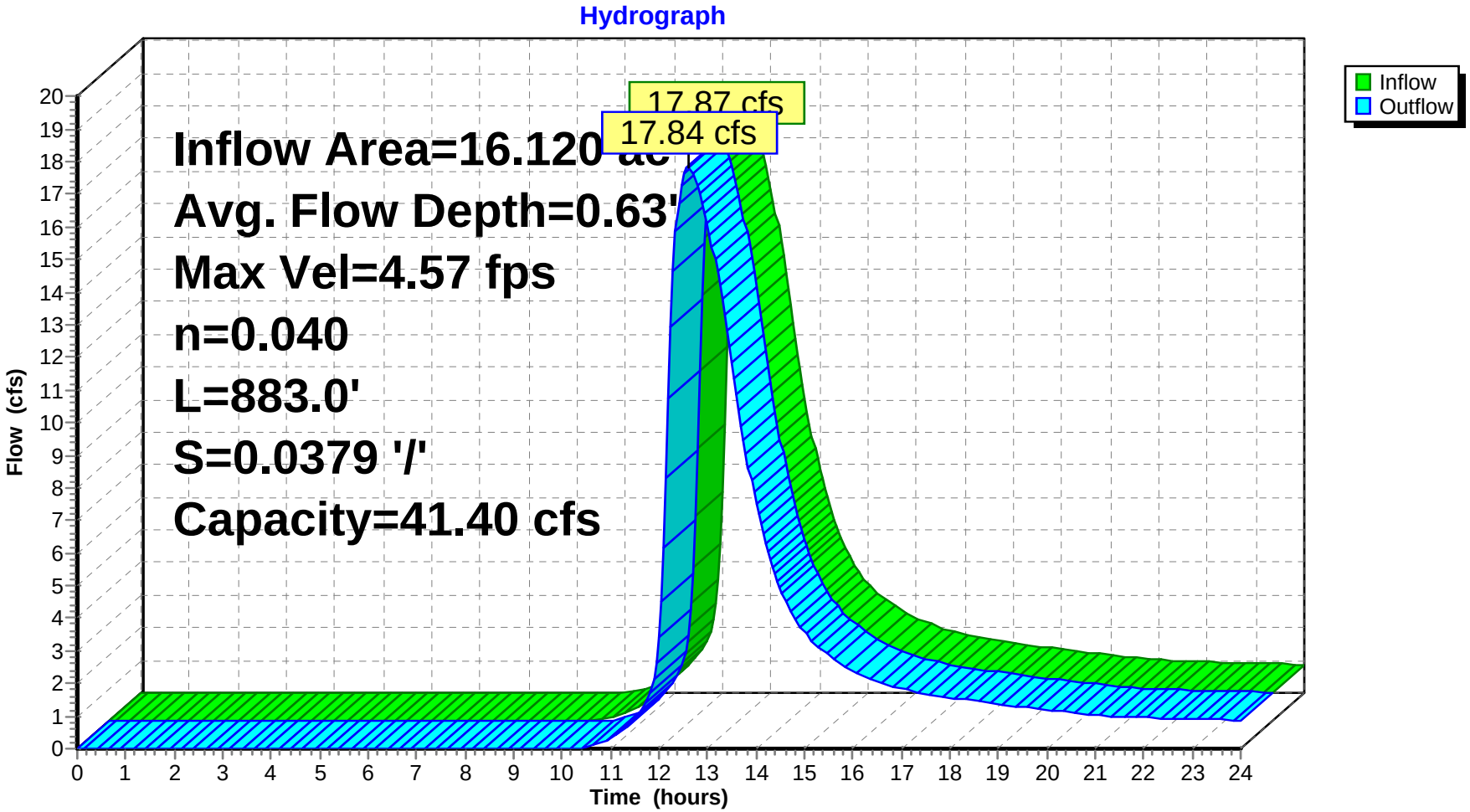
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.57 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 2.16 fps, Avg. Travel Time= 6.8 min

Peak Storage= 3,451 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.63' , Surface Width= 7.50'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
17.87 cfs
17.84 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.63'
Max Vel=4.57 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 2.78" for 10-yr event
Inflow = 62.27 cfs @ 12.38 hrs, Volume= 9.048 af
Outflow = 52.68 cfs @ 12.82 hrs, Volume= 8.893 af, Atten= 15%, Lag= 26.1 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.00 fps, Min. Travel Time= 14.3 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 32.0 min

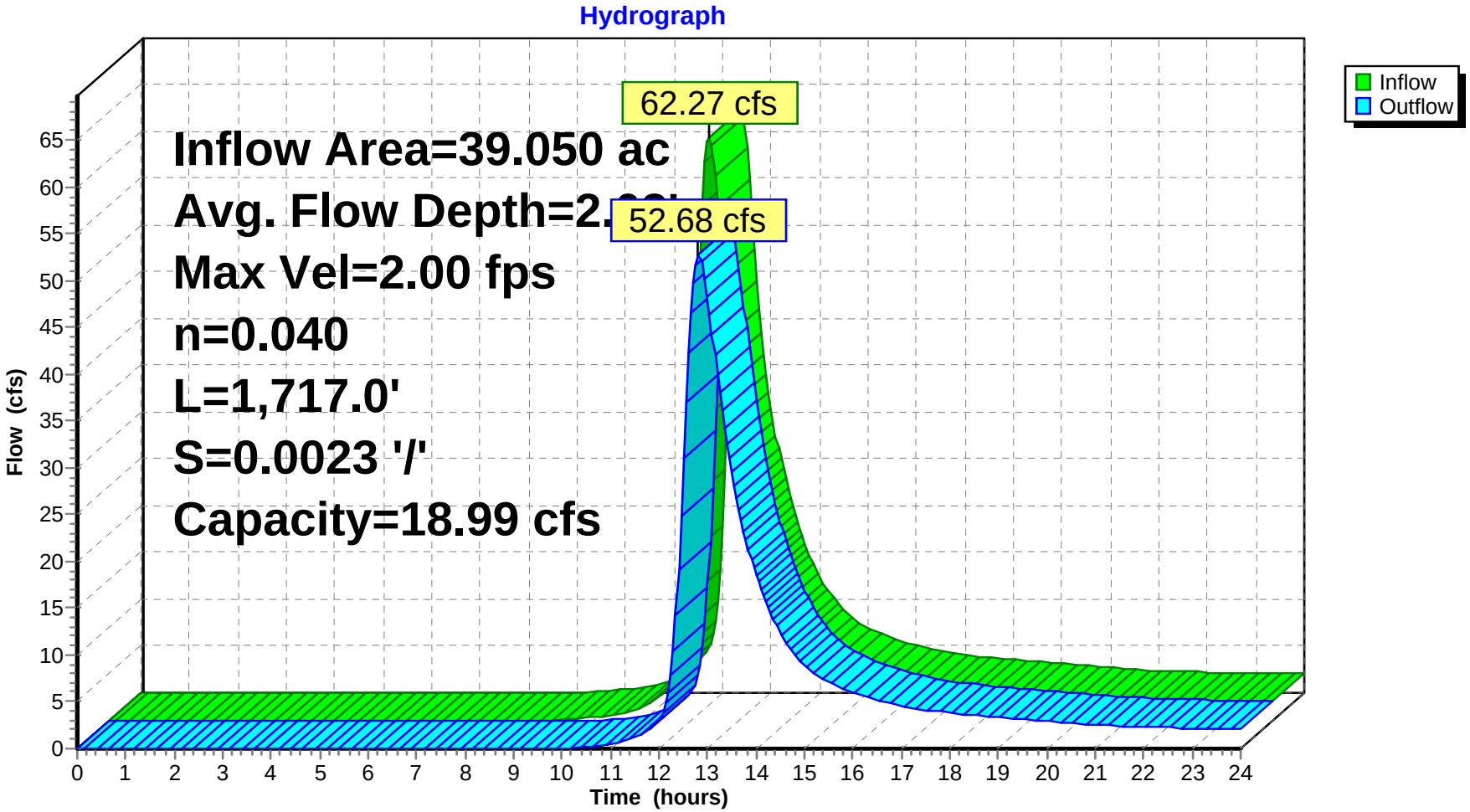
Peak Storage= 45,236 cf @ 12.58 hrs
Average Depth at Peak Storage= 2.03' , Surface Width= 18.10'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
Inflow
Outflow
62.27 cfs
52.68 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=2.
Max Vel=2.00 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Flow (cfs)
0
5
10
15
20
25
30
35
40
45
50
55
60
65
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
Time (hours)

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 2.65" for 10-yr event
Inflow = 71.74 cfs @ 12.81 hrs, Volume= 14.208 af
Outflow = 71.12 cfs @ 12.92 hrs, Volume= 14.154 af, Atten= 1%, Lag= 6.4 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.47 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 6.2 min

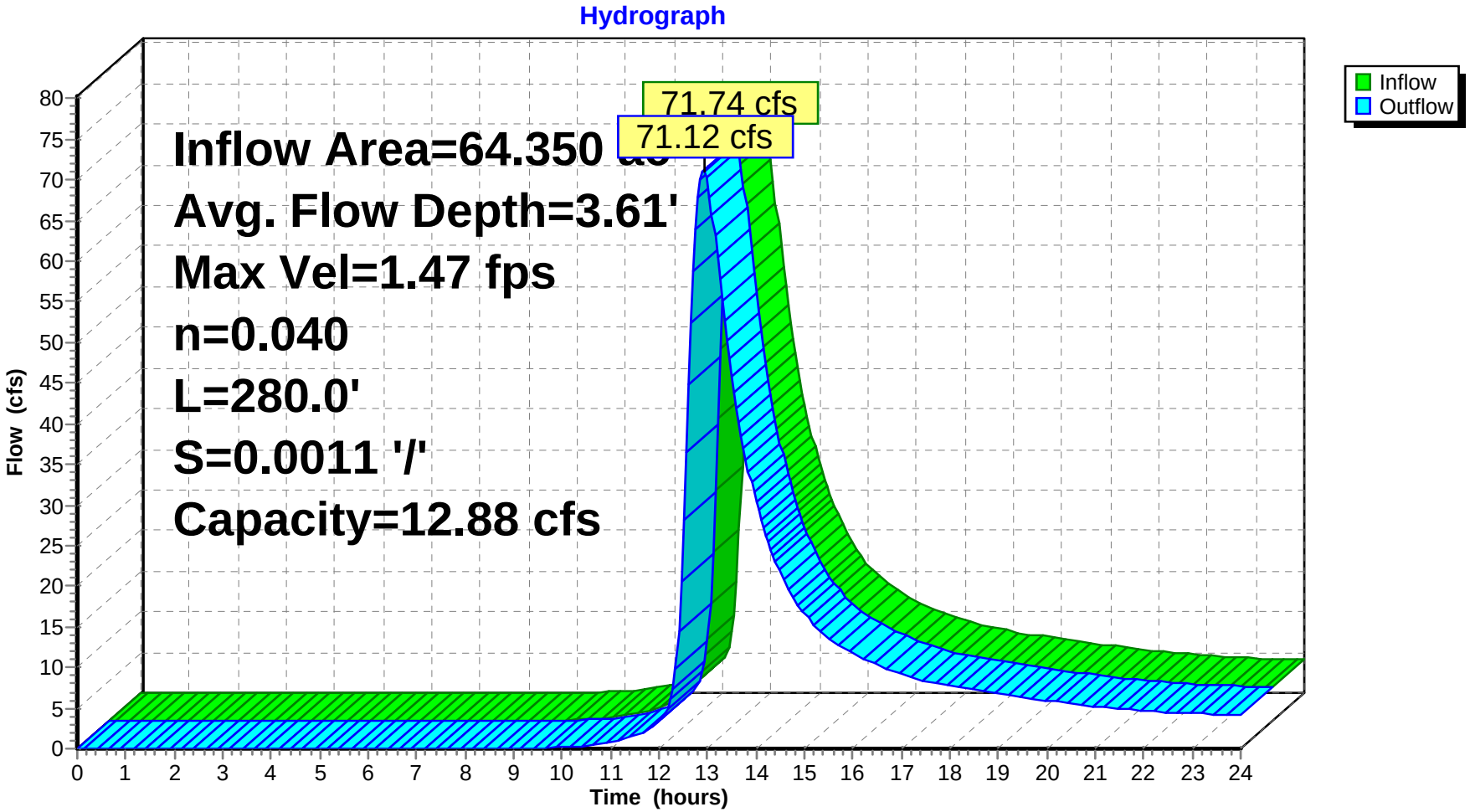
Peak Storage= 13,589 cf @ 12.86 hrs
Average Depth at Peak Storage= 3.61' , Surface Width= 24.45'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
Inflow
Outflow
71.74 cfs
71.12 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=3.61'
Max Vel=1.47 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 2.63" for 10-yr event
Inflow = 71.60 cfs @ 12.92 hrs, Volume= 14.339 af
Outflow = 71.14 cfs @ 13.01 hrs, Volume= 14.294 af, Atten= 1%, Lag= 5.4 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.36 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.72 fps, Avg. Travel Time= 5.1 min

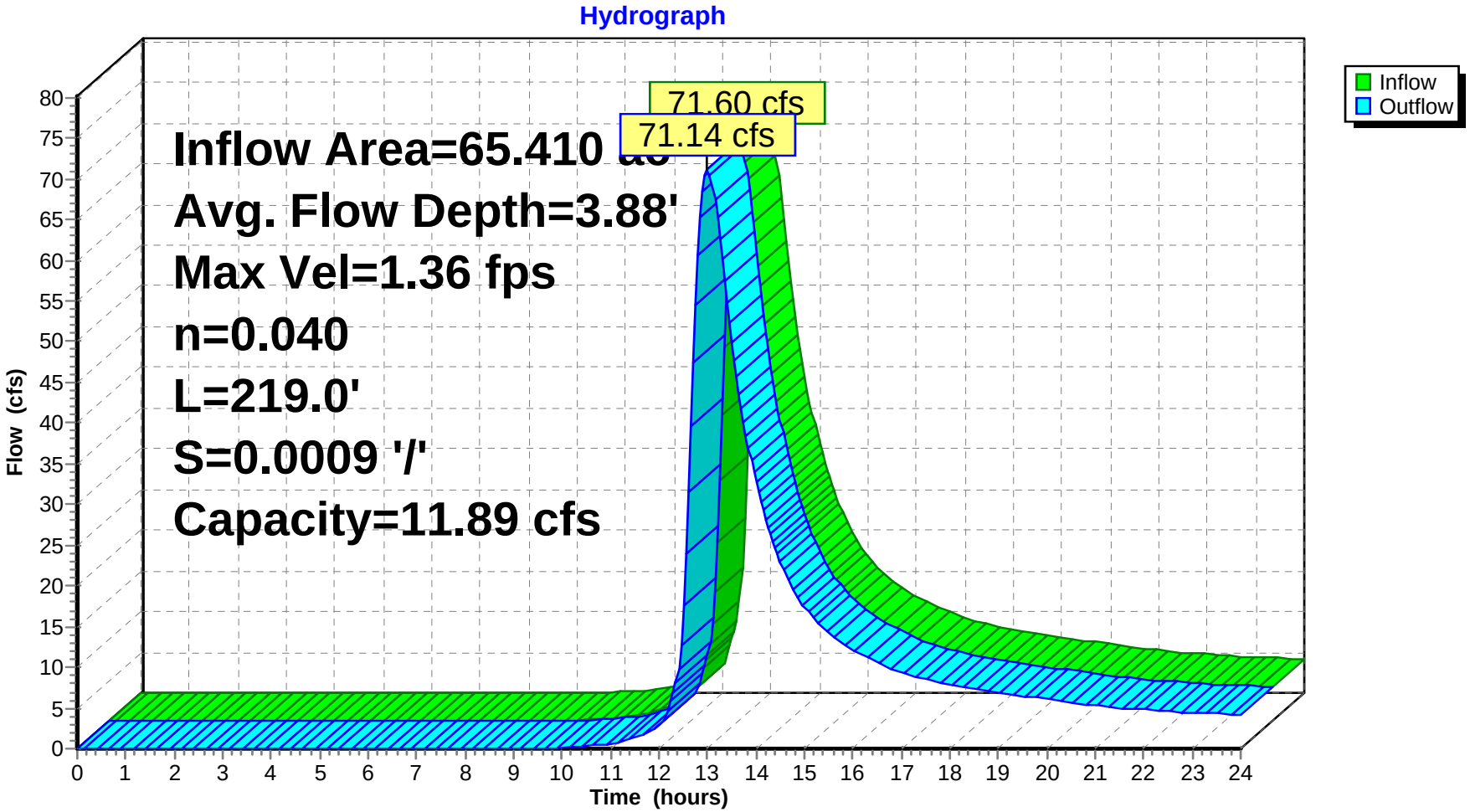
Peak Storage= 11,447 cf @ 12.96 hrs
Average Depth at Peak Storage= 3.88' , Surface Width= 25.52'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
71.60 cfs
71.14 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=3.88'
Max Vel=1.36 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.94" for 10-yr event
Inflow = 48.22 cfs @ 12.17 hrs, Volume= 3.944 af
Outflow = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af, Atten= 63%, Lag= 20.3 min
Primary = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.20' @ 12.50 hrs Surf.Area= 35,125 sf Storage= 55,419 cf

Plug-Flow detention time= 55.6 min calculated for 3.818 af (97% of inflow)
Center-of-Mass det. time= 38.8 min (876.0 - 837.2)

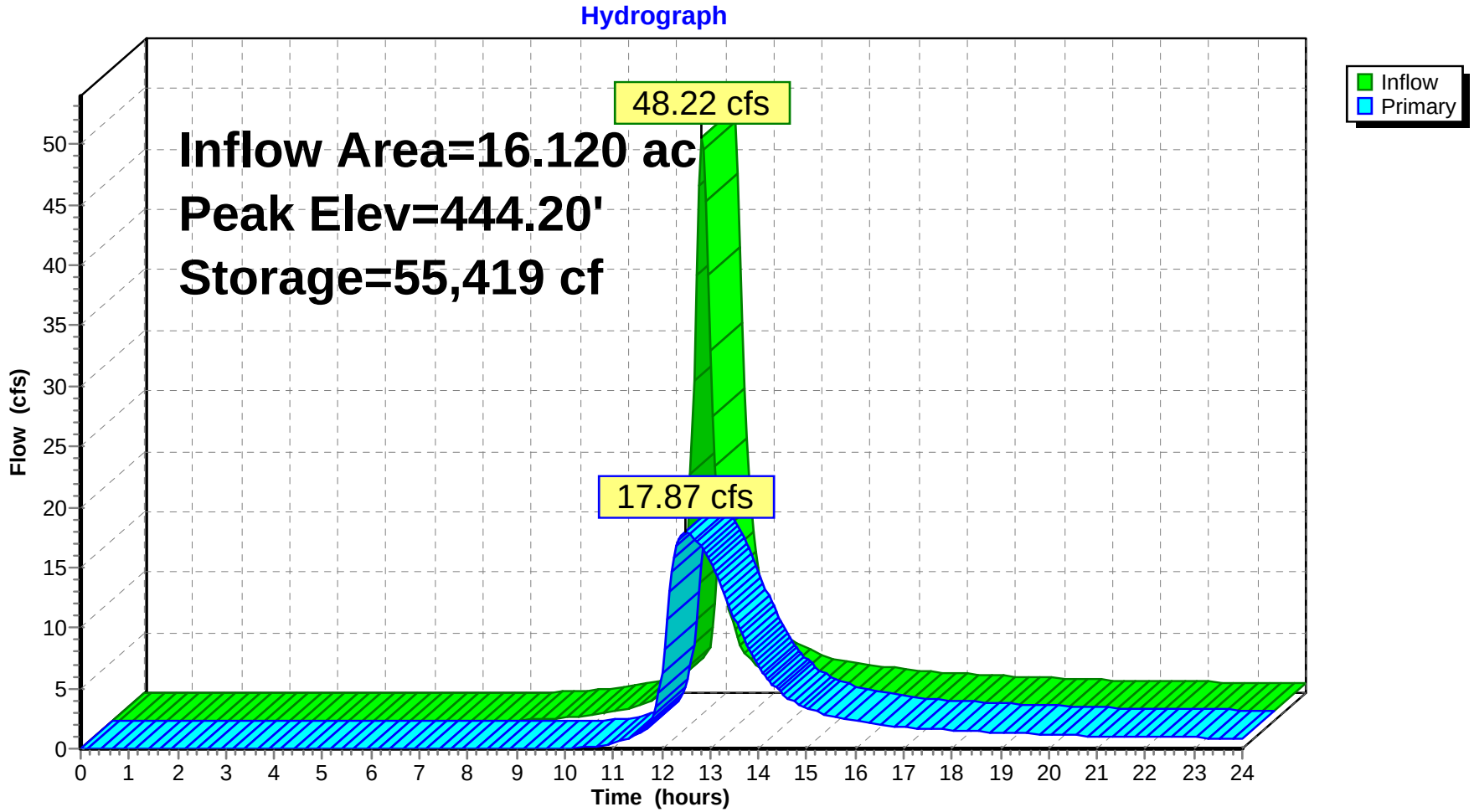
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=17.87 cfs @ 12.50 hrs HW=444.20' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 17.87 cfs @ 5.69 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes 17.87 cfs of 34.05 cfs potential flow)
  ├**3=Orifice/Grate** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0	445.20	36,815	91,523	448.90	40,718	141,234
441.60	3,108	215	445.30	36,984	95,213	449.00	40,718	141,234
441.70	5,024	622	445.40	37,152	98,919	449.10	40,718	141,234
441.80	6,940	1,220	445.50	37,321	102,643	449.20	40,718	141,234
441.90	8,856	2,010	445.60	37,489	106,384	449.30	40,718	141,234
442.00	10,772	2,991	445.70	37,658	110,141	449.40	40,718	141,234
442.10	11,973	4,128	445.80	37,826	113,915	449.50	40,718	141,234
442.20	13,174	5,386	445.90	37,995	117,706	449.60	40,718	141,234
442.30	14,375	6,763	446.00	38,163	121,514	449.70	40,718	141,234
442.40	15,576	8,261	446.10	38,674	125,356	449.80	40,718	141,234
442.50	16,778	9,878	446.20	39,185	129,249	449.90	40,718	141,234
442.60	17,979	11,616	446.30	39,696	133,193	450.00	40,718	141,234
442.70	19,180	13,474	446.40	40,207	137,188	450.10	40,718	141,234
442.80	20,381	15,452	446.50	**40,718**	**141,234**	450.20	40,718	141,234
442.90	21,582	17,550	446.60	40,718	141,234	450.30	40,718	141,234
443.00	22,783	19,769	446.70	40,718	141,234	450.40	40,718	141,234
443.10	23,984	22,107	446.80	40,718	141,234	450.50	40,718	141,234
443.20	25,185	24,565	446.90	40,718	141,234			
443.30	26,386	27,144	447.00	40,718	141,234			
443.40	27,587	29,843	447.10	40,718	141,234			
443.50	28,789	32,661	447.20	40,718	141,234			
443.60	29,990	35,600	447.30	40,718	141,234			
443.70	31,191	38,659	447.40	40,718	141,234			
443.80	32,392	41,838	447.50	40,718	141,234			
443.90	33,593	45,138	447.60	40,718	141,234			
444.00	34,794	48,557	447.70	40,718	141,234			
444.10	34,962	52,045	447.80	40,718	141,234			
444.20	35,131	55,549	447.90	40,718	141,234			
444.30	35,299	59,071	448.00	40,718	141,234			
444.40	35,468	62,609	448.10	40,718	141,234			
444.50	35,636	66,165	448.20	40,718	141,234			
444.60	35,805	69,737	448.30	40,718	141,234			
444.70	35,973	73,326	448.40	40,718	141,234			
444.80	36,142	76,931	448.50	40,718	141,234			
444.90	36,310	80,554	448.60	40,718	141,234			
445.00	36,479	84,193	448.70	40,718	141,234			
445.10	36,647	87,850	448.80	40,718	141,234			

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 3.29" for 10-yr event
Inflow = 21.66 cfs @ 12.48 hrs, Volume= 2.876 af
Outflow = 17.77 cfs @ 12.71 hrs, Volume= 2.725 af, Atten= 18%, Lag= 13.9 min
Primary = 17.77 cfs @ 12.71 hrs, Volume= 2.725 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.93' @ 12.71 hrs Surf.Area= 9,841 sf Storage= 30,105 cf

Plug-Flow detention time= 87.5 min calculated for 2.725 af (95% of inflow)
Center-of-Mass det. time= 59.6 min (906.5 - 846.9)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

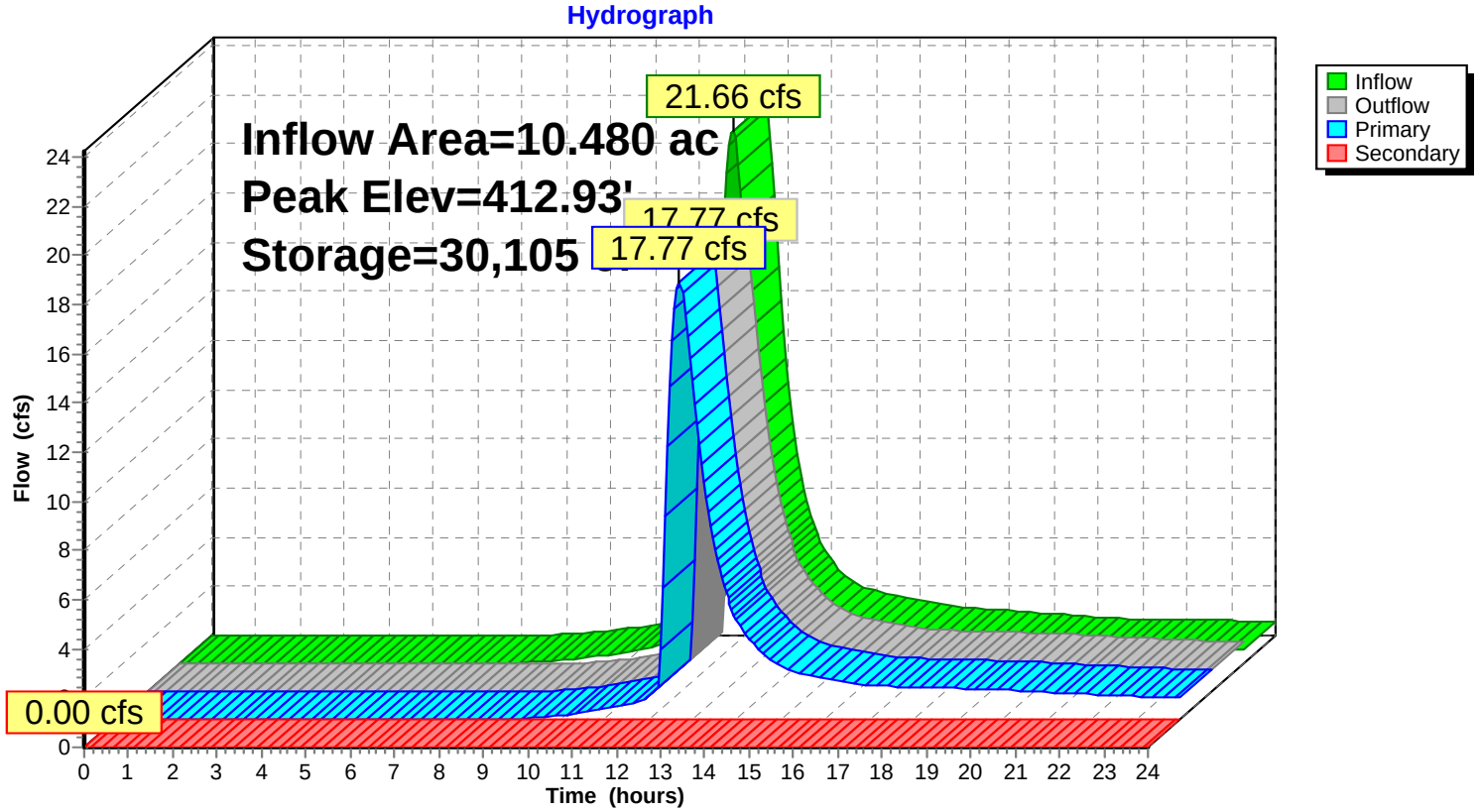
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=17.74 cfs @ 12.71 hrs HW=412.93' (Free Discharge)
└─**1=Culvert** (Passes 17.74 cfs of 29.98 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.81 cfs @ 9.24 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 15.92 cfs @ 5.84 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 3.27" for 10-yr event
Inflow = 27.13 cfs @ 12.56 hrs, Volume= 4.037 af
Outflow = 5.58 cfs @ 13.84 hrs, Volume= 2.590 af, Atten= 79%, Lag= 76.5 min
Primary = 5.58 cfs @ 13.84 hrs, Volume= 2.590 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.49' @ 13.84 hrs Surf.Area= 27,754 sf Storage= 97,224 cf

Plug-Flow detention time= 249.1 min calculated for 2.590 af (64% of inflow)
Center-of-Mass det. time= 148.1 min (1,000.6 - 852.6)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

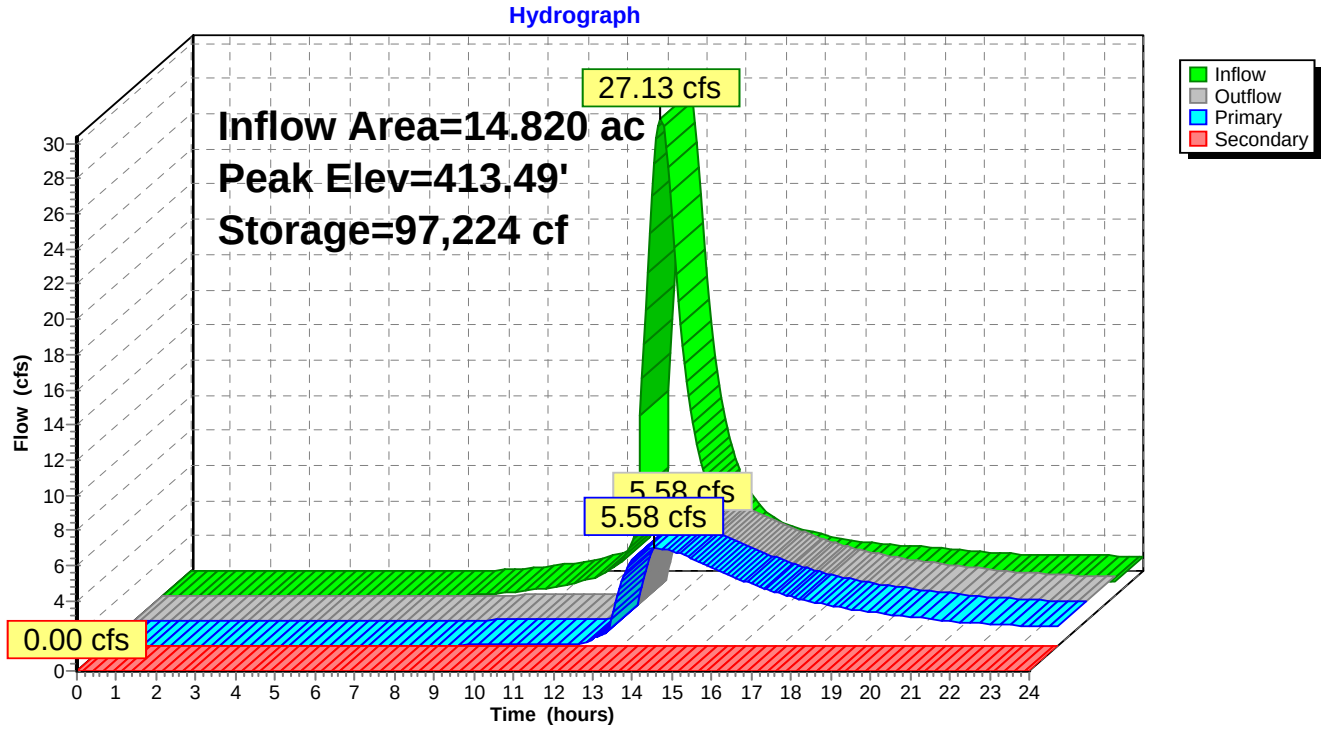
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=5.58 cfs @ 13.84 hrs HW=413.49' (Free Discharge)
- **1=Culvert** (Passes 5.58 cfs of 32.06 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.24 cfs @ 11.20 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.77 cfs @ 8.78 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 4.57 cfs @ 4.36 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 4.57" for 10-yr event
Inflow = 7.00 cfs @ 12.00 hrs, Volume= 0.404 af
Outflow = 1.74 cfs @ 12.21 hrs, Volume= 0.186 af, Atten= 75%, Lag= 12.6 min
Primary = 1.74 cfs @ 12.21 hrs, Volume= 0.186 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.46' @ 12.21 hrs Surf.Area= 8,000 sf Storage= 10,264 cf

Plug-Flow detention time= 256.2 min calculated for 0.186 af (46% of inflow)
Center-of-Mass det. time= 137.0 min (915.3 - 778.3)

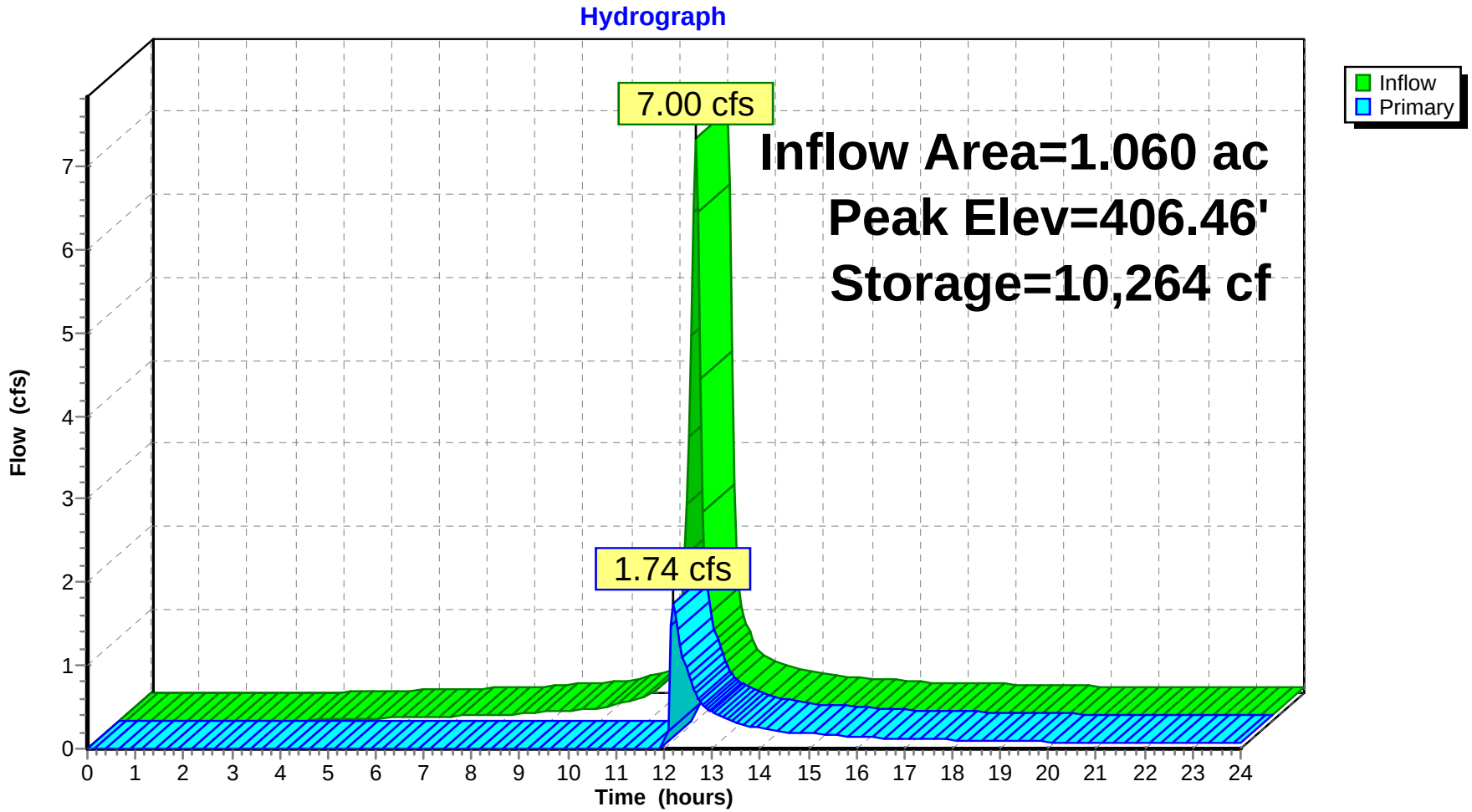
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.71 cfs @ 12.21 hrs HW=406.46' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 1.71 cfs @ 0.81 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0
405.02	6,127	122
405.04	6,153	245
405.06	6,179	368
405.08	6,205	492
405.10	6,230	617
405.12	6,256	741
405.14	6,282	867
405.16	6,308	993
405.18	6,334	1,119
405.20	6,360	1,246
405.22	6,386	1,374
405.24	6,412	1,502
405.26	6,437	1,630
405.28	6,463	1,759
405.30	6,489	1,889
405.32	6,515	2,019
405.34	6,541	2,149
405.36	6,567	2,280
405.38	6,593	2,412
405.40	6,619	2,544
405.42	6,644	2,677
405.44	6,670	2,810
405.46	6,696	2,943
405.48	6,722	3,078
405.50	6,748	3,212
405.52	6,774	3,347
405.54	6,800	3,483
405.56	6,826	3,619
405.58	6,852	3,756
405.60	6,877	3,894
405.62	6,903	4,031
405.64	6,929	4,170
405.66	6,955	4,308
405.68	6,981	4,448
405.70	7,007	4,588
405.72	7,033	4,728
405.74	7,059	4,869
405.76	7,084	5,010
405.78	7,110	5,152
405.80	7,136	5,295
405.82	7,162	5,438
405.84	7,188	5,581
405.86	7,214	5,725
405.88	7,240	5,870
405.90	7,266	6,015
405.92	7,291	6,161
405.94	7,317	6,307
405.96	7,343	6,453
405.98	7,369	6,600
406.00	7,395	6,748
406.02	7,421	6,896
406.04	7,448	7,045
406.06	7,474	7,194
406.08	7,501	7,344
406.10	7,527	7,494
406.12	7,553	7,645
406.14	7,580	7,796
406.16	7,606	7,948
406.18	7,633	8,100
406.20	7,659	8,253
406.22	7,685	8,407
406.24	7,712	8,561
406.26	7,738	8,715
406.28	7,765	8,870
406.30	7,791	9,026
406.32	7,817	9,182
406.34	7,844	9,339
406.36	7,870	9,496
406.38	7,897	9,653
406.40	7,924	9,812
406.42	7,951	9,970
406.44	7,978	10,130
406.46	8,005	10,289
406.48	8,032	10,450
406.50	8,058	10,611
406.52	8,085	10,772
406.54	8,112	10,934
406.56	8,139	11,097
406.58	8,166	11,260
406.60	8,193	11,423
406.62	8,219	11,587
406.64	8,246	11,752
406.66	8,273	11,917
406.68	8,300	12,083
406.70	8,327	12,249
406.72	8,354	12,416
406.74	**8,381**	**12,583**

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 3.31" for 10-yr event
Inflow = 9.76 cfs @ 12.19 hrs, Volume= 0.837 af
Outflow = 4.15 cfs @ 12.50 hrs, Volume= 0.816 af, Atten= 57%, Lag= 19.0 min
Primary = 4.15 cfs @ 12.50 hrs, Volume= 0.816 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 425.31' @ 12.50 hrs Surf.Area= 6,244 sf Storage= 11,943 cf

Plug-Flow detention time= 56.6 min calculated for 0.816 af (97% of inflow)
Center-of-Mass det. time= 42.0 min (870.7 - 828.7)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

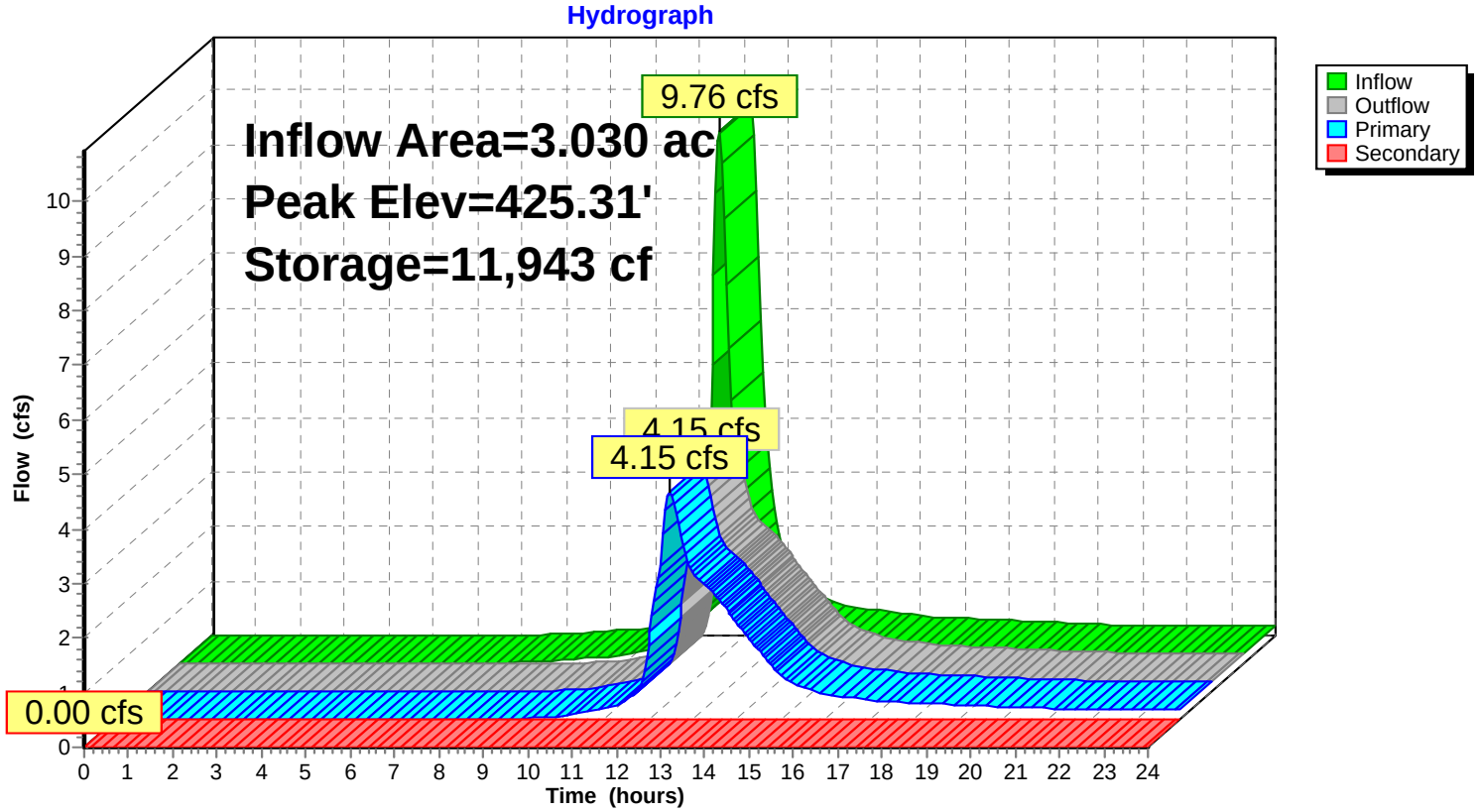
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=4.14 cfs @ 12.50 hrs HW=425.31' (Free Discharge)
└─**1=Culvert** (Passes 4.14 cfs of 10.63 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 2.96 cfs @ 6.70 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.18 cfs @ 1.96 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 4.03" for 10-yr event
Inflow = 3.07 cfs @ 12.07 hrs, Volume= 0.208 af
Outflow = 3.07 cfs @ 12.10 hrs, Volume= 0.147 af, Atten= 0%, Lag= 1.5 min
Primary = 3.07 cfs @ 12.10 hrs, Volume= 0.147 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.17' @ 12.10 hrs Surf.Area= 1,541 sf Storage= 2,900 cf

Plug-Flow detention time= 152.4 min calculated for 0.147 af (71% of inflow)
Center-of-Mass det. time= 58.6 min (860.1 - 801.5)

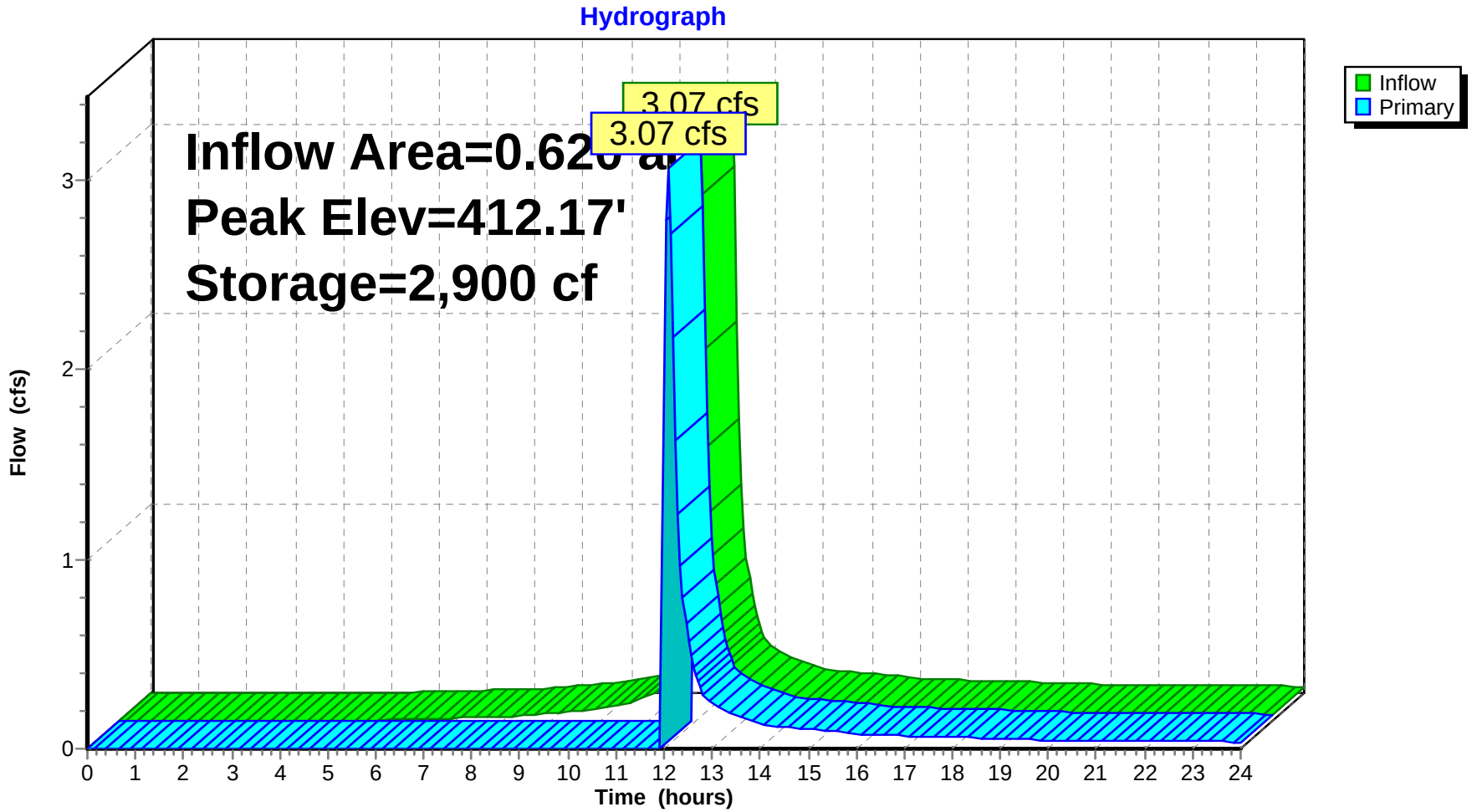
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=3.04 cfs @ 12.10 hrs HW=412.17' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 3.04 cfs @ 1.00 fps)

Pond WQB-1: WQB-1



Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>3.75"
Flow Length=777' Tc=38.6 min CN=74 Runoff=63.42 cfs 7.172 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>3.98"
Flow Length=209' Tc=23.3 min CN=76 Runoff=65.36 cfs 5.344 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>4.38"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=28.75 cfs 3.823 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>4.37"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=35.39 cfs 5.171 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>5.76"
Tc=9.2 min CN=92 Runoff=8.69 cfs 0.509 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>5.18"
Flow Length=274' Tc=15.6 min CN=87 Runoff=3.90 cfs 0.268 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>3.81"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=16.14 cfs 3.089 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>4.40"
Flow Length=234' Tc=25.2 min CN=80 Runoff=12.91 cfs 1.112 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>3.96"
Flow Length=590' Tc=36.5 min CN=76 Runoff=10.26 cfs 1.113 af

Reach R-1: R-1 Avg. Flow Depth=0.70' Max Vel=4.85 fps Inflow=21.65 cfs 5.211 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=21.63 cfs 5.193 af

Reach R-2: R-2 Avg. Flow Depth=2.57' Max Vel=2.08 fps Inflow=83.03 cfs 12.366 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=70.56 cfs 12.182 af

Reach R-3: R-3 Avg. Flow Depth=4.85' Max Vel=1.50 fps Inflow=99.56 cfs 19.666 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=98.64 cfs 19.602 af

Reach R-4: R-4 Avg. Flow Depth=5.22' Max Vel=1.39 fps Inflow=99.24 cfs 19.893 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=98.62 cfs 19.839 af

Pond Pond 1b: Pond 1b Peak Elev=444.85' Storage=78,683 cf Inflow=65.36 cfs 5.344 af
Outflow=21.65 cfs 5.211 af

Pond Pond 1c: Pond 1c Peak Elev=413.33' Storage=34,148 cf Inflow=28.75 cfs 3.823 af
Primary=25.56 cfs 3.613 af Secondary=0.00 cfs 0.000 af Outflow=25.56 cfs 3.613 af

Pond Pond 1d: Pond 1d Peak Elev=414.44' Storage=124,671 cf Inflow=35.99 cfs 5.377 af
Primary=8.47 cfs 3.871 af Secondary=0.00 cfs 0.000 af Outflow=8.47 cfs 3.871 af

Pond Pond 1e: Pond 1e Peak Elev=406.58' Storage=11,220 cf Inflow=8.69 cfs 0.509 af
Outflow=5.34 cfs 0.290 af

Pond Pond 3: Pond 3 Peak Elev=425.69' Storage=14,356 cf Inflow=12.91 cfs 1.112 af
Primary=7.29 cfs 1.088 af Secondary=0.00 cfs 0.000 af Outflow=7.29 cfs 1.088 af

Pond WQB-1: WQB-1 Peak Elev=412.20' Storage=2,945 cf Inflow=3.90 cfs 0.268 af
Outflow=3.88 cfs 0.207 af

Summary for Subcatchment P-1a: P-1a

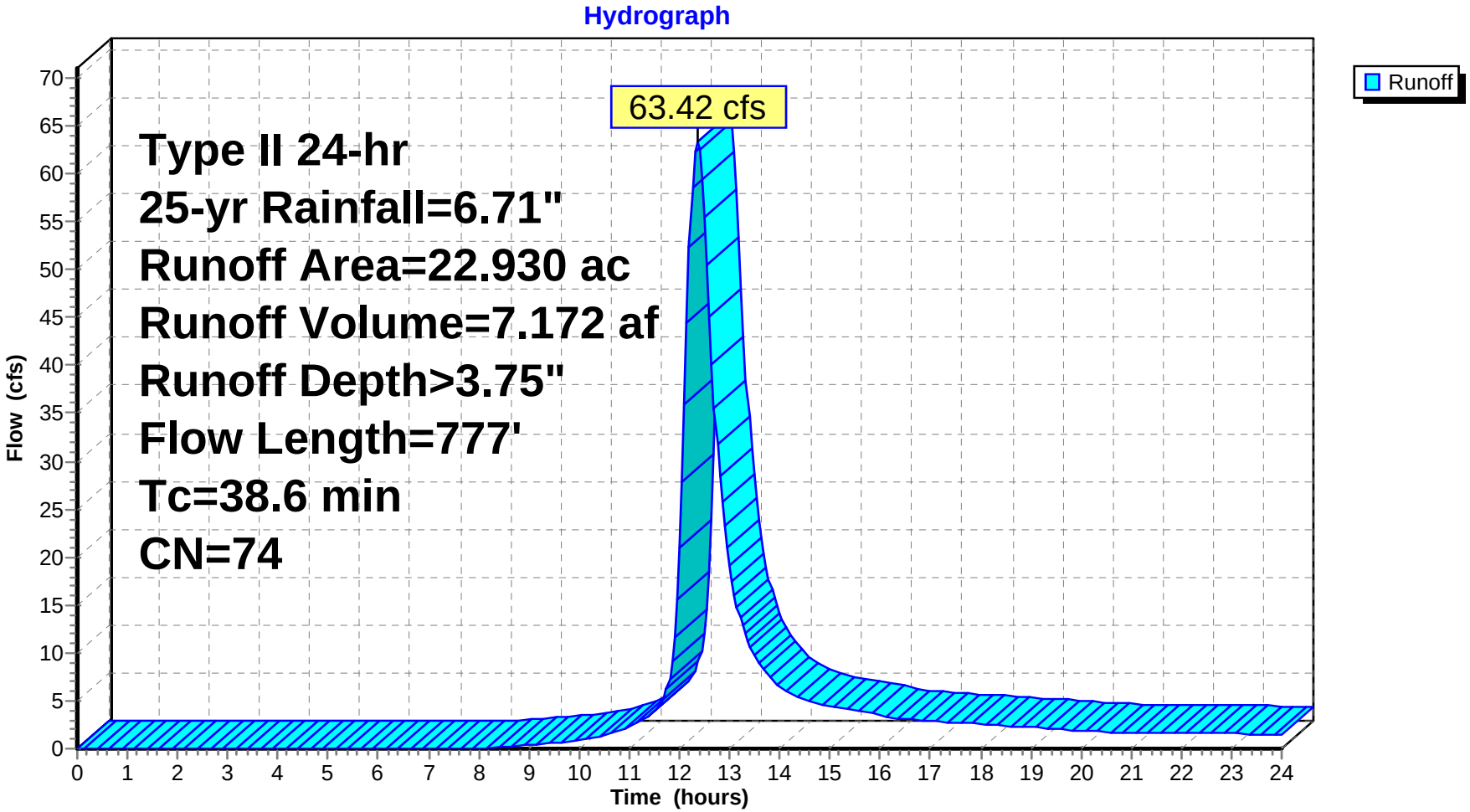
Runoff = 63.42 cfs @ 12.35 hrs, Volume= 7.172 af, Depth> 3.75"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

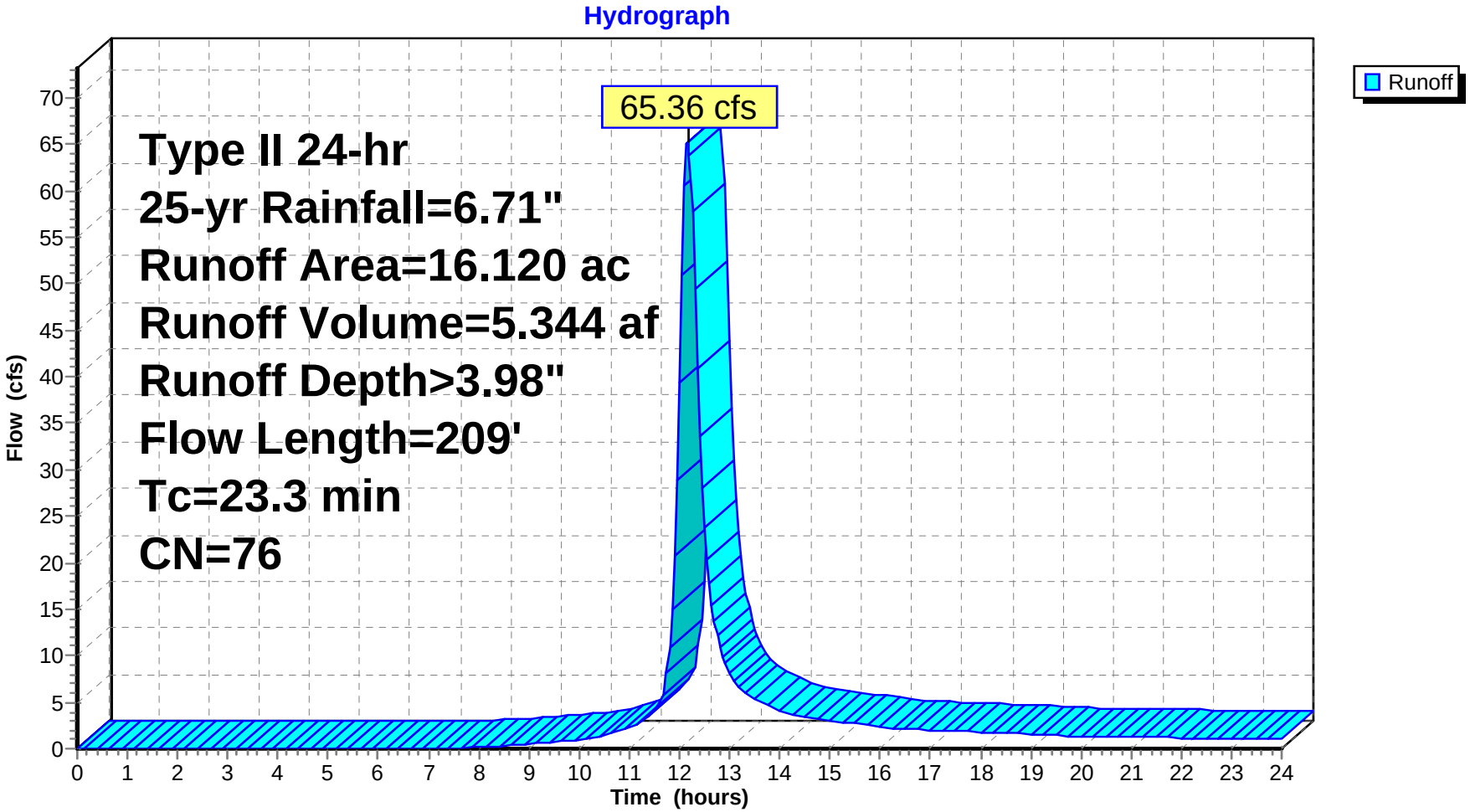
Runoff = 65.36 cfs @ 12.16 hrs, Volume= 5.344 af, Depth> 3.98"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

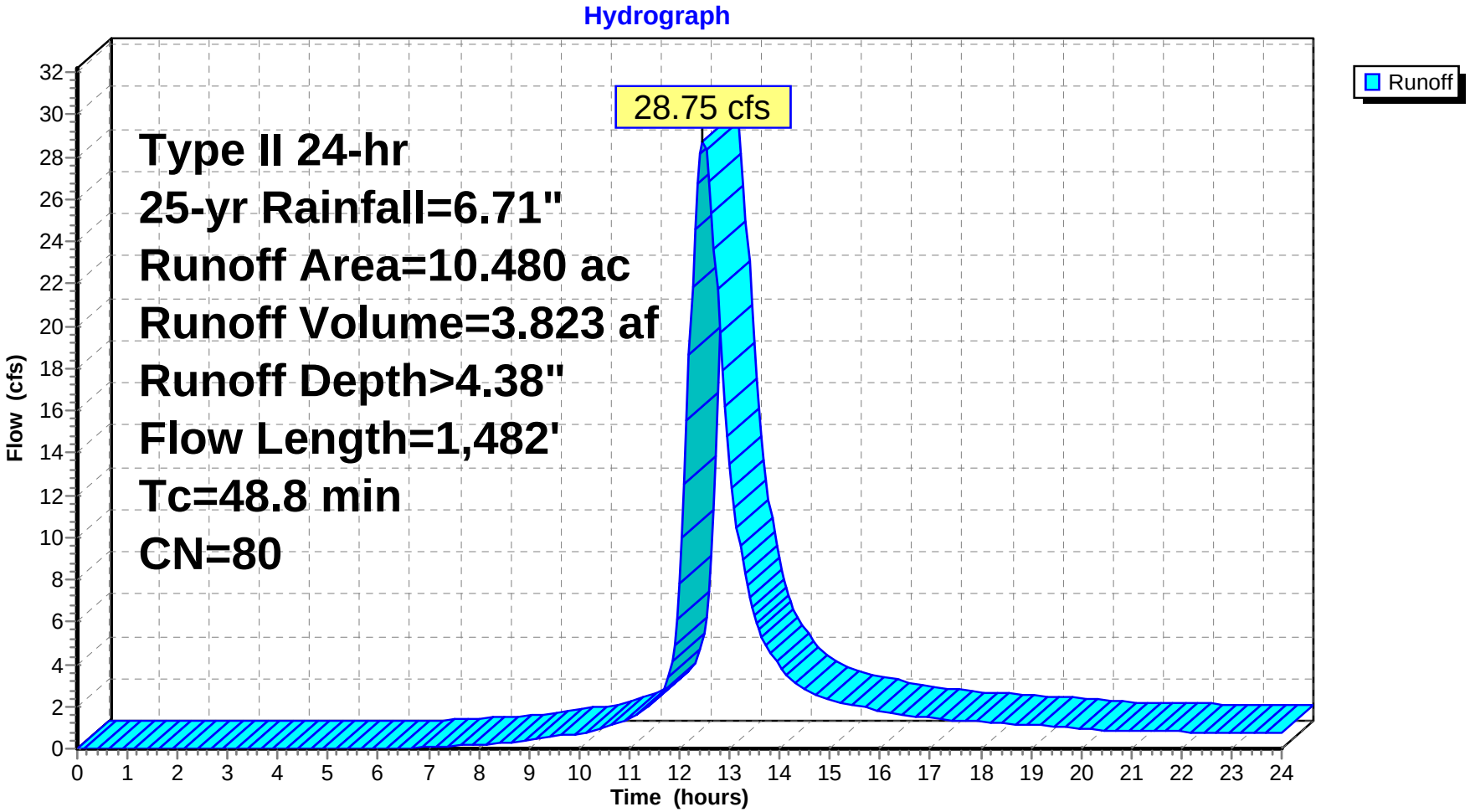
Runoff = 28.75 cfs @ 12.47 hrs, Volume= 3.823 af, Depth> 4.38"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

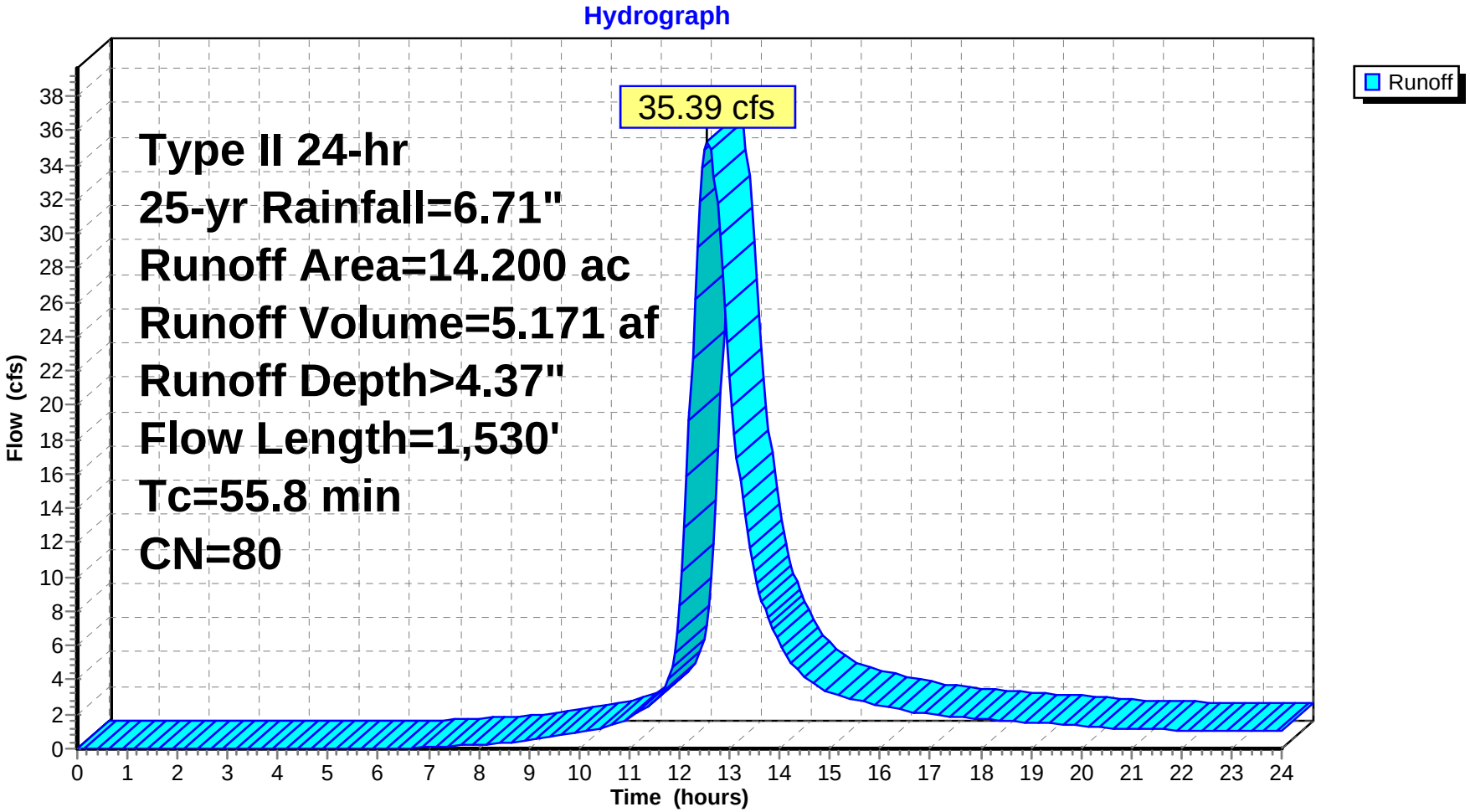
Runoff = 35.39 cfs @ 12.57 hrs, Volume= 5.171 af, Depth> 4.37"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

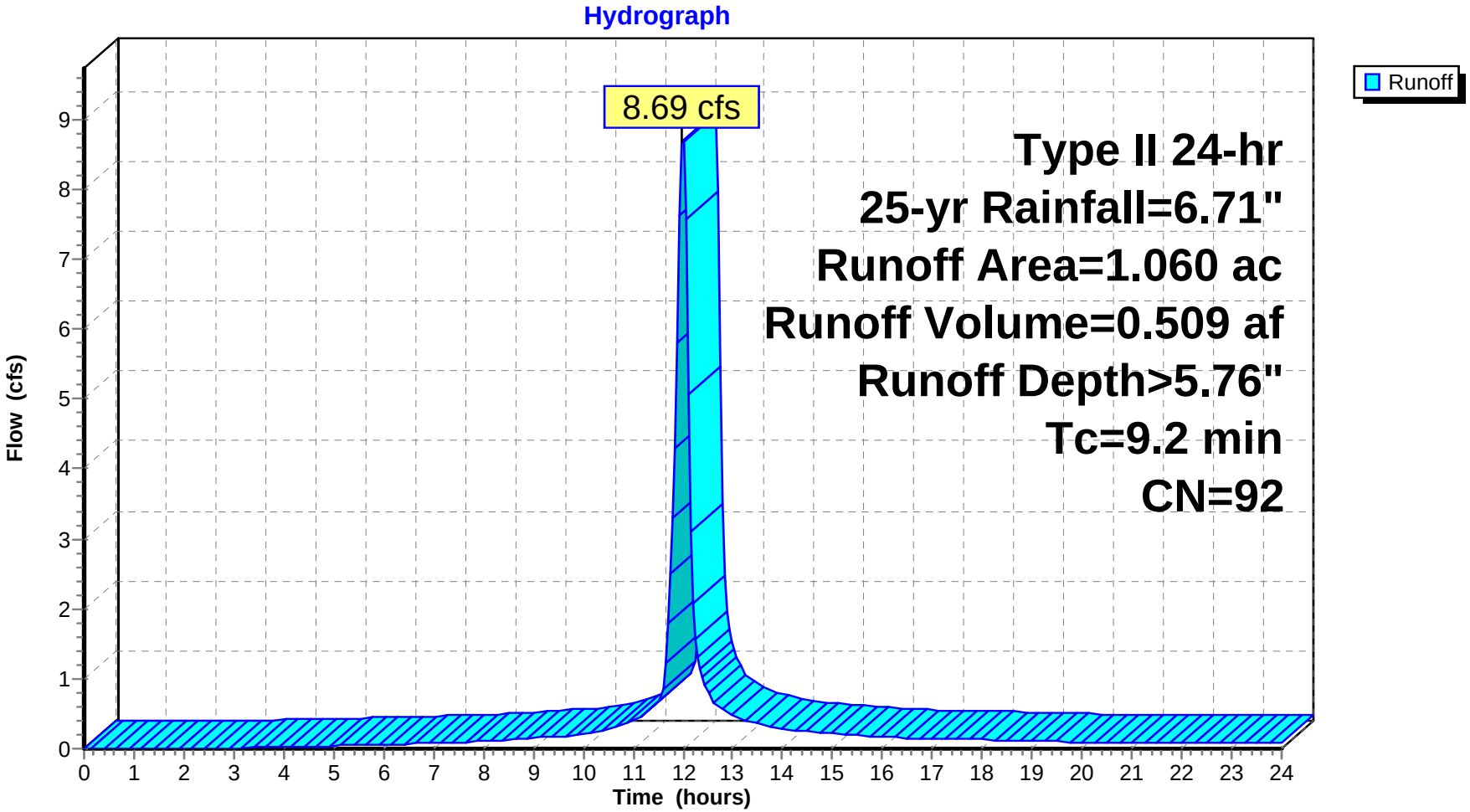
Runoff = 8.69 cfs @ 12.00 hrs, Volume= 0.509 af, Depth> 5.76"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

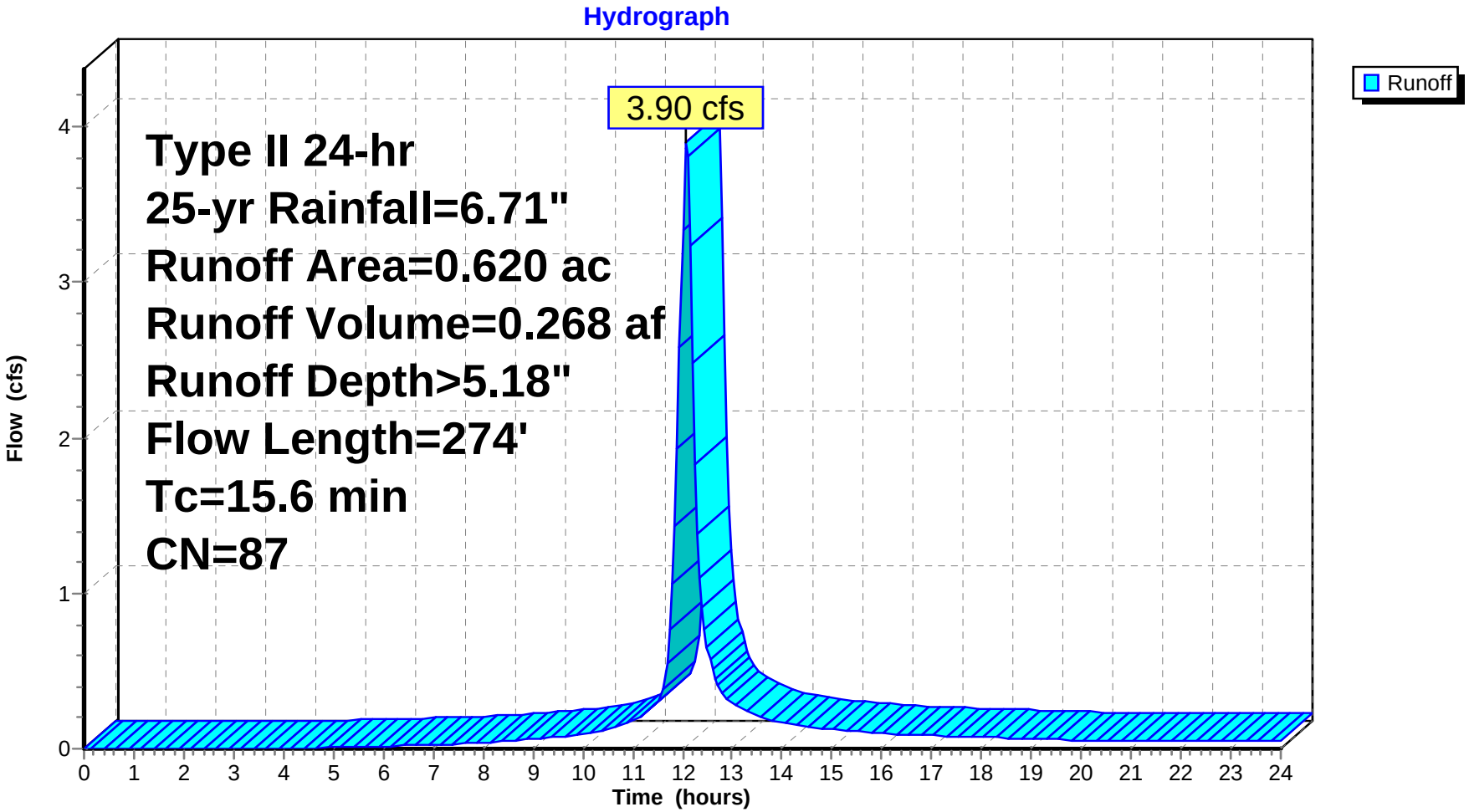
Runoff = 3.90 cfs @ 12.07 hrs, Volume= 0.268 af, Depth> 5.18"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

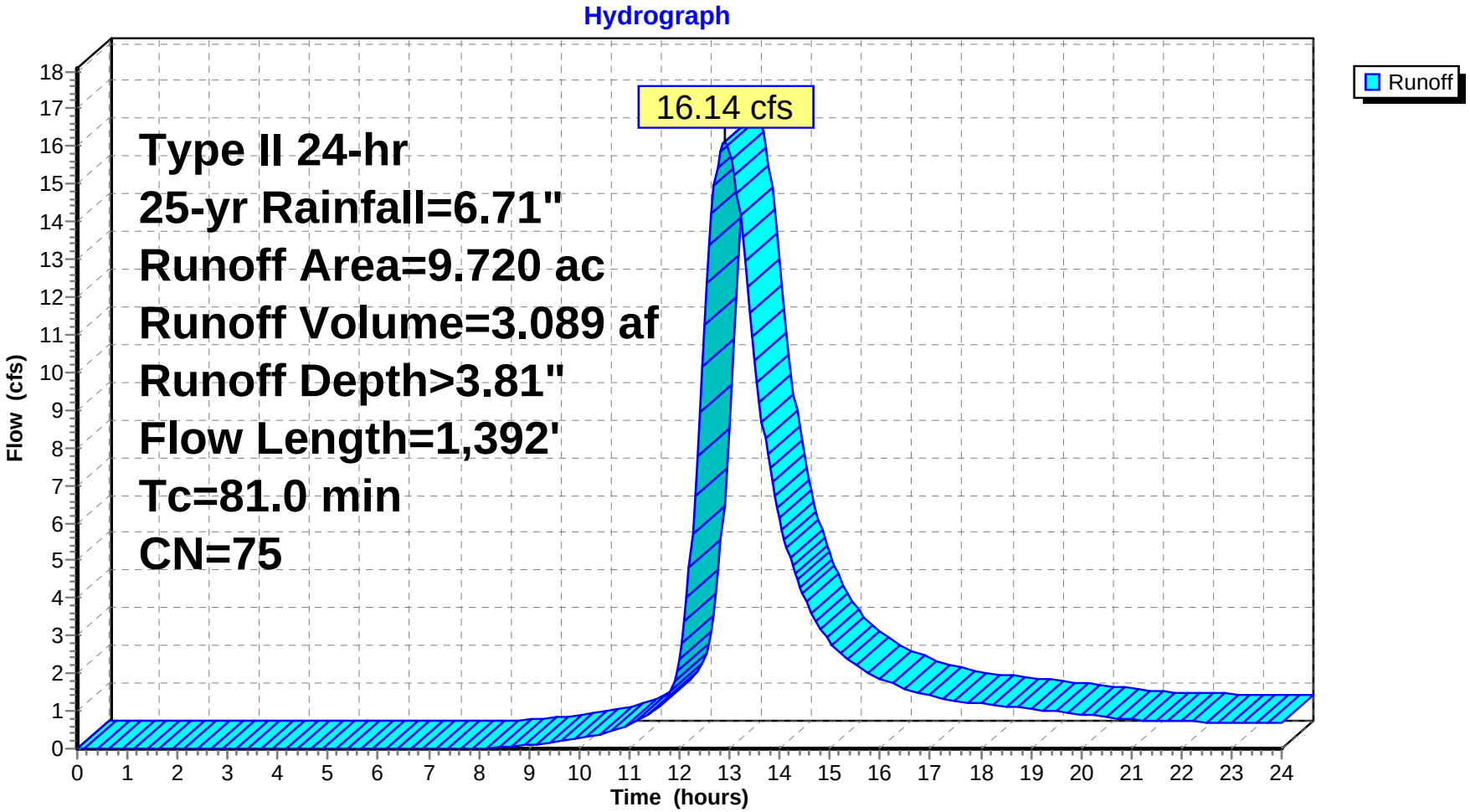
Runoff = 16.14 cfs @ 12.89 hrs, Volume= 3.089 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

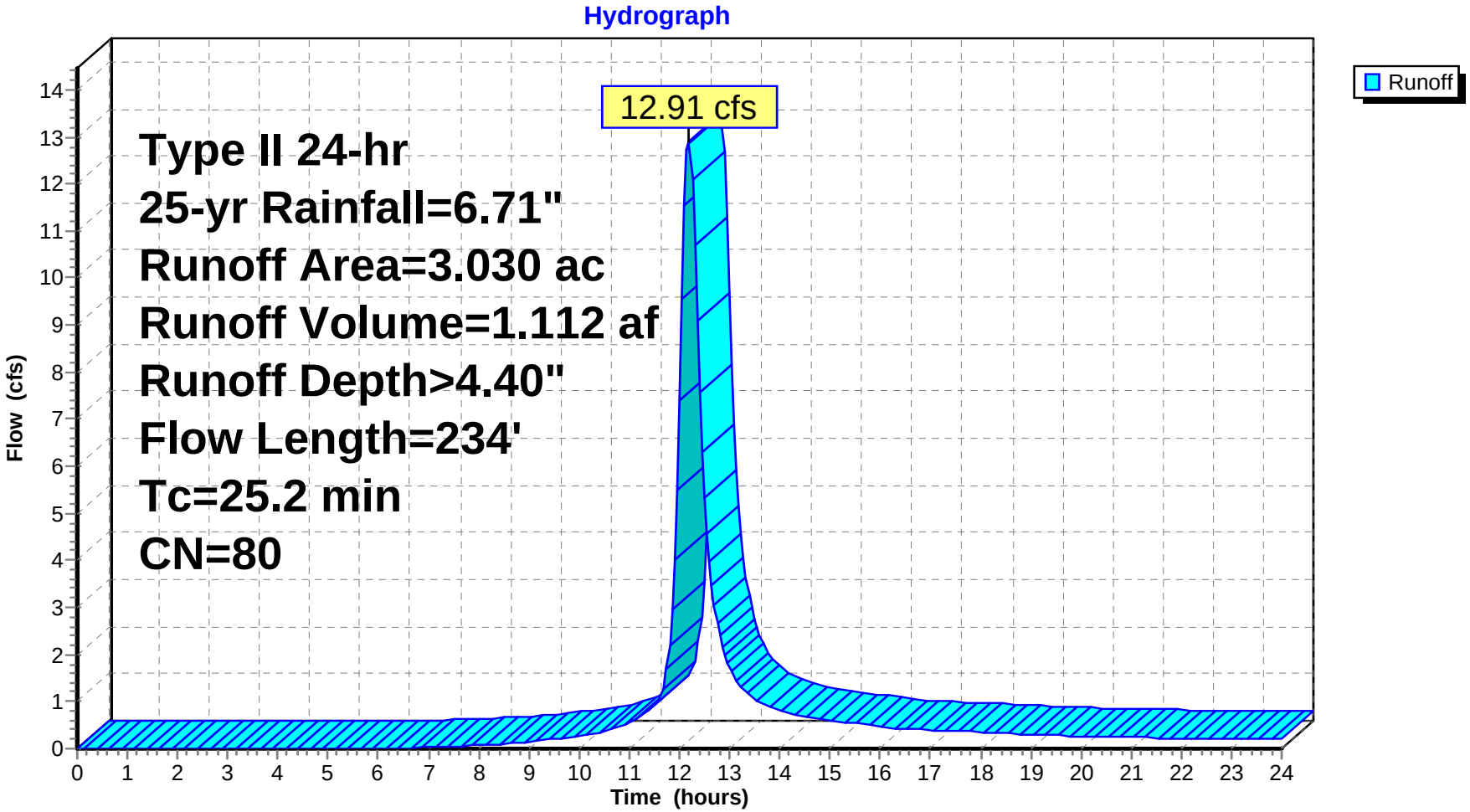
Runoff = 12.91 cfs @ 12.18 hrs, Volume= 1.112 af, Depth> 4.40"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

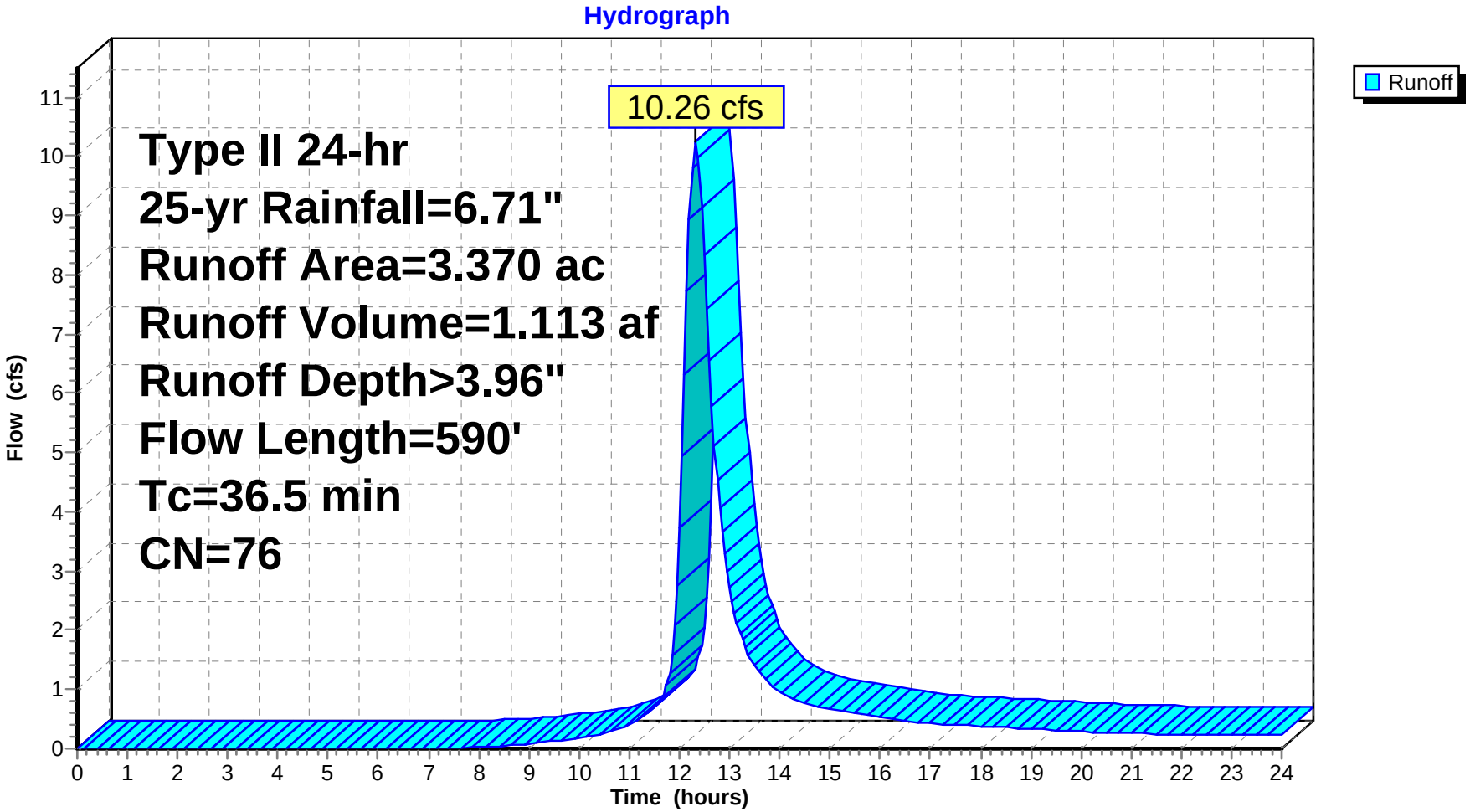
Runoff = 10.26 cfs @ 12.32 hrs, Volume= 1.113 af, Depth> 3.96"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC**
					Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 3.88" for 25-yr event
Inflow = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af
Outflow = 21.63 cfs @ 12.62 hrs, Volume= 5.193 af, Atten= 0%, Lag= 5.3 min
Routed to Reach R-2 : R-2

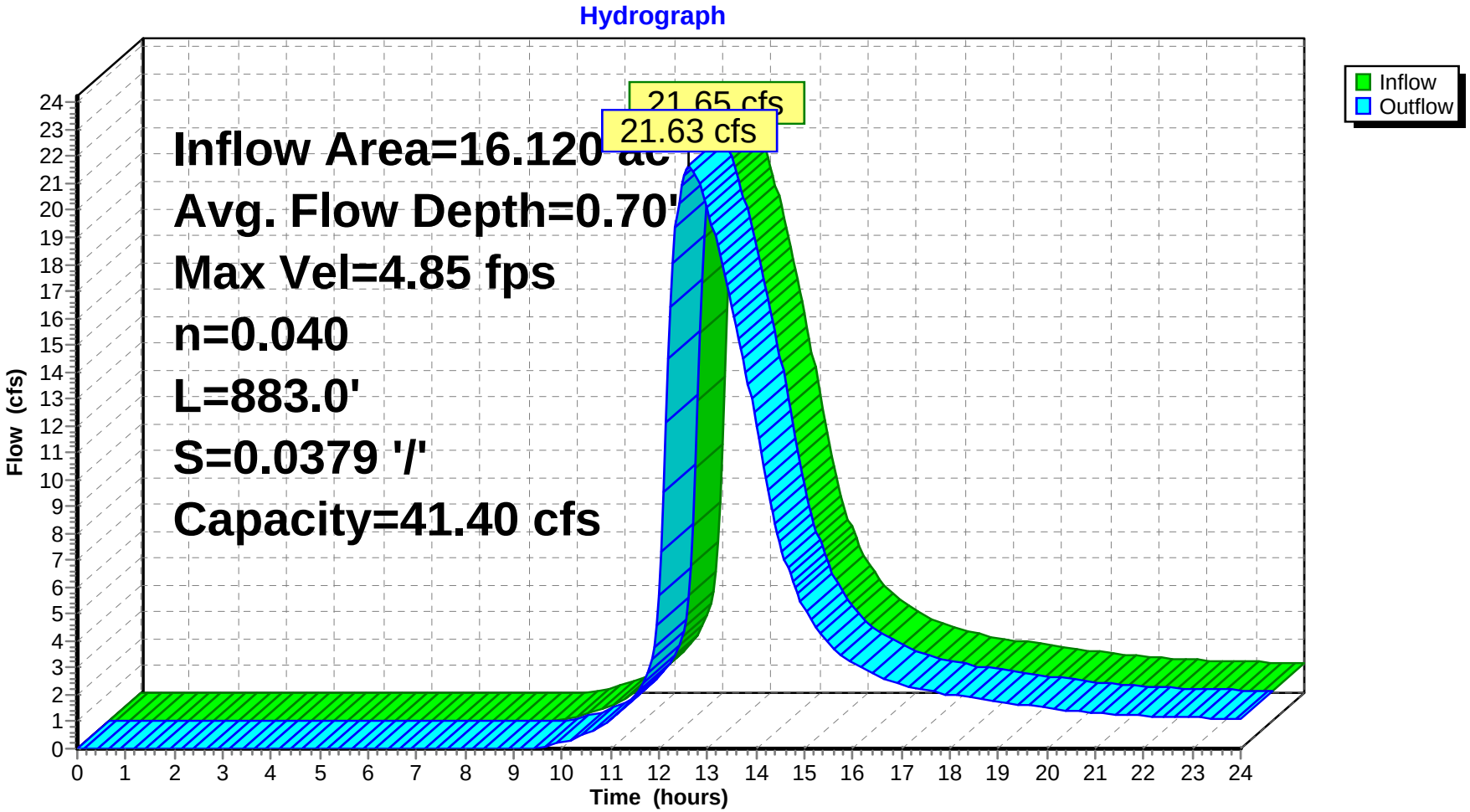
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.85 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 6.3 min

Peak Storage= 3,936 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.70' , Surface Width= 7.79'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
Inflow
Outflow
21.65 cfs
21.63 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.70'
Max Vel=4.85 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Flow (cfs)
Time (hours)
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 3.80" for 25-yr event
Inflow = 83.03 cfs @ 12.37 hrs, Volume= 12.366 af
Outflow = 70.56 cfs @ 12.79 hrs, Volume= 12.182 af, Atten= 15%, Lag= 25.3 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 13.8 min
Avg. Velocity = 0.96 fps, Avg. Travel Time= 29.9 min

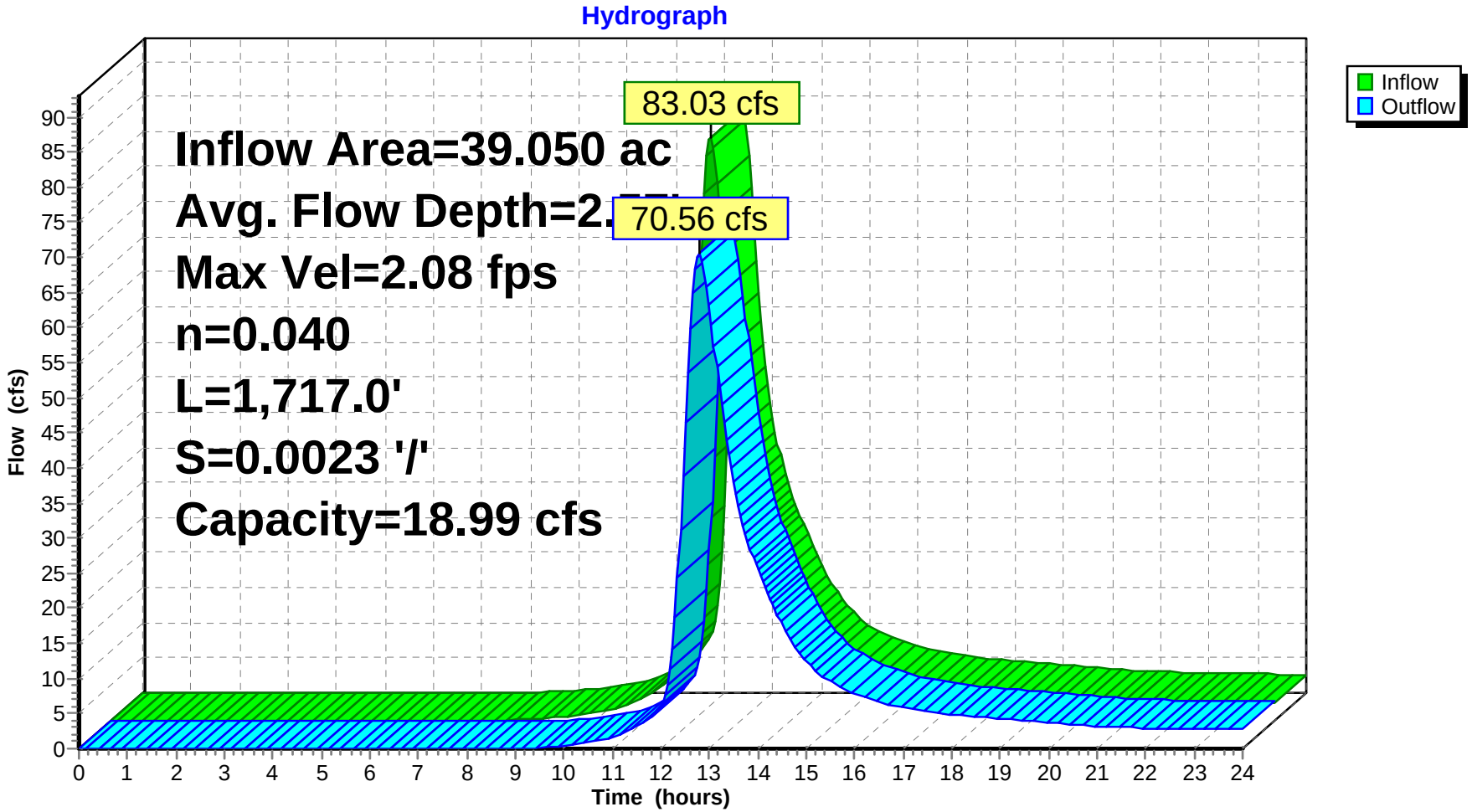
Peak Storage= 58,369 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.57' , Surface Width= 20.29'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
Inflow
Outflow
83.03 cfs
70.56 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=2.
Max Vel=2.08 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 3.67" for 25-yr event
Inflow = 99.56 cfs @ 12.77 hrs, Volume= 19.666 af
Outflow = 98.64 cfs @ 12.88 hrs, Volume= 19.602 af, Atten= 1%, Lag= 6.3 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.50 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 5.8 min

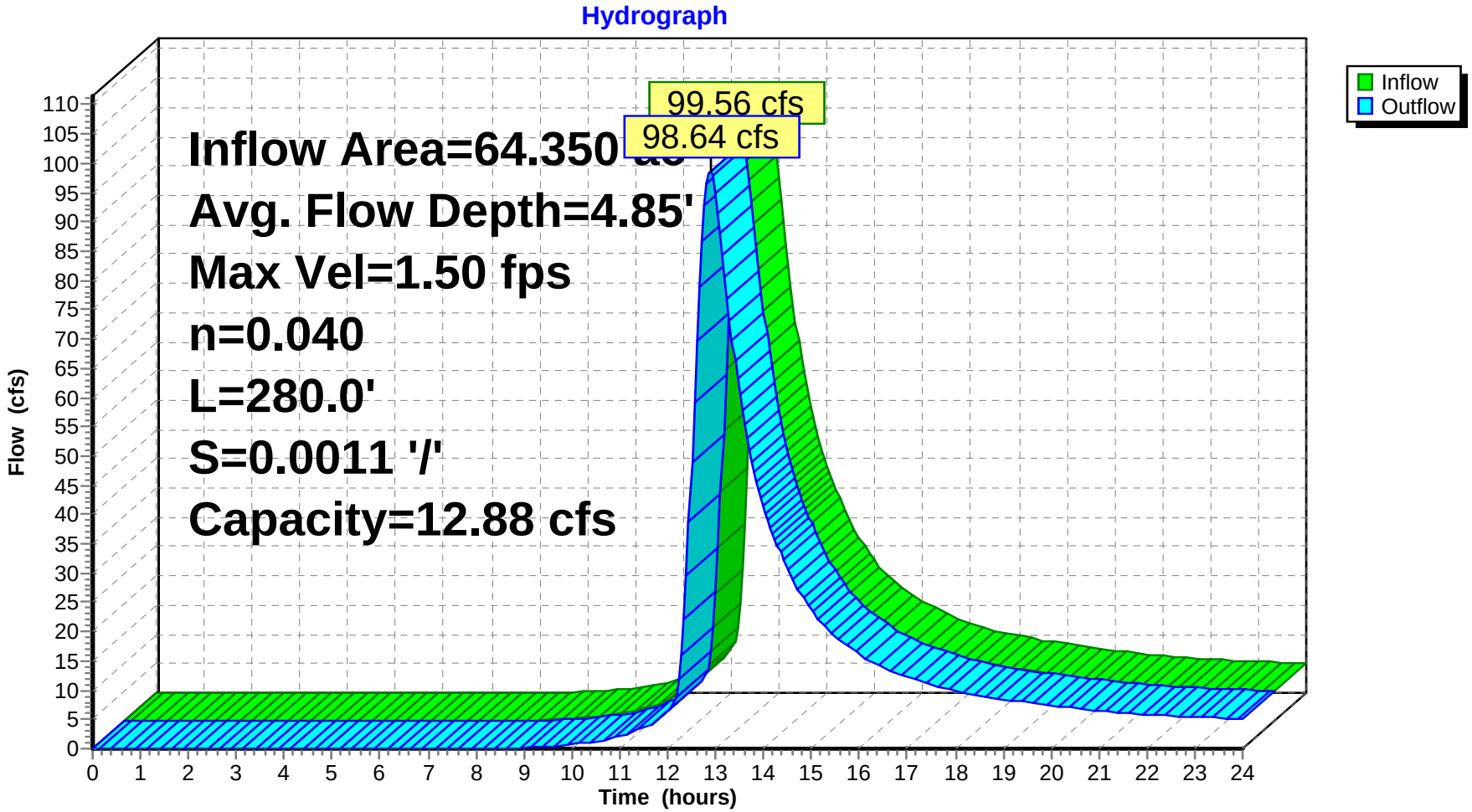
Peak Storage= 18,419 cf @ 12.83 hrs
Average Depth at Peak Storage= 4.85' , Surface Width= 29.39'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
99.56 cfs
98.64 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=4.85'
Max Vel=1.50 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 3.65" for 25-yr event
Inflow = 99.24 cfs @ 12.88 hrs, Volume= 19.893 af
Outflow = 98.62 cfs @ 12.97 hrs, Volume= 19.839 af, Atten= 1%, Lag= 5.3 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.39 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.77 fps, Avg. Travel Time= 4.8 min

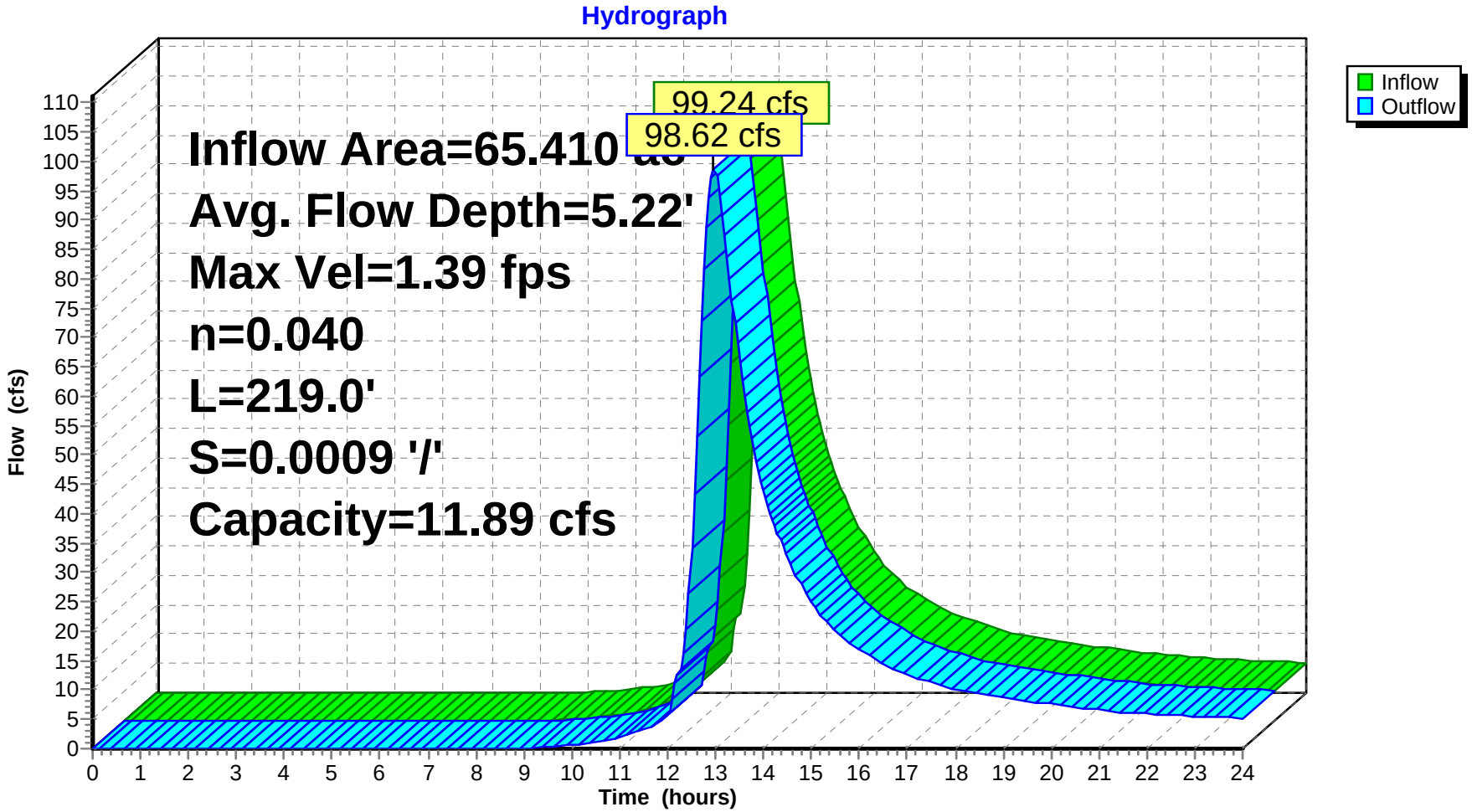
Peak Storage= 15,537 cf @ 12.92 hrs
Average Depth at Peak Storage= 5.22' , Surface Width= 30.87'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
99.24 cfs
98.62 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=5.22'
Max Vel=1.39 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 3.98" for 25-yr event
Inflow = 65.36 cfs @ 12.16 hrs, Volume= 5.344 af
Outflow = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af, Atten= 67%, Lag= 22.1 min
Primary = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.85' @ 12.53 hrs Surf.Area= 36,223 sf Storage= 78,683 cf

Plug-Flow detention time= 56.3 min calculated for 5.200 af (97% of inflow)
Center-of-Mass det. time= 42.0 min (870.7 - 828.7)

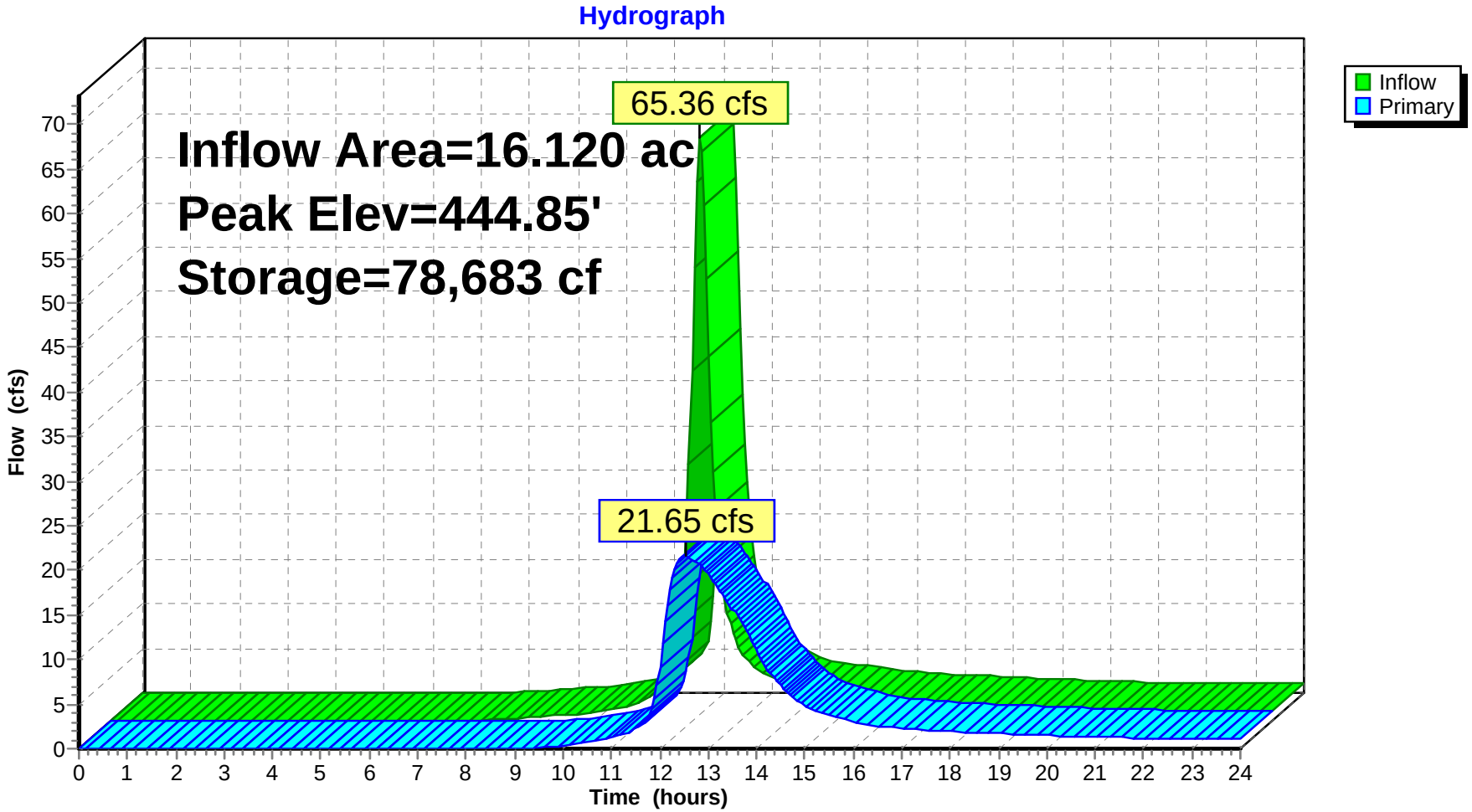
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.64 cfs @ 12.53 hrs HW=444.85' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 21.64 cfs @ 6.89 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 21.64 cfs of 49.95 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0	445.20	36,815	91,523	448.90	40,718	141,234
441.60	3,108	215	445.30	36,984	95,213	449.00	40,718	141,234
441.70	5,024	622	445.40	37,152	98,919	449.10	40,718	141,234
441.80	6,940	1,220	445.50	37,321	102,643	449.20	40,718	141,234
441.90	8,856	2,010	445.60	37,489	106,384	449.30	40,718	141,234
442.00	10,772	2,991	445.70	37,658	110,141	449.40	40,718	141,234
442.10	11,973	4,128	445.80	37,826	113,915	449.50	40,718	141,234
442.20	13,174	5,386	445.90	37,995	117,706	449.60	40,718	141,234
442.30	14,375	6,763	446.00	38,163	121,514	449.70	40,718	141,234
442.40	15,576	8,261	446.10	38,674	125,356	449.80	40,718	141,234
442.50	16,778	9,878	446.20	39,185	129,249	449.90	40,718	141,234
442.60	17,979	11,616	446.30	39,696	133,193	450.00	40,718	141,234
442.70	19,180	13,474	446.40	40,207	137,188	450.10	40,718	141,234
442.80	20,381	15,452	446.50	**40,718**	**141,234**	450.20	40,718	141,234
442.90	21,582	17,550	446.60	40,718	141,234	450.30	40,718	141,234
443.00	22,783	19,769	446.70	40,718	141,234	450.40	40,718	141,234
443.10	23,984	22,107	446.80	40,718	141,234	450.50	40,718	141,234
443.20	25,185	24,565	446.90	40,718	141,234			
443.30	26,386	27,144	447.00	40,718	141,234			
443.40	27,587	29,843	447.10	40,718	141,234			
443.50	28,789	32,661	447.20	40,718	141,234			
443.60	29,990	35,600	447.30	40,718	141,234			
443.70	31,191	38,659	447.40	40,718	141,234			
443.80	32,392	41,838	447.50	40,718	141,234			
443.90	33,593	45,138	447.60	40,718	141,234			
444.00	34,794	48,557	447.70	40,718	141,234			
444.10	34,962	52,045	447.80	40,718	141,234			
444.20	35,131	55,549	447.90	40,718	141,234			
444.30	35,299	59,071	448.00	40,718	141,234			
444.40	35,468	62,609	448.10	40,718	141,234			
444.50	35,636	66,165	448.20	40,718	141,234			
444.60	35,805	69,737	448.30	40,718	141,234			
444.70	35,973	73,326	448.40	40,718	141,234			
444.80	36,142	76,931	448.50	40,718	141,234			
444.90	36,310	80,554	448.60	40,718	141,234			
445.00	36,479	84,193	448.70	40,718	141,234			
445.10	36,647	87,850	448.80	40,718	141,234			

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 4.38" for 25-yr event
Inflow = 28.75 cfs @ 12.47 hrs, Volume= 3.823 af
Outflow = 25.56 cfs @ 12.65 hrs, Volume= 3.613 af, Atten= 11%, Lag= 10.5 min
Primary = 25.56 cfs @ 12.65 hrs, Volume= 3.613 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.33' @ 12.65 hrs Surf.Area= 10,319 sf Storage= 34,148 cf

Plug-Flow detention time= 74.7 min calculated for 3.605 af (94% of inflow)
Center-of-Mass det. time= 45.8 min (884.9 - 839.1)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

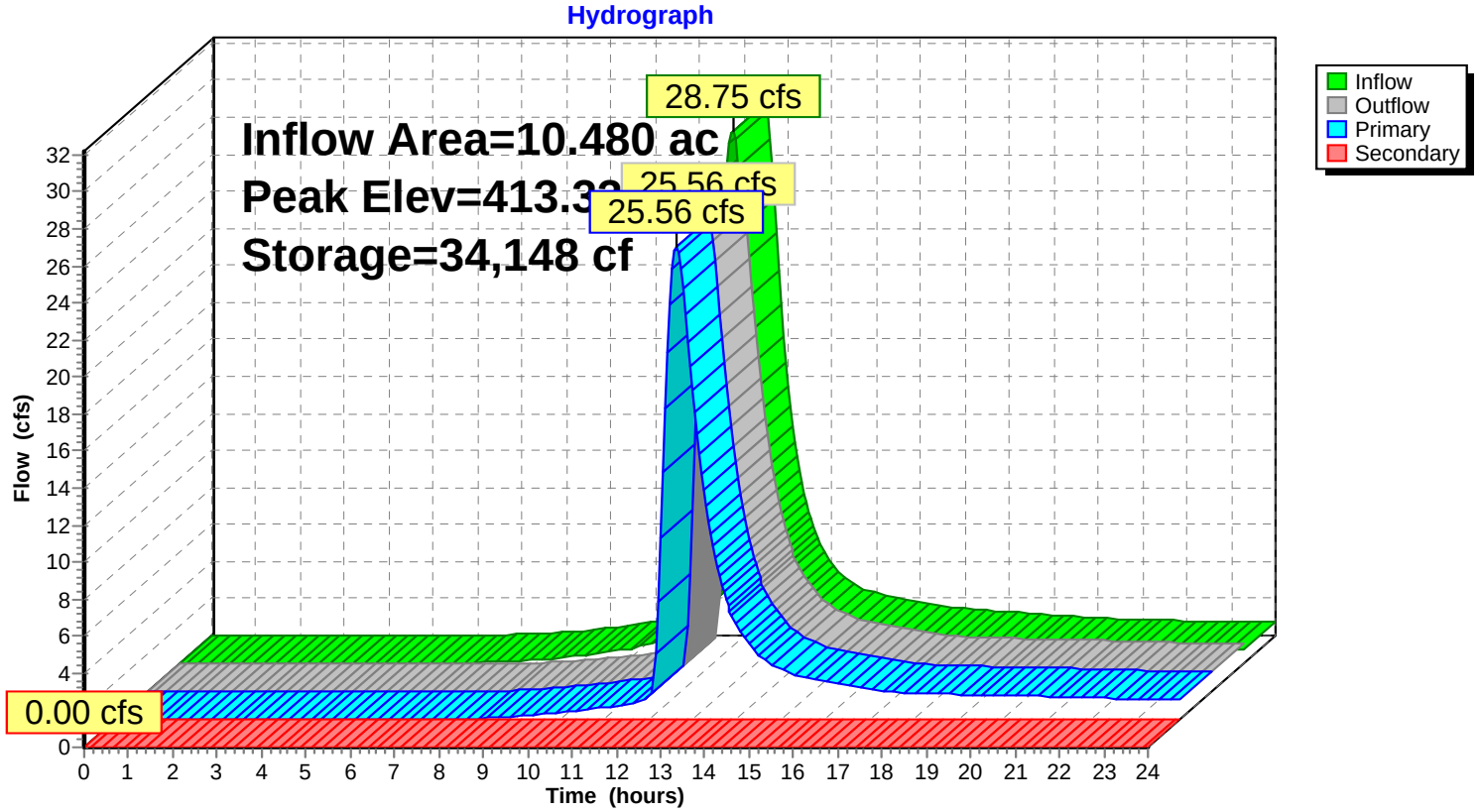
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=25.54 cfs @ 12.65 hrs HW=413.33' (Free Discharge)
└─**1=Culvert** (Passes 25.54 cfs of 31.48 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 1.91 cfs @ 9.73 fps)
  ├─**3=Sharp-Crested Rectangular Weir** (Weir Controls 22.59 cfs @ 6.98 fps)
  └─**4=Orifice/Grate** (Orifice Controls 1.04 cfs @ 1.85 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 4.35" for 25-yr event
Inflow = 35.99 cfs @ 12.56 hrs, Volume= 5.377 af
Outflow = 8.47 cfs @ 13.68 hrs, Volume= 3.871 af, Atten= 76%, Lag= 67.3 min
Primary = 8.47 cfs @ 13.68 hrs, Volume= 3.871 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.44' @ 13.68 hrs Surf.Area= 29,973 sf Storage= 124,671 cf

Plug-Flow detention time= 227.7 min calculated for 3.871 af (72% of inflow)
Center-of-Mass det. time= 137.6 min (982.1 - 844.5)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

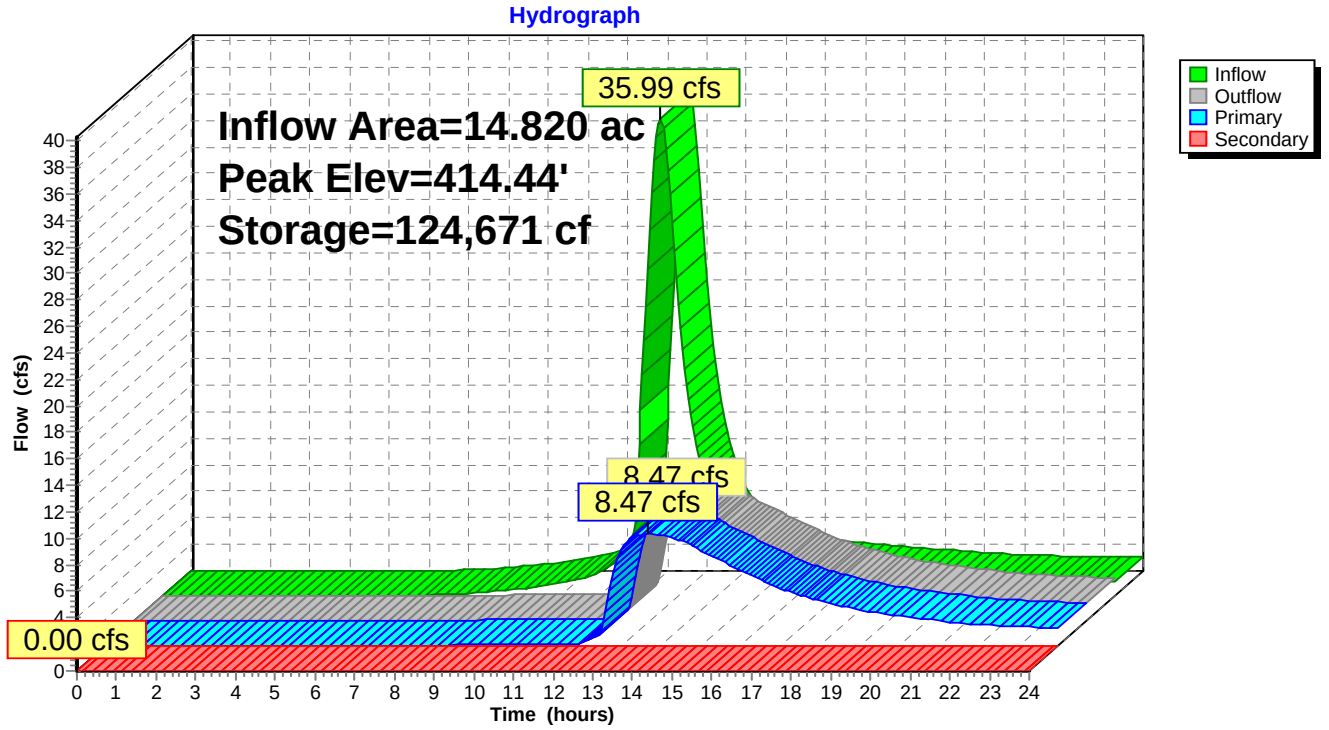
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=8.48 cfs @ 13.68 hrs HW=414.44' (Free Discharge)
- **1=Culvert** (Passes 8.48 cfs of 35.29 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.26 cfs @ 12.14 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.87 cfs @ 9.96 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 7.34 cfs @ 5.88 fps)
  - **5=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 5.76" for 25-yr event
Inflow = 8.69 cfs @ 12.00 hrs, Volume= 0.509 af
Outflow = 5.34 cfs @ 12.11 hrs, Volume= 0.290 af, Atten= 39%, Lag= 6.5 min
Primary = 5.34 cfs @ 12.11 hrs, Volume= 0.290 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.58' @ 12.11 hrs Surf.Area= 8,159 sf Storage= 11,220 cf

Plug-Flow detention time= 208.4 min calculated for 0.290 af (57% of inflow)
Center-of-Mass det. time= 102.0 min (874.4 - 772.4)

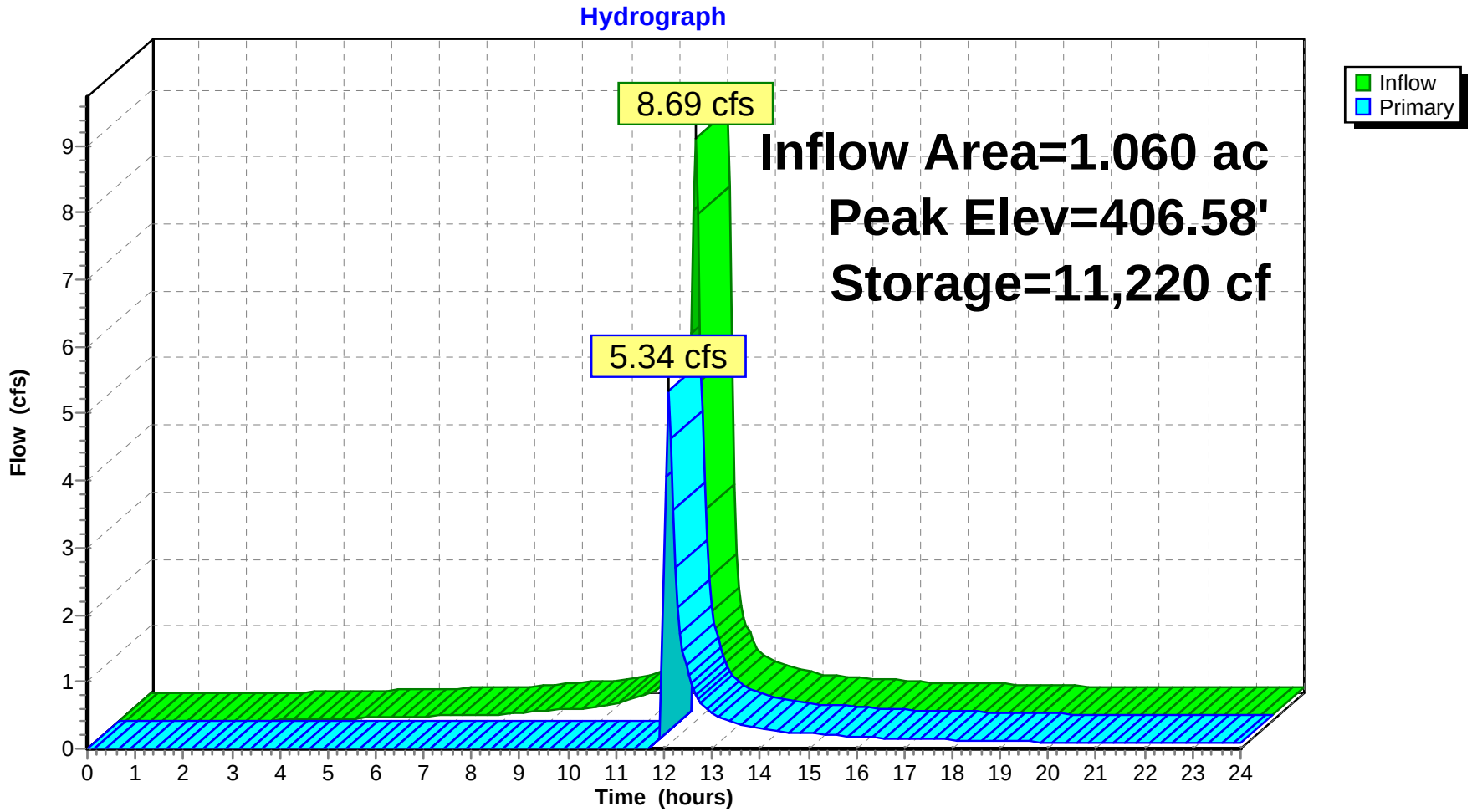
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.21 cfs @ 12.11 hrs HW=406.57' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.21 cfs @ 1.18 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0
405.02	6,127	122
405.04	6,153	245
405.06	6,179	368
405.08	6,205	492
405.10	6,230	617
405.12	6,256	741
405.14	6,282	867
405.16	6,308	993
405.18	6,334	1,119
405.20	6,360	1,246
405.22	6,386	1,374
405.24	6,412	1,502
405.26	6,437	1,630
405.28	6,463	1,759
405.30	6,489	1,889
405.32	6,515	2,019
405.34	6,541	2,149
405.36	6,567	2,280
405.38	6,593	2,412
405.40	6,619	2,544
405.42	6,644	2,677
405.44	6,670	2,810
405.46	6,696	2,943
405.48	6,722	3,078
405.50	6,748	3,212
405.52	6,774	3,347
405.54	6,800	3,483
405.56	6,826	3,619
405.58	6,852	3,756
405.60	6,877	3,894
405.62	6,903	4,031
405.64	6,929	4,170
405.66	6,955	4,308
405.68	6,981	4,448
405.70	7,007	4,588
405.72	7,033	4,728
405.74	7,059	4,869
405.76	7,084	5,010
405.78	7,110	5,152
405.80	7,136	5,295
405.82	7,162	5,438
405.84	7,188	5,581
405.86	7,214	5,725
405.88	7,240	5,870
405.90	7,266	6,015
405.92	7,291	6,161
405.94	7,317	6,307
405.96	7,343	6,453
405.98	7,369	6,600
406.00	7,395	6,748
406.02	7,421	6,896
406.04	7,448	7,045
406.06	7,474	7,194
406.08	7,501	7,344
406.10	7,527	7,494
406.12	7,553	7,645
406.14	7,580	7,796
406.16	7,606	7,948
406.18	7,633	8,100
406.20	7,659	8,253
406.22	7,685	8,407
406.24	7,712	8,561
406.26	7,738	8,715
406.28	7,765	8,870
406.30	7,791	9,026
406.32	7,817	9,182
406.34	7,844	9,339
406.36	7,870	9,496
406.38	7,897	9,653
406.40	7,924	9,812
406.42	7,951	9,970
406.44	7,978	10,130
406.46	8,005	10,289
406.48	8,032	10,450
406.50	8,058	10,611
406.52	8,085	10,772
406.54	8,112	10,934
406.56	8,139	11,097
406.58	8,166	11,260
406.60	8,193	11,423
406.62	8,219	11,587
406.64	8,246	11,752
406.66	8,273	11,917
406.68	8,300	12,083
406.70	8,327	12,249
406.72	8,354	12,416
406.74	**8,381**	**12,583**

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 4.40" for 25-yr event
Inflow = 12.91 cfs @ 12.18 hrs, Volume= 1.112 af
Outflow = 7.29 cfs @ 12.42 hrs, Volume= 1.088 af, Atten= 44%, Lag= 14.0 min
Primary = 7.29 cfs @ 12.42 hrs, Volume= 1.088 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 425.69' @ 12.42 hrs Surf.Area= 6,593 sf Storage= 14,356 cf

Plug-Flow detention time= 51.2 min calculated for 1.088 af (98% of inflow)
Center-of-Mass det. time= 38.6 min (859.4 - 820.8)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

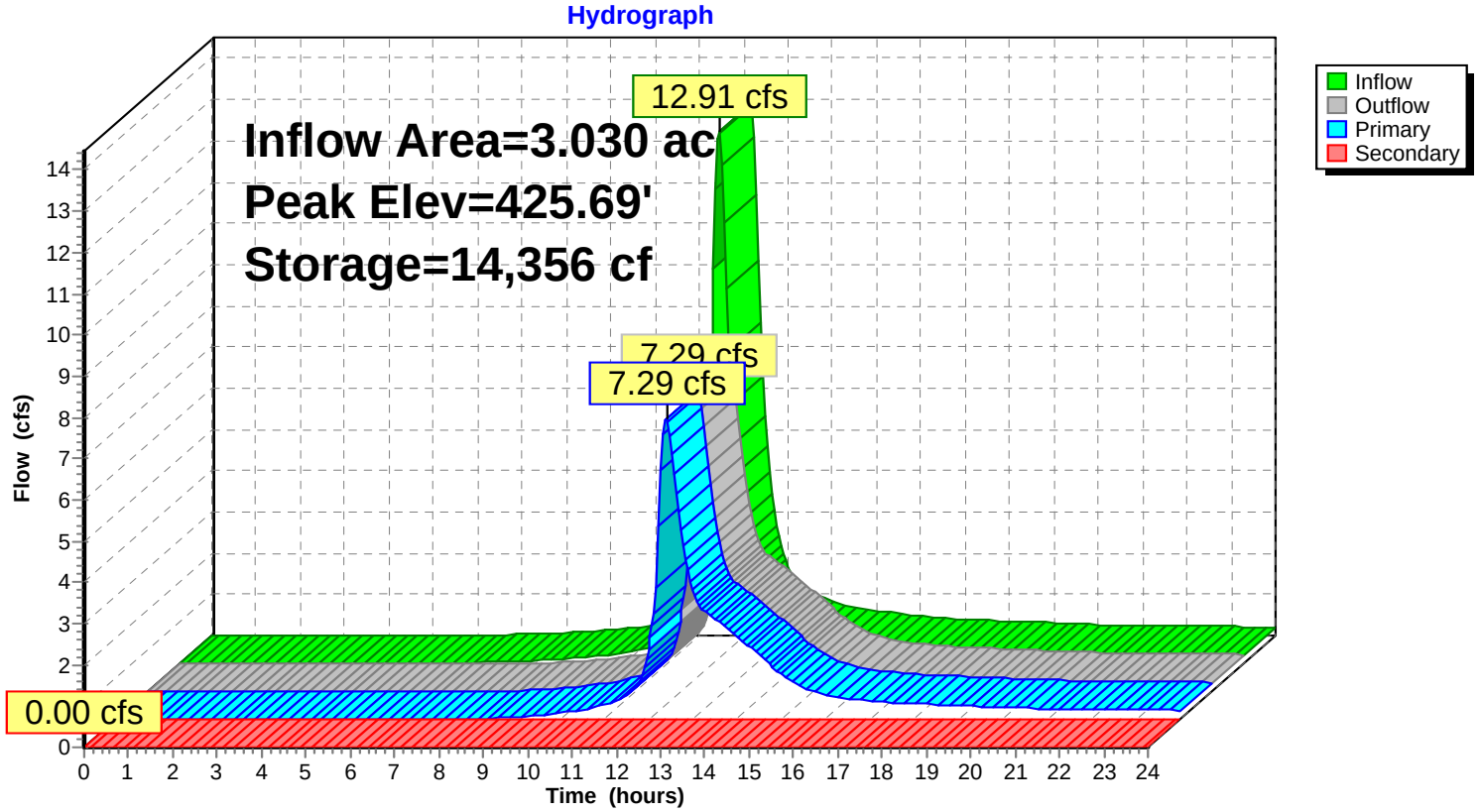
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=7.24 cfs @ 12.42 hrs HW=425.68' (Free Discharge)
└─**1=Culvert** (Passes 7.24 cfs of 11.83 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 3.23 cfs @ 7.31 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 4.01 cfs @ 3.15 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 5.18" for 25-yr event
Inflow = 3.90 cfs @ 12.07 hrs, Volume= 0.268 af
Outflow = 3.88 cfs @ 12.09 hrs, Volume= 0.207 af, Atten= 1%, Lag= 1.0 min
Primary = 3.88 cfs @ 12.09 hrs, Volume= 0.207 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.20' @ 12.09 hrs Surf.Area= 1,563 sf Storage= 2,945 cf

Plug-Flow detention time= 132.7 min calculated for 0.207 af (77% of inflow)
Center-of-Mass det. time= 48.9 min (843.4 - 794.5)

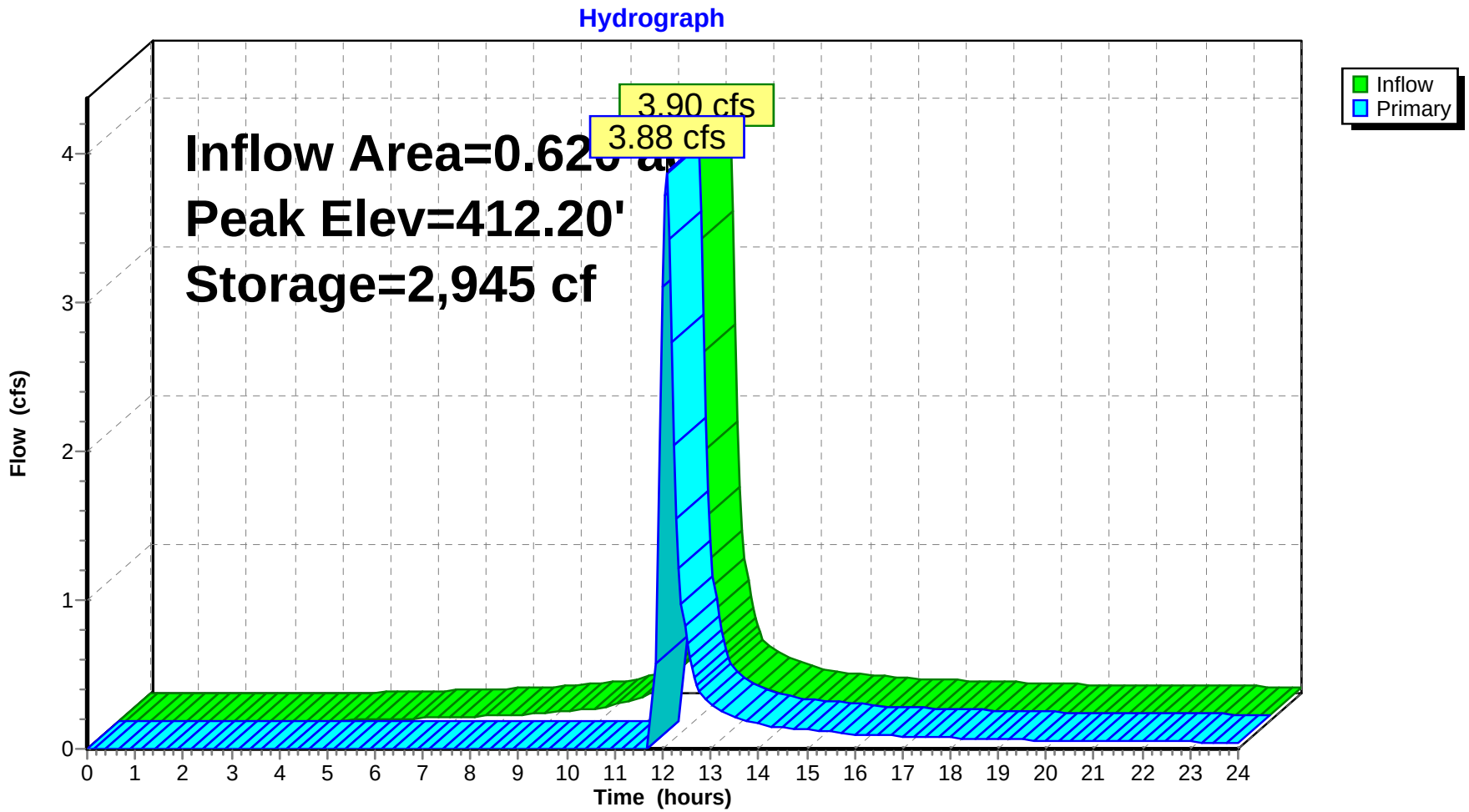
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=3.81 cfs @ 12.09 hrs HW=412.20' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 3.81 cfs @ 1.08 fps)

Pond WQB-1: WQB-1



Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>4.54"
Flow Length=777' Tc=38.6 min CN=74 Runoff=76.72 cfs 8.666 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>4.78"
Flow Length=209' Tc=23.3 min CN=76 Runoff=78.35 cfs 6.419 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>5.20"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=34.08 cfs 4.543 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>5.19"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=41.96 cfs 6.146 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>6.65"
Tc=9.2 min CN=92 Runoff=9.94 cfs 0.587 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>6.05"
Flow Length=274' Tc=15.6 min CN=87 Runoff=4.52 cfs 0.313 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>4.60"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=19.49 cfs 3.723 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>5.23"
Flow Length=234' Tc=25.2 min CN=80 Runoff=15.27 cfs 1.321 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>4.76"
Flow Length=590' Tc=36.5 min CN=76 Runoff=12.32 cfs 1.338 af

Reach R-1: R-1 Avg. Flow Depth=0.74' Max Vel=5.02 fps Inflow=24.17 cfs 6.276 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=24.15 cfs 6.256 af

Reach R-2: R-2 Avg. Flow Depth=2.98' Max Vel=2.12 fps Inflow=98.53 cfs 14.923 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=83.85 cfs 14.719 af

Reach R-3: R-3 Avg. Flow Depth=5.75' Max Vel=1.52 fps Inflow=119.89 cfs 23.863 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=118.83 cfs 23.793 af

Reach R-4: R-4 Avg. Flow Depth=6.19' Max Vel=1.40 fps Inflow=119.52 cfs 24.162 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=118.69 cfs 24.102 af

Pond Pond 1b: Pond 1b Peak Elev=445.35' Storage=97,217 cf Inflow=78.35 cfs 6.419 af
Outflow=24.17 cfs 6.276 af

Pond Pond 1c: Pond 1c Peak Elev=413.57' Storage=36,654 cf Inflow=34.08 cfs 4.543 af
Primary=31.26 cfs 4.293 af Secondary=0.00 cfs 0.000 af Outflow=31.26 cfs 4.293 af

Pond Pond 1d: Pond 1d Peak Elev=415.09' Storage=144,434 cf Inflow=42.65 cfs 6.397 af
Primary=11.90 cfs 4.851 af Secondary=0.00 cfs 0.000 af Outflow=11.90 cfs 4.851 af

Pond Pond 1e: Pond 1e Peak Elev=406.64' Storage=11,728 cf Inflow=9.94 cfs 0.587 af
Outflow=7.73 cfs 0.368 af

Pond Pond 3: Pond 3 Peak Elev=425.91' Storage=15,854 cf Inflow=15.27 cfs 1.321 af
Primary=9.70 cfs 1.295 af Secondary=0.00 cfs 0.000 af Outflow=9.70 cfs 1.295 af

Pond WQB-1: WQB-1 Peak Elev=412.22' Storage=2,977 cf Inflow=4.52 cfs 0.313 af
Outflow=4.49 cfs 0.252 af

Summary for Subcatchment P-1a: P-1a

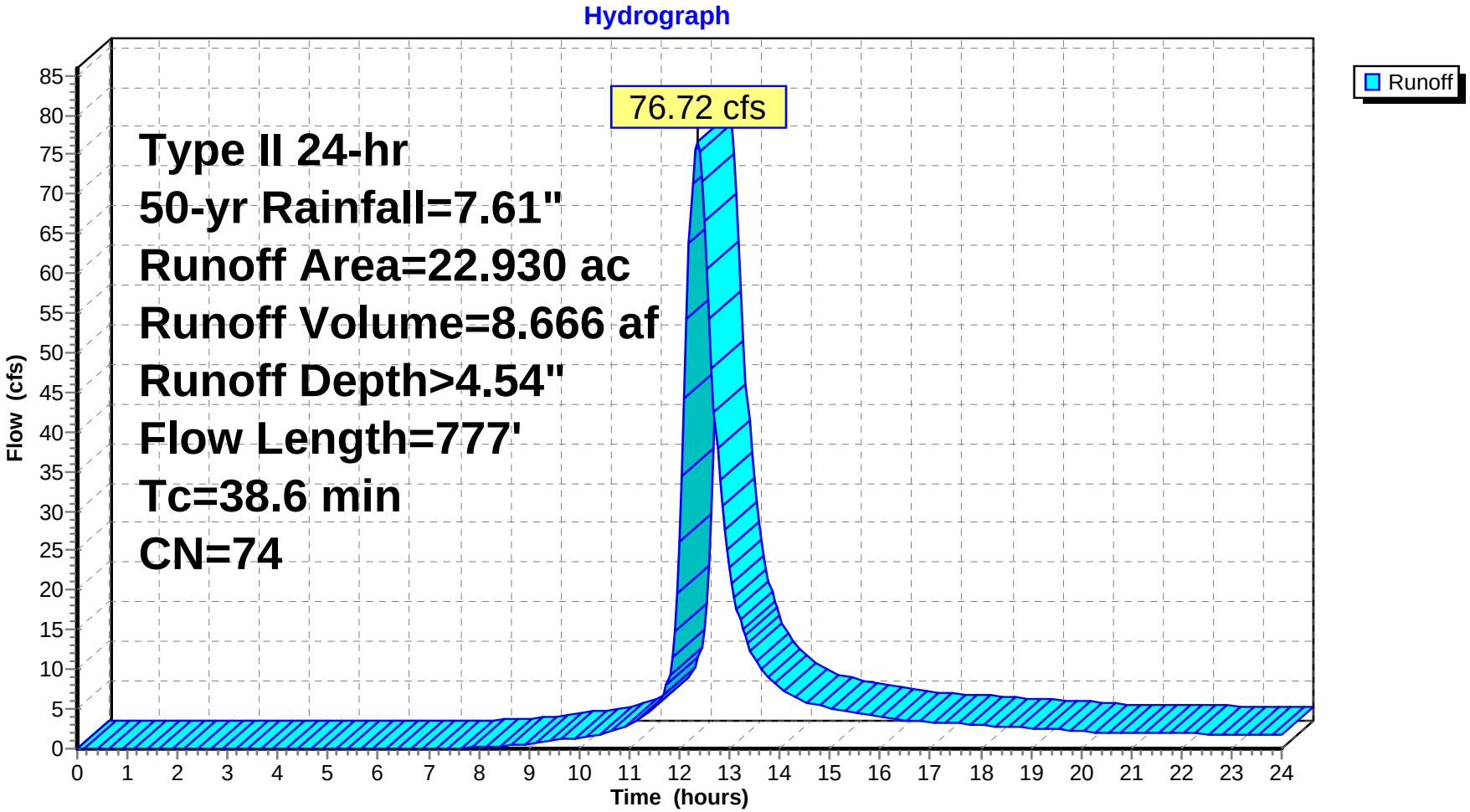
Runoff = 76.72 cfs @ 12.35 hrs, Volume= 8.666 af, Depth> 4.54"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

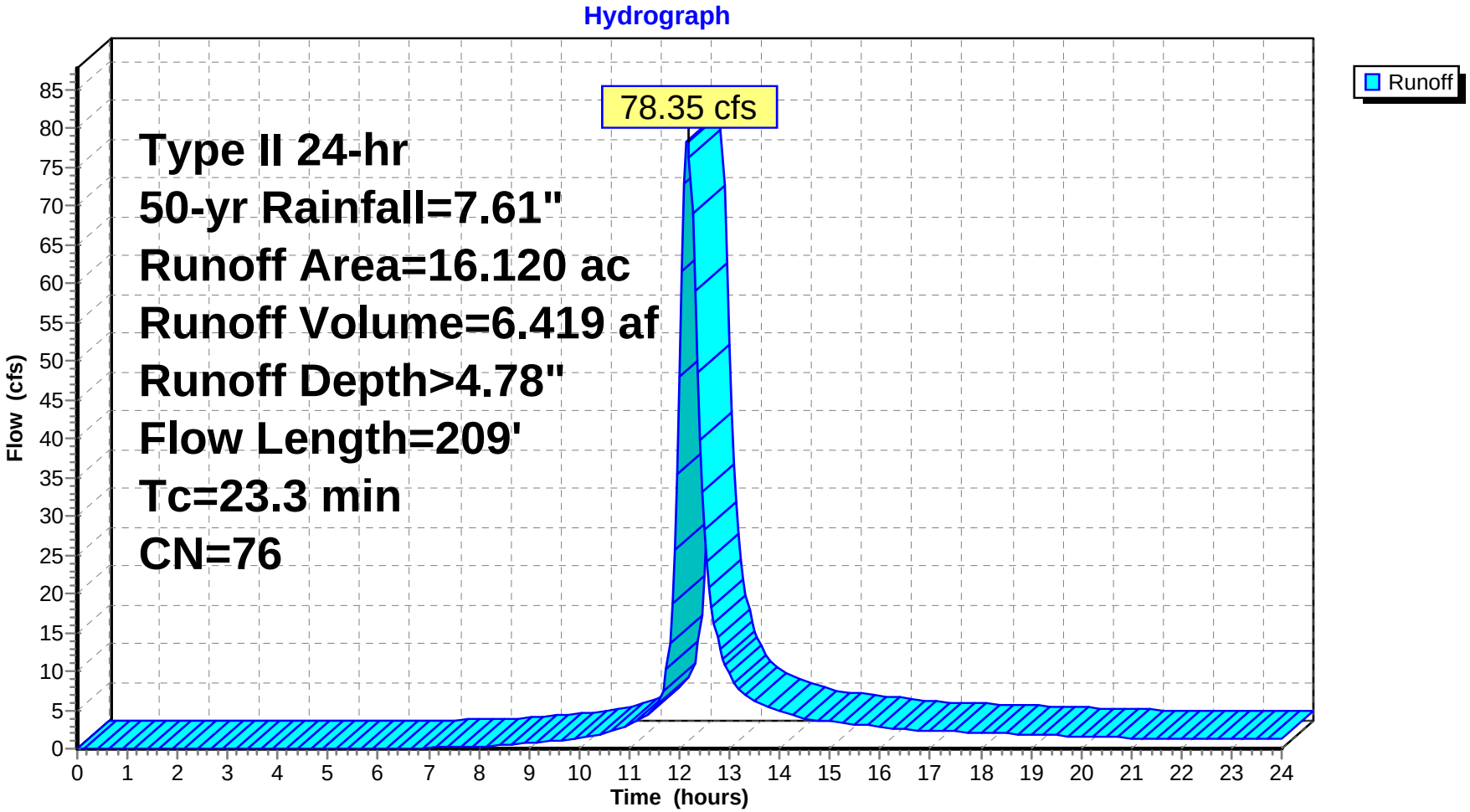
Runoff = 78.35 cfs @ 12.16 hrs, Volume= 6.419 af, Depth> 4.78"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

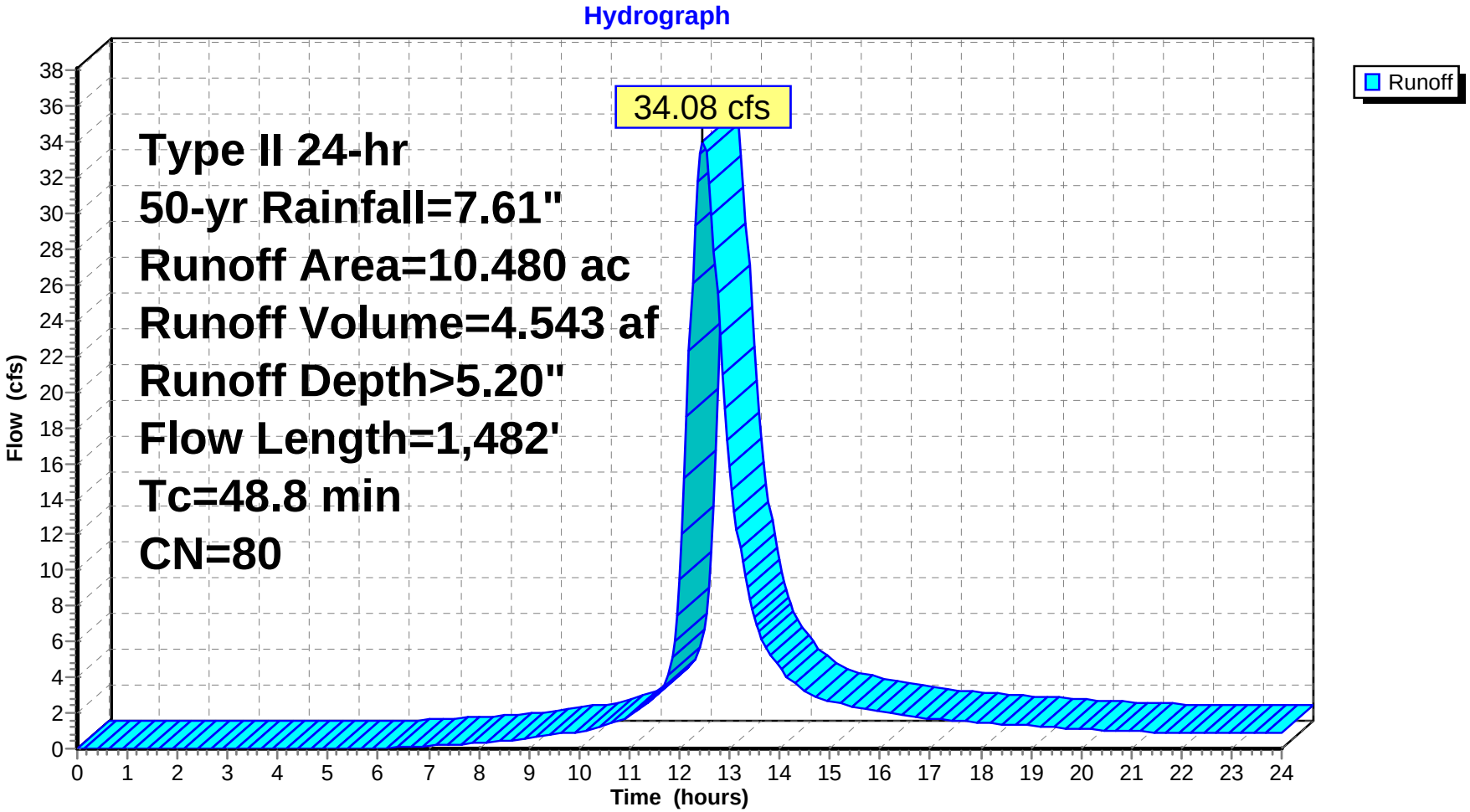
Runoff = 34.08 cfs @ 12.47 hrs, Volume= 4.543 af, Depth> 5.20"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

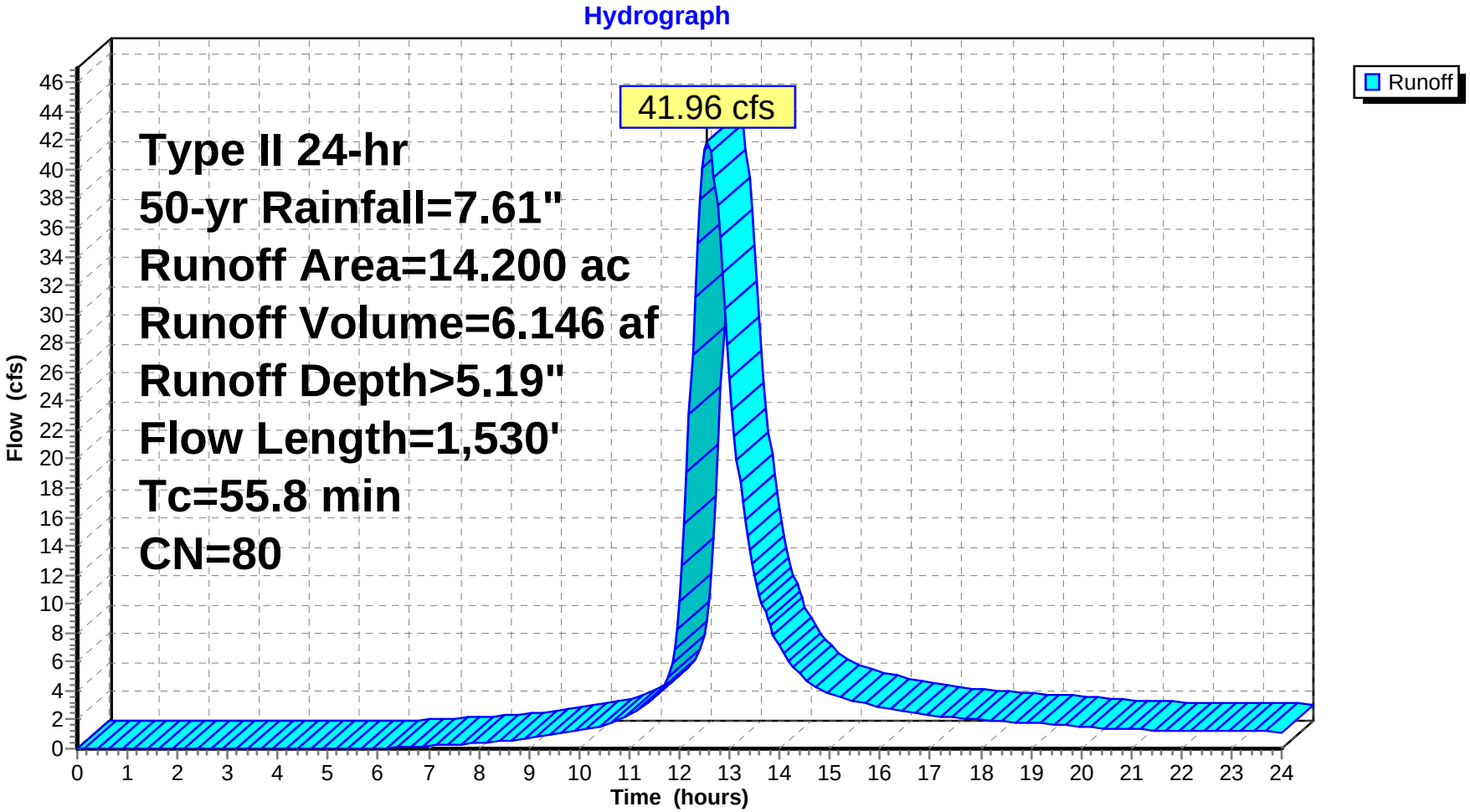
Runoff = 41.96 cfs @ 12.56 hrs, Volume= 6.146 af, Depth> 5.19"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

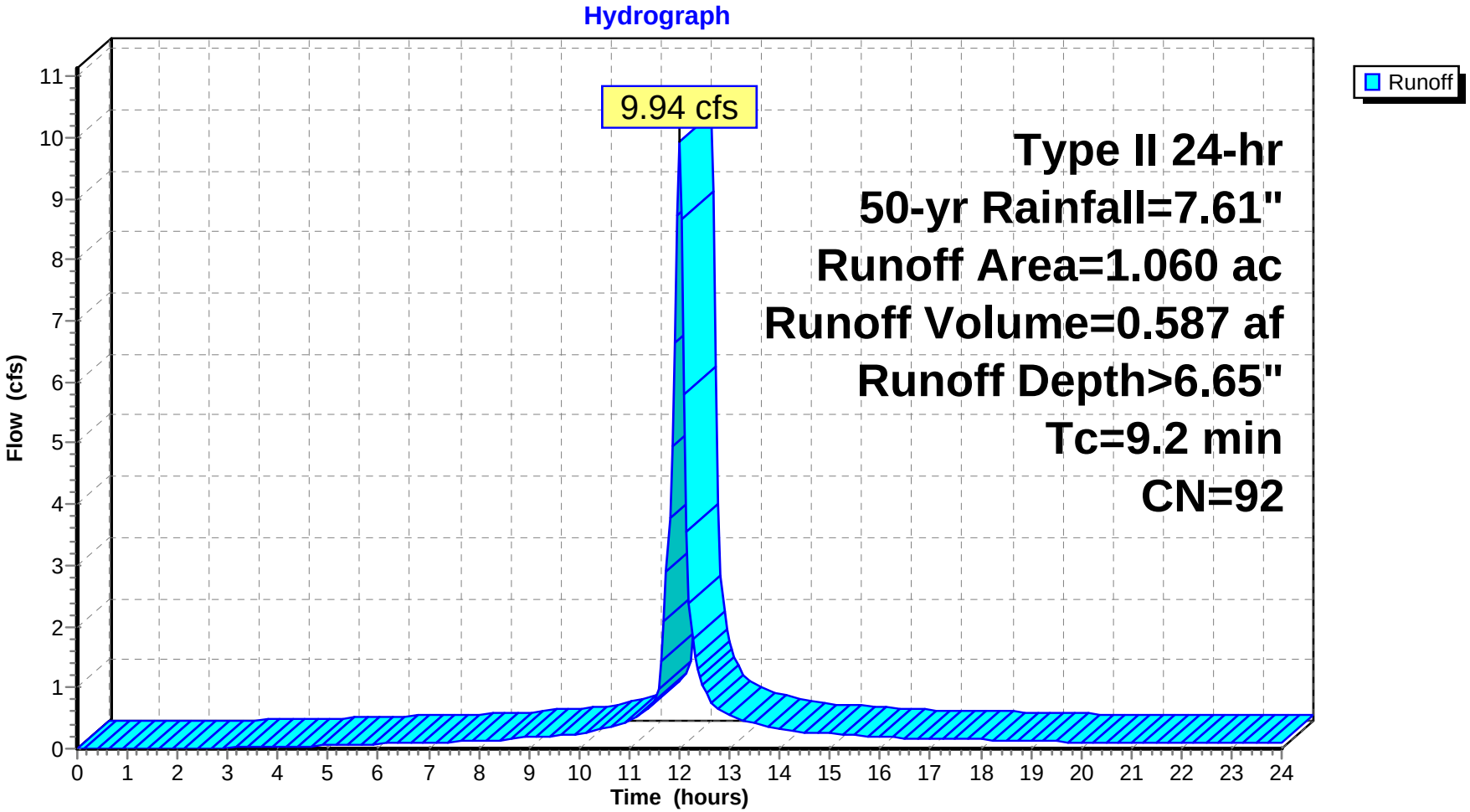
Runoff = 9.94 cfs @ 12.00 hrs, Volume= 0.587 af, Depth> 6.65"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

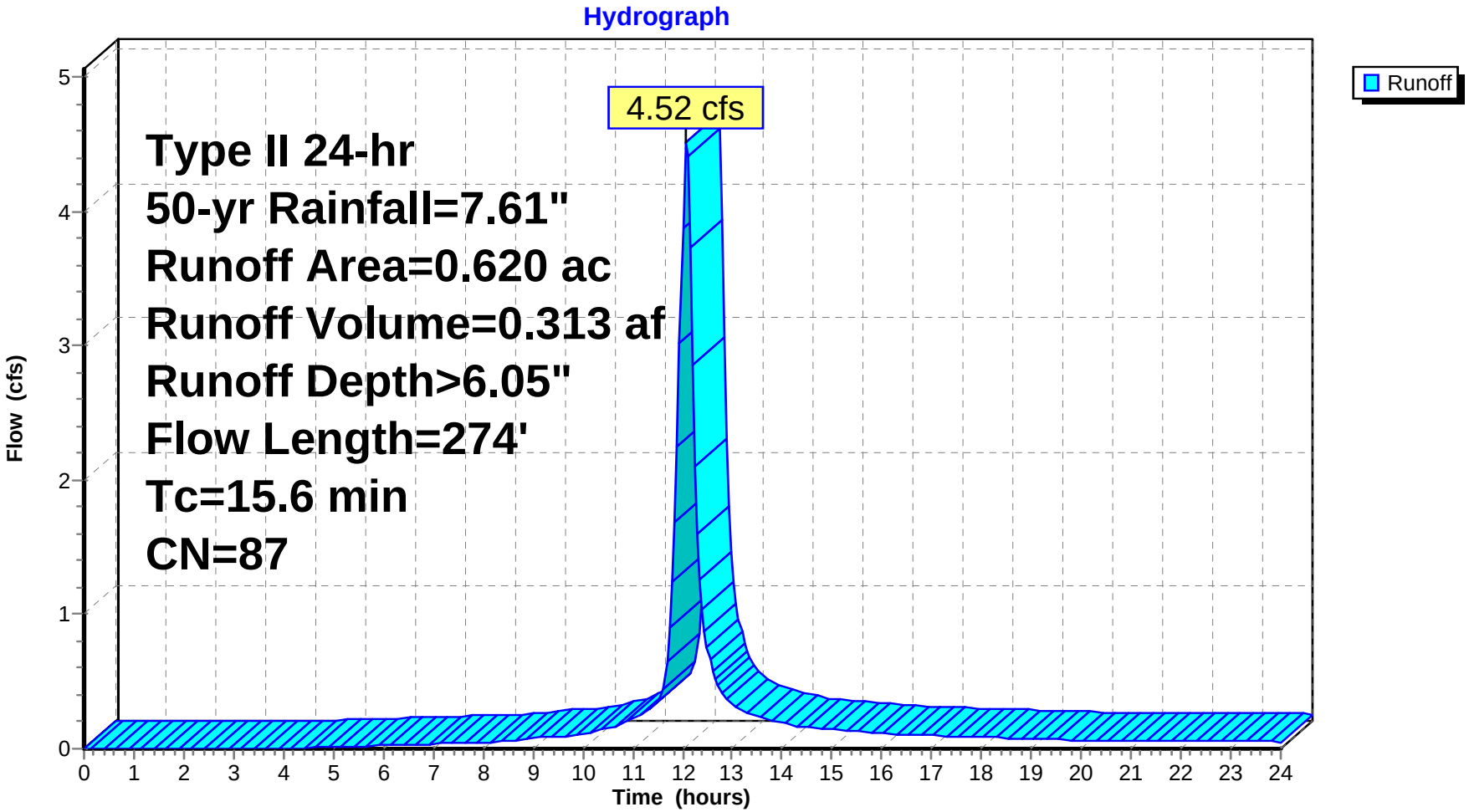
Runoff = 4.52 cfs @ 12.07 hrs, Volume= 0.313 af, Depth> 6.05"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

Runoff = 19.49 cfs @ 12.89 hrs, Volume= 3.723 af, Depth> 4.60"

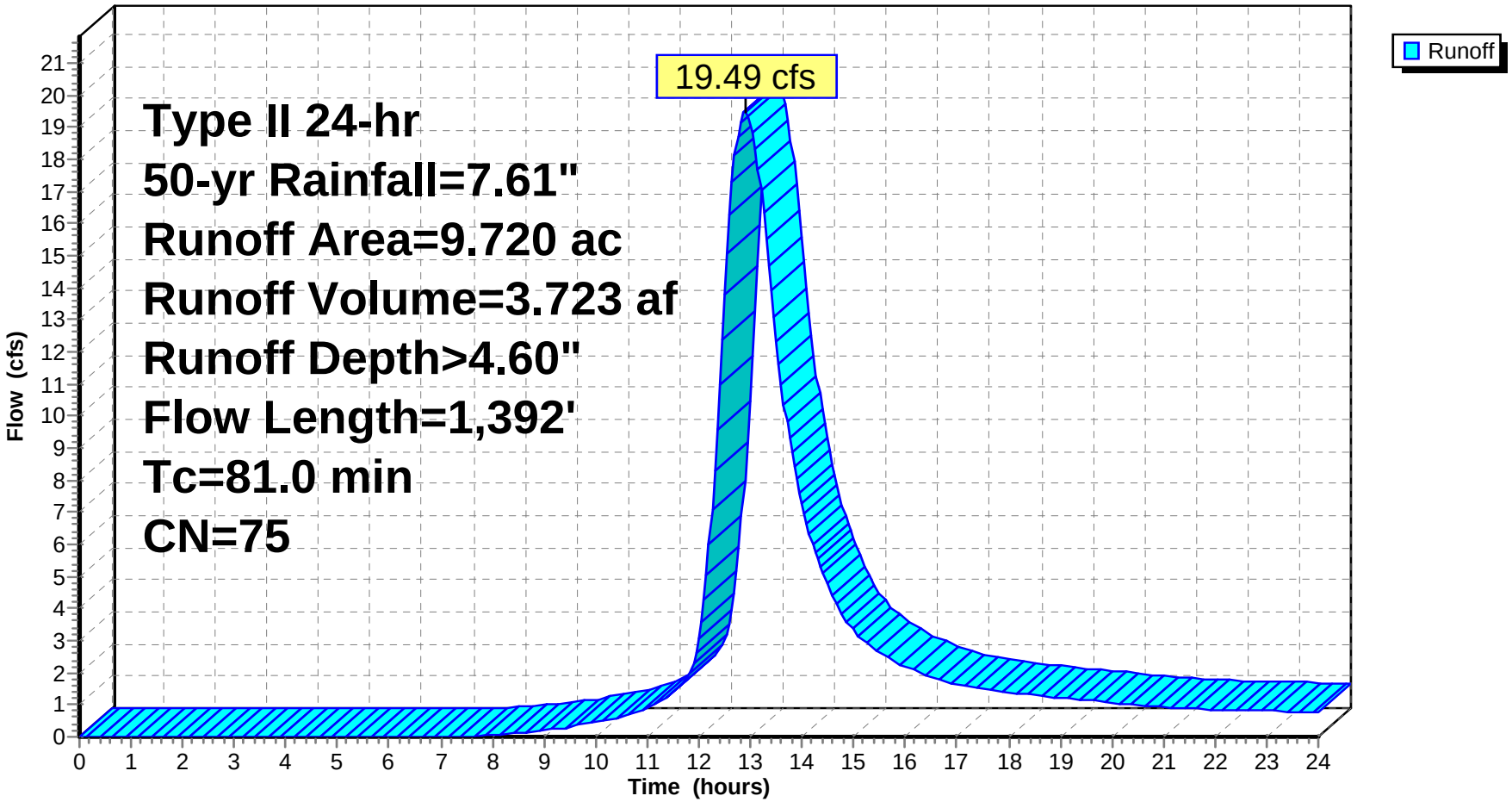
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2

Hydrograph



Summary for Subcatchment P-3: P-3

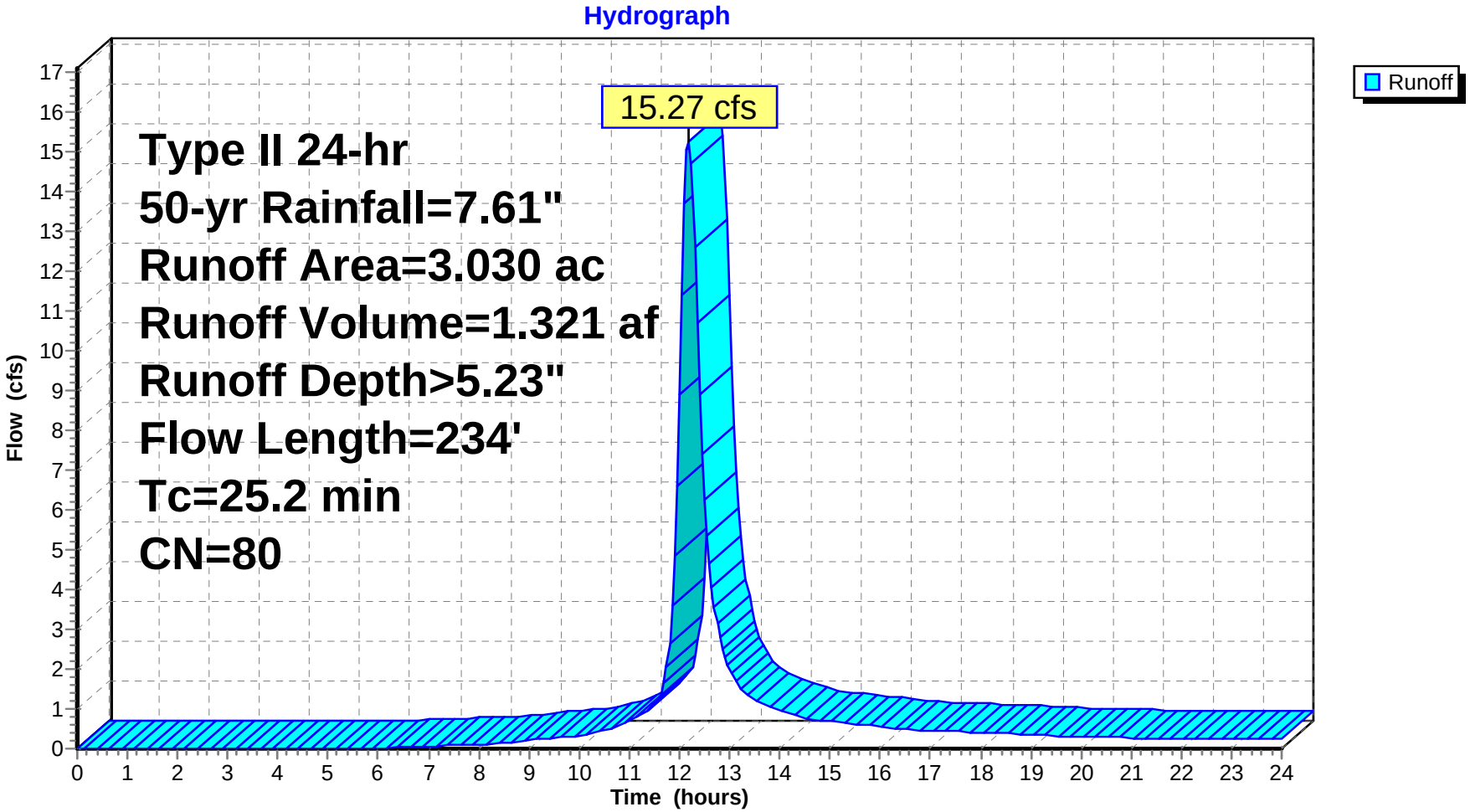
Runoff = 15.27 cfs @ 12.18 hrs, Volume= 1.321 af, Depth> 5.23"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

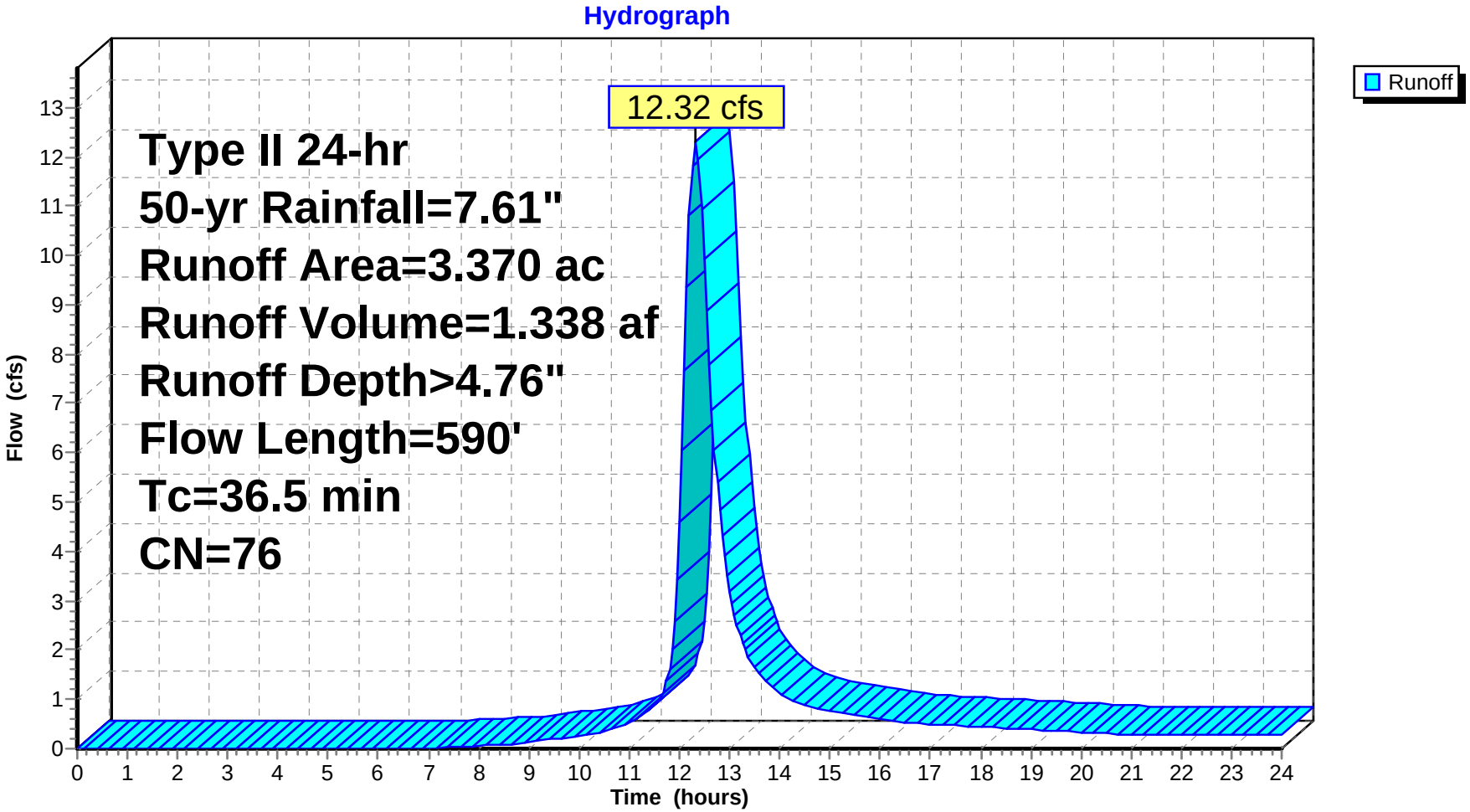
Runoff = 12.32 cfs @ 12.32 hrs, Volume= 1.338 af, Depth> 4.76"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 4.67" for 50-yr event
Inflow = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af
Outflow = 24.15 cfs @ 12.64 hrs, Volume= 6.256 af, Atten= 0%, Lag= 5.1 min
Routed to Reach R-2 : R-2

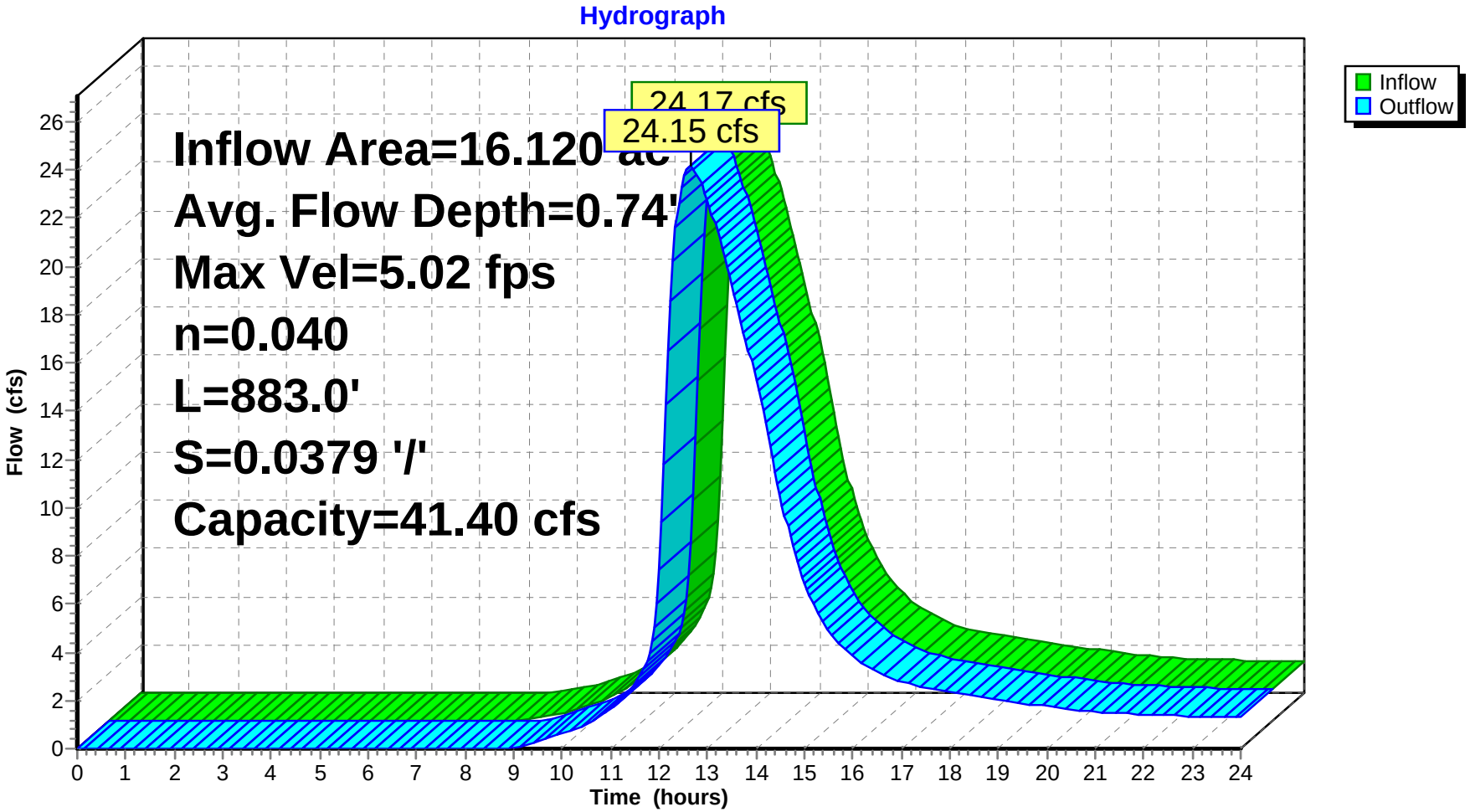
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.02 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 6.0 min

Peak Storage= 4,247 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 7.97'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
24.17 cfs
24.15 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.74'
Max Vel=5.02 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 4.59" for 50-yr event
Inflow = 98.53 cfs @ 12.37 hrs, Volume= 14.923 af
Outflow = 83.85 cfs @ 12.78 hrs, Volume= 14.719 af, Atten= 15%, Lag= 24.8 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.12 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 28.6 min

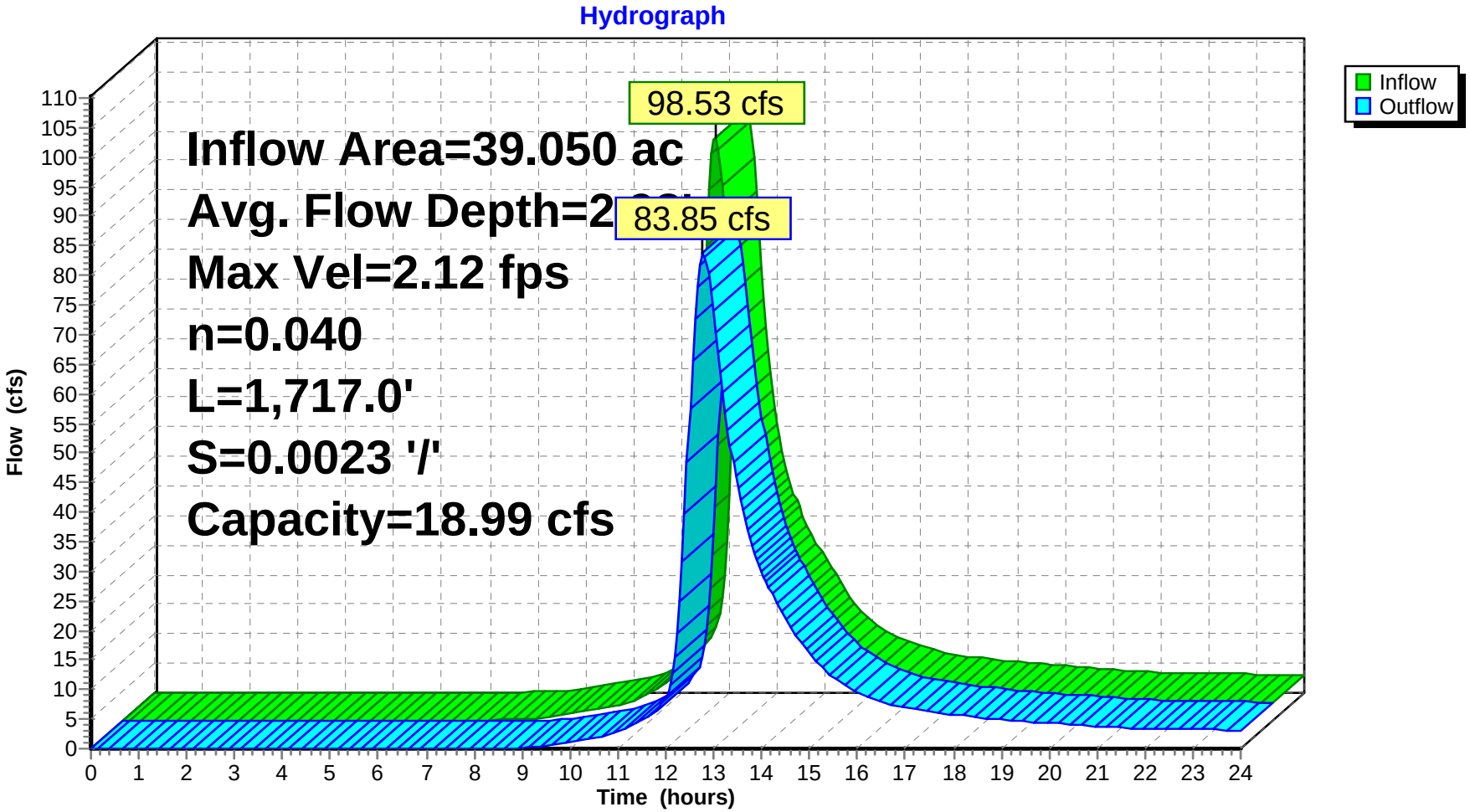
Peak Storage= 68,101 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.98' , Surface Width= 21.91'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
Inflow
Outflow
98.53 cfs
83.85 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=2
Max Vel=2.12 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Flow (cfs)
Time (hours)
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 4.45" for 50-yr event
Inflow = 119.89 cfs @ 12.75 hrs, Volume= 23.863 af
Outflow = 118.83 cfs @ 12.86 hrs, Volume= 23.793 af, Atten= 1%, Lag= 6.2 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.52 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 5.6 min

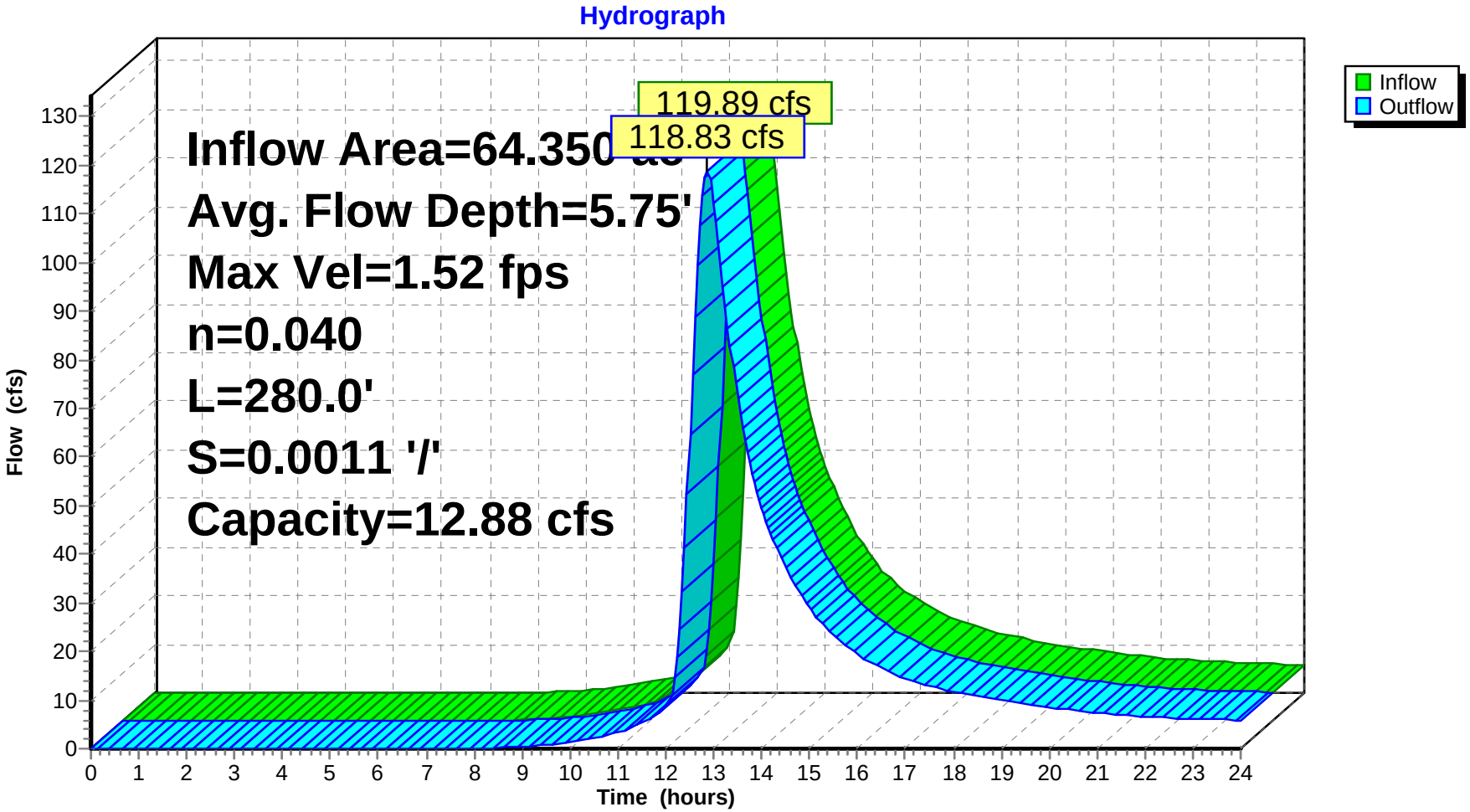
Peak Storage= 21,962 cf @ 12.81 hrs
Average Depth at Peak Storage= 5.75' , Surface Width= 33.01'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
119.89 cfs
118.83 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=5.75'
Max Vel=1.52 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0 10 20 30 40 50 60 70 80 90 100 110 120 130
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 4.43" for 50-yr event
Inflow = 119.52 cfs @ 12.86 hrs, Volume= 24.162 af
Outflow = 118.69 cfs @ 12.95 hrs, Volume= 24.102 af, Atten= 1%, Lag= 5.3 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.40 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 4.6 min

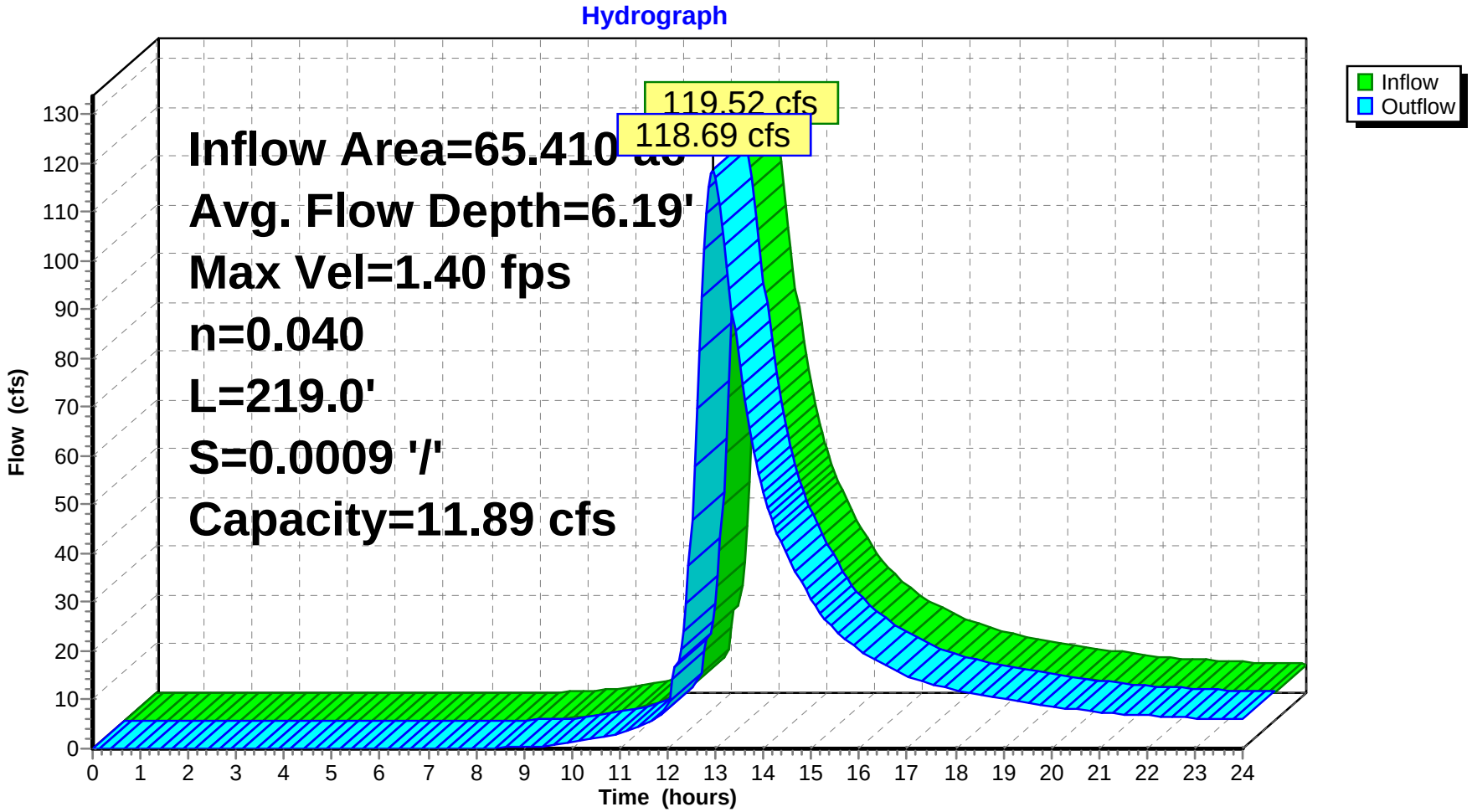
Peak Storage= 18,527 cf @ 12.90 hrs
Average Depth at Peak Storage= 6.19' , Surface Width= 34.77'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
119.52 cfs
118.69 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=6.19'
Max Vel=1.40 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 10 20 30 40 50 60 70 80 90 100 110 120 130
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 4.78" for 50-yr event
Inflow = 78.35 cfs @ 12.16 hrs, Volume= 6.419 af
Outflow = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af, Atten= 69%, Lag= 23.4 min
Primary = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 445.35' @ 12.55 hrs Surf.Area= 37,075 sf Storage= 97,217 cf

Plug-Flow detention time= 57.8 min calculated for 6.263 af (98% of inflow)
Center-of-Mass det. time= 44.8 min (868.4 - 823.6)

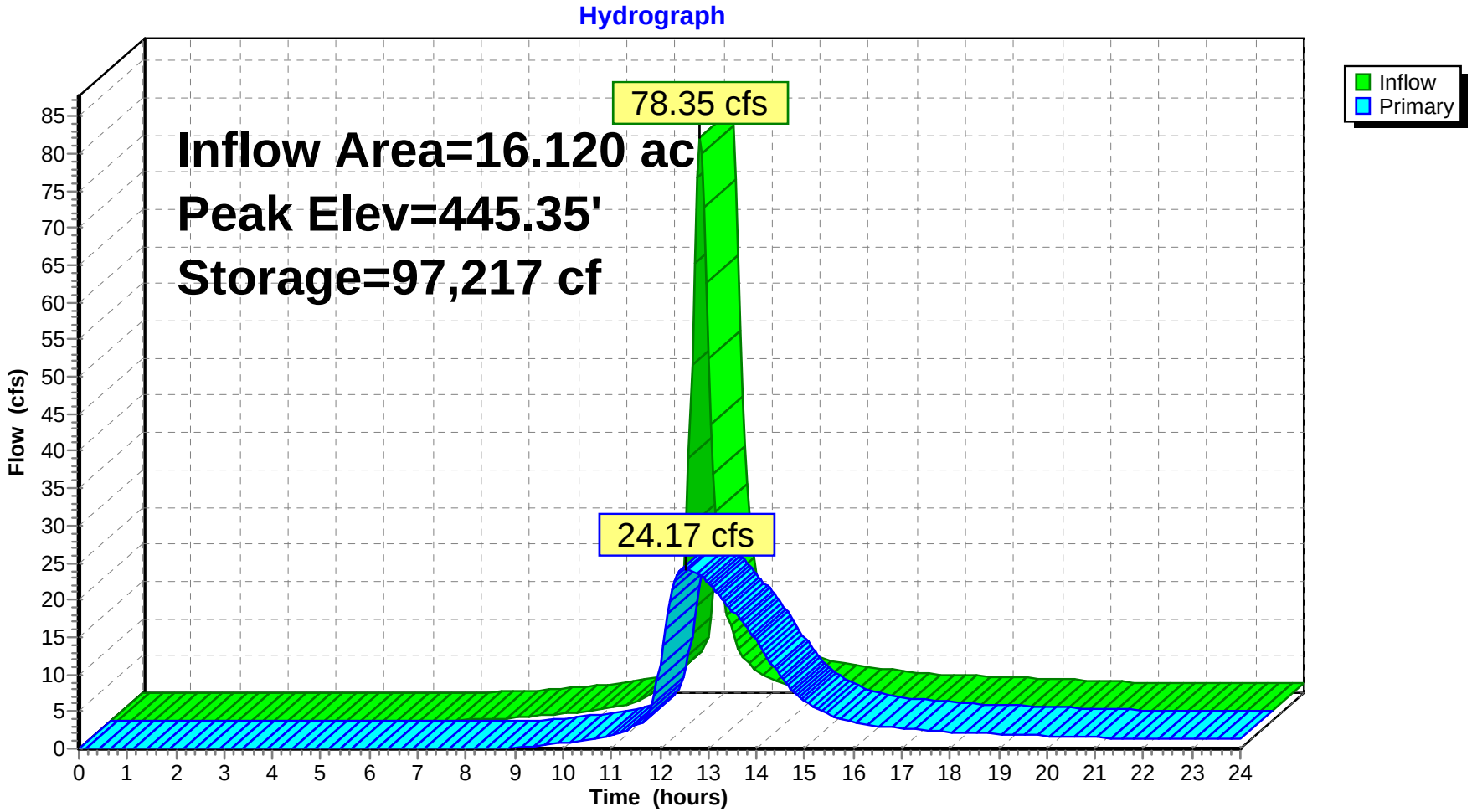
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=24.17 cfs @ 12.55 hrs HW=445.35' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 24.17 cfs @ 7.69 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes < 64.32 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 0.61 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0	445.20	36,815	91,523	448.90	40,718	141,234
441.60	3,108	215	445.30	36,984	95,213	449.00	40,718	141,234
441.70	5,024	622	445.40	37,152	98,919	449.10	40,718	141,234
441.80	6,940	1,220	445.50	37,321	102,643	449.20	40,718	141,234
441.90	8,856	2,010	445.60	37,489	106,384	449.30	40,718	141,234
442.00	10,772	2,991	445.70	37,658	110,141	449.40	40,718	141,234
442.10	11,973	4,128	445.80	37,826	113,915	449.50	40,718	141,234
442.20	13,174	5,386	445.90	37,995	117,706	449.60	40,718	141,234
442.30	14,375	6,763	446.00	38,163	121,514	449.70	40,718	141,234
442.40	15,576	8,261	446.10	38,674	125,356	449.80	40,718	141,234
442.50	16,778	9,878	446.20	39,185	129,249	449.90	40,718	141,234
442.60	17,979	11,616	446.30	39,696	133,193	450.00	40,718	141,234
442.70	19,180	13,474	446.40	40,207	137,188	450.10	40,718	141,234
442.80	20,381	15,452	446.50	**40,718**	**141,234**	450.20	40,718	141,234
442.90	21,582	17,550	446.60	40,718	141,234	450.30	40,718	141,234
443.00	22,783	19,769	446.70	40,718	141,234	450.40	40,718	141,234
443.10	23,984	22,107	446.80	40,718	141,234	450.50	40,718	141,234
443.20	25,185	24,565	446.90	40,718	141,234			
443.30	26,386	27,144	447.00	40,718	141,234			
443.40	27,587	29,843	447.10	40,718	141,234			
443.50	28,789	32,661	447.20	40,718	141,234			
443.60	29,990	35,600	447.30	40,718	141,234			
443.70	31,191	38,659	447.40	40,718	141,234			
443.80	32,392	41,838	447.50	40,718	141,234			
443.90	33,593	45,138	447.60	40,718	141,234			
444.00	34,794	48,557	447.70	40,718	141,234			
444.10	34,962	52,045	447.80	40,718	141,234			
444.20	35,131	55,549	447.90	40,718	141,234			
444.30	35,299	59,071	448.00	40,718	141,234			
444.40	35,468	62,609	448.10	40,718	141,234			
444.50	35,636	66,165	448.20	40,718	141,234			
444.60	35,805	69,737	448.30	40,718	141,234			
444.70	35,973	73,326	448.40	40,718	141,234			
444.80	36,142	76,931	448.50	40,718	141,234			
444.90	36,310	80,554	448.60	40,718	141,234			
445.00	36,479	84,193	448.70	40,718	141,234			
445.10	36,647	87,850	448.80	40,718	141,234			

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 5.20" for 50-yr event
Inflow = 34.08 cfs @ 12.47 hrs, Volume= 4.543 af
Outflow = 31.26 cfs @ 12.62 hrs, Volume= 4.293 af, Atten= 8%, Lag= 8.9 min
Primary = 31.26 cfs @ 12.62 hrs, Volume= 4.293 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.57' @ 12.62 hrs Surf.Area= 10,605 sf Storage= 36,654 cf

Plug-Flow detention time= 67.9 min calculated for 4.293 af (94% of inflow)
Center-of-Mass det. time= 38.5 min (872.8 - 834.4)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

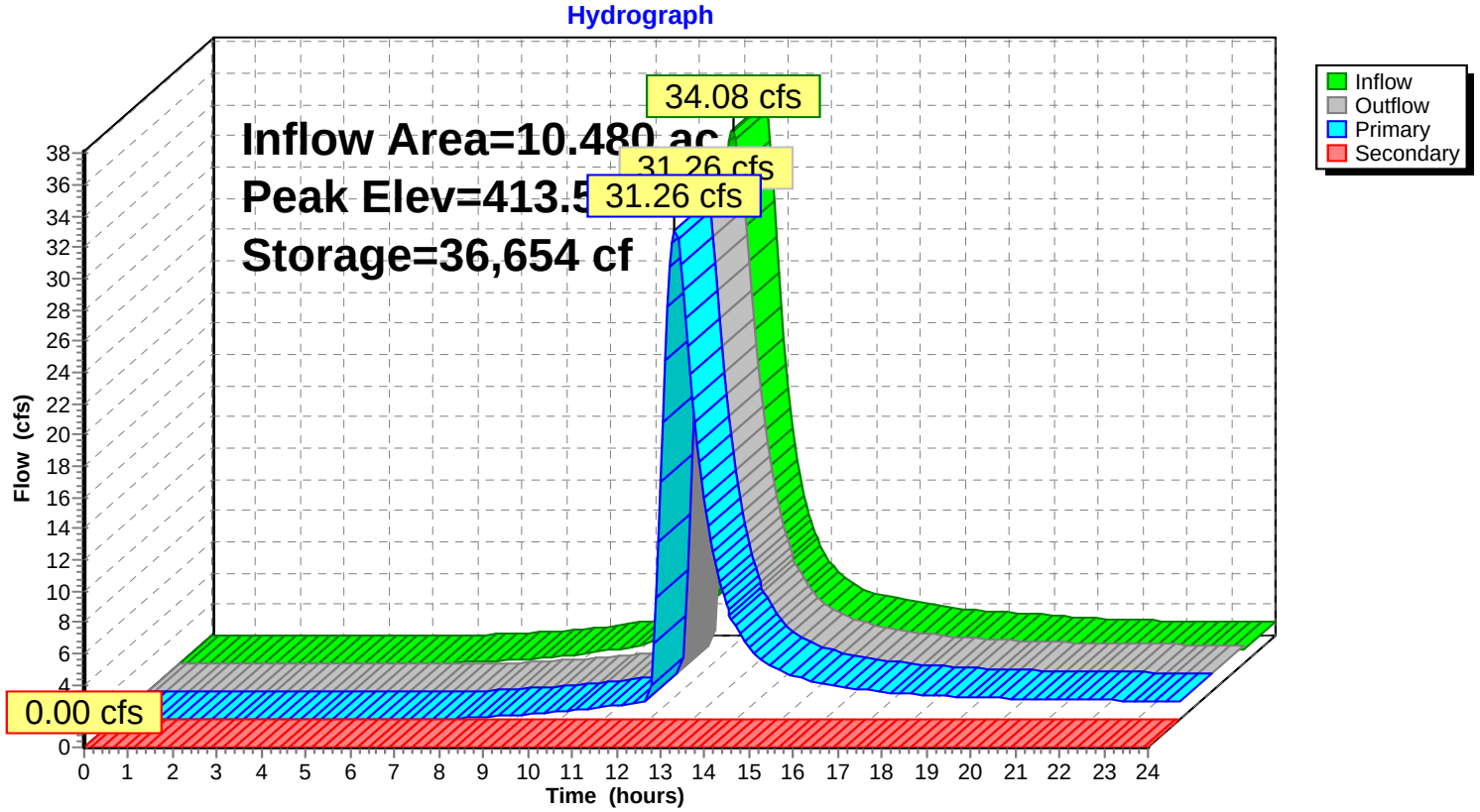
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=31.16 cfs @ 12.62 hrs HW=413.57' (Free Discharge)
└─**1=Culvert** (Passes 31.16 cfs of 32.33 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.96 cfs @ 10.01 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 26.86 cfs @ 7.66 fps)
  └─**4=Orifice/Grate** (Orifice Controls 2.34 cfs @ 2.42 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 5.18" for 50-yr event
Inflow = 42.65 cfs @ 12.56 hrs, Volume= 6.397 af
Outflow = 11.90 cfs @ 13.52 hrs, Volume= 4.851 af, Atten= 72%, Lag= 58.1 min
Primary = 11.90 cfs @ 13.52 hrs, Volume= 4.851 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 415.09' @ 13.52 hrs Surf.Area= 31,504 sf Storage= 144,434 cf

Plug-Flow detention time= 216.6 min calculated for 4.851 af (76% of inflow)
Center-of-Mass det. time= 133.1 min (972.7 - 839.7)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

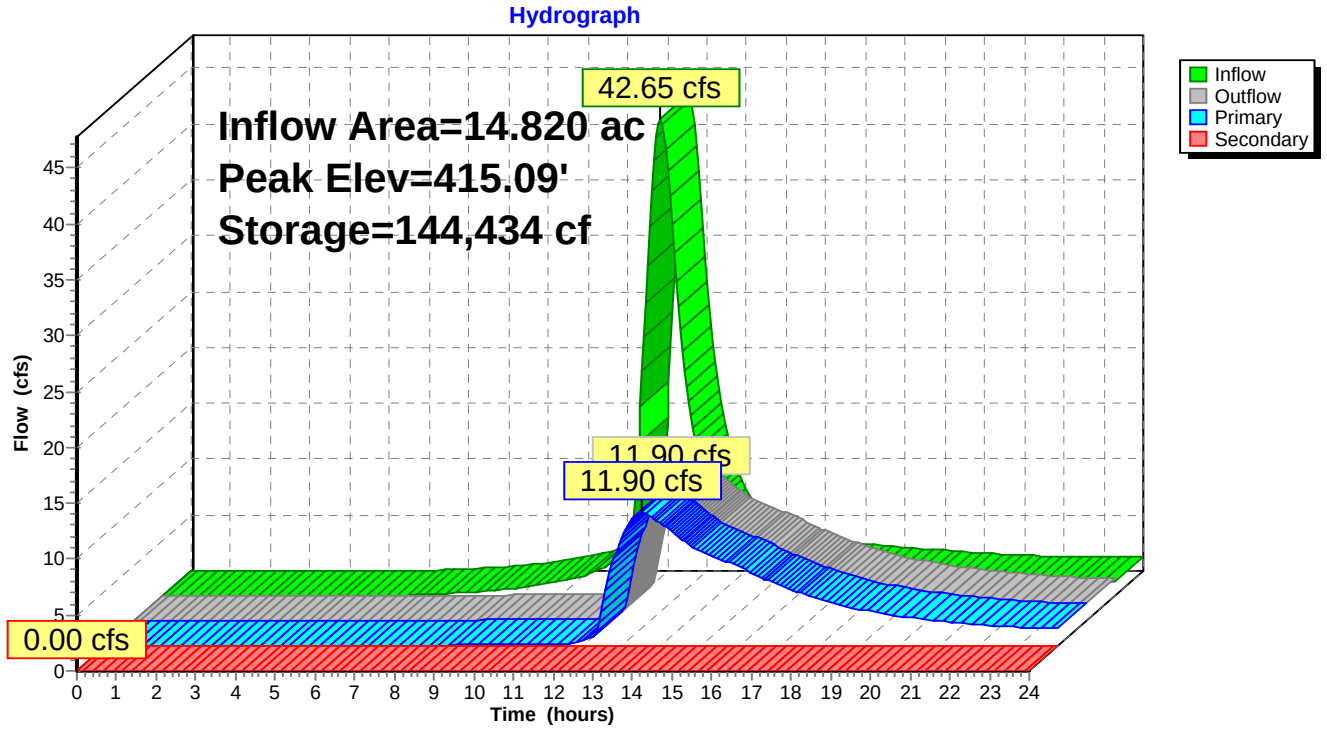
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=11.89 cfs @ 13.52 hrs HW=415.09' (Free Discharge)
- **1=Culvert** (Passes 11.89 cfs of 37.32 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.28 cfs @ 12.74 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.93 cfs @ 10.68 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 10.54 cfs @ 6.83 fps)
  - **5=Orifice/Grate** (Orifice Controls 0.14 cfs @ 0.94 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 6.65" for 50-yr event
Inflow = 9.94 cfs @ 12.00 hrs, Volume= 0.587 af
Outflow = 7.73 cfs @ 12.07 hrs, Volume= 0.368 af, Atten= 22%, Lag= 4.4 min
Primary = 7.73 cfs @ 12.07 hrs, Volume= 0.368 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.64' @ 12.07 hrs Surf.Area= 8,242 sf Storage= 11,728 cf

Plug-Flow detention time= 190.3 min calculated for 0.368 af (63% of inflow)
Center-of-Mass det. time= 89.4 min (858.3 - 768.8)

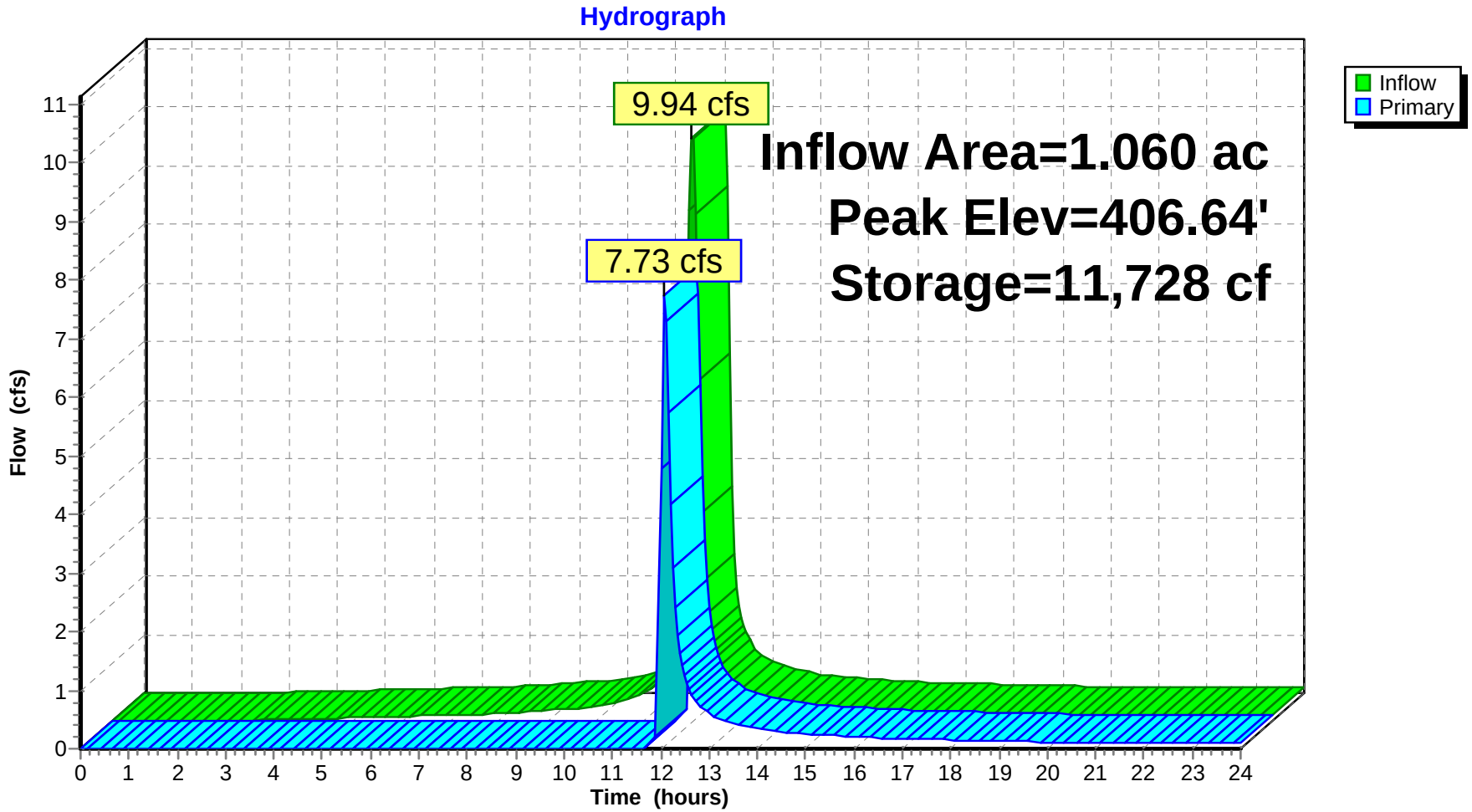
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.38 cfs @ 12.07 hrs HW=406.63' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 7.38 cfs @ 1.33 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0
405.02	6,127	122
405.04	6,153	245
405.06	6,179	368
405.08	6,205	492
405.10	6,230	617
405.12	6,256	741
405.14	6,282	867
405.16	6,308	993
405.18	6,334	1,119
405.20	6,360	1,246
405.22	6,386	1,374
405.24	6,412	1,502
405.26	6,437	1,630
405.28	6,463	1,759
405.30	6,489	1,889
405.32	6,515	2,019
405.34	6,541	2,149
405.36	6,567	2,280
405.38	6,593	2,412
405.40	6,619	2,544
405.42	6,644	2,677
405.44	6,670	2,810
405.46	6,696	2,943
405.48	6,722	3,078
405.50	6,748	3,212
405.52	6,774	3,347
405.54	6,800	3,483
405.56	6,826	3,619
405.58	6,852	3,756
405.60	6,877	3,894
405.62	6,903	4,031
405.64	6,929	4,170
405.66	6,955	4,308
405.68	6,981	4,448
405.70	7,007	4,588
405.72	7,033	4,728
405.74	7,059	4,869
405.76	7,084	5,010
405.78	7,110	5,152
405.80	7,136	5,295
405.82	7,162	5,438
405.84	7,188	5,581
405.86	7,214	5,725
405.88	7,240	5,870
405.90	7,266	6,015
405.92	7,291	6,161
405.94	7,317	6,307
405.96	7,343	6,453
405.98	7,369	6,600
406.00	7,395	6,748
406.02	7,421	6,896
406.04	7,448	7,045
406.06	7,474	7,194
406.08	7,501	7,344
406.10	7,527	7,494
406.12	7,553	7,645
406.14	7,580	7,796
406.16	7,606	7,948
406.18	7,633	8,100
406.20	7,659	8,253
406.22	7,685	8,407
406.24	7,712	8,561
406.26	7,738	8,715
406.28	7,765	8,870
406.30	7,791	9,026
406.32	7,817	9,182
406.34	7,844	9,339
406.36	7,870	9,496
406.38	7,897	9,653
406.40	7,924	9,812
406.42	7,951	9,970
406.44	7,978	10,130
406.46	8,005	10,289
406.48	8,032	10,450
406.50	8,058	10,611
406.52	8,085	10,772
406.54	8,112	10,934
406.56	8,139	11,097
406.58	8,166	11,260
406.60	8,193	11,423
406.62	8,219	11,587
406.64	8,246	11,752
406.66	8,273	11,917
406.68	8,300	12,083
406.70	8,327	12,249
406.72	8,354	12,416
406.74	**8,381**	**12,583**

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 5.23" for 50-yr event
Inflow = 15.27 cfs @ 12.18 hrs, Volume= 1.321 af
Outflow = 9.70 cfs @ 12.38 hrs, Volume= 1.295 af, Atten= 36%, Lag= 12.0 min
Primary = 9.70 cfs @ 12.38 hrs, Volume= 1.295 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 425.91' @ 12.38 hrs Surf.Area= 6,801 sf Storage= 15,854 cf

Plug-Flow detention time= 47.9 min calculated for 1.292 af (98% of inflow)
Center-of-Mass det. time= 36.3 min (852.3 - 816.0)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

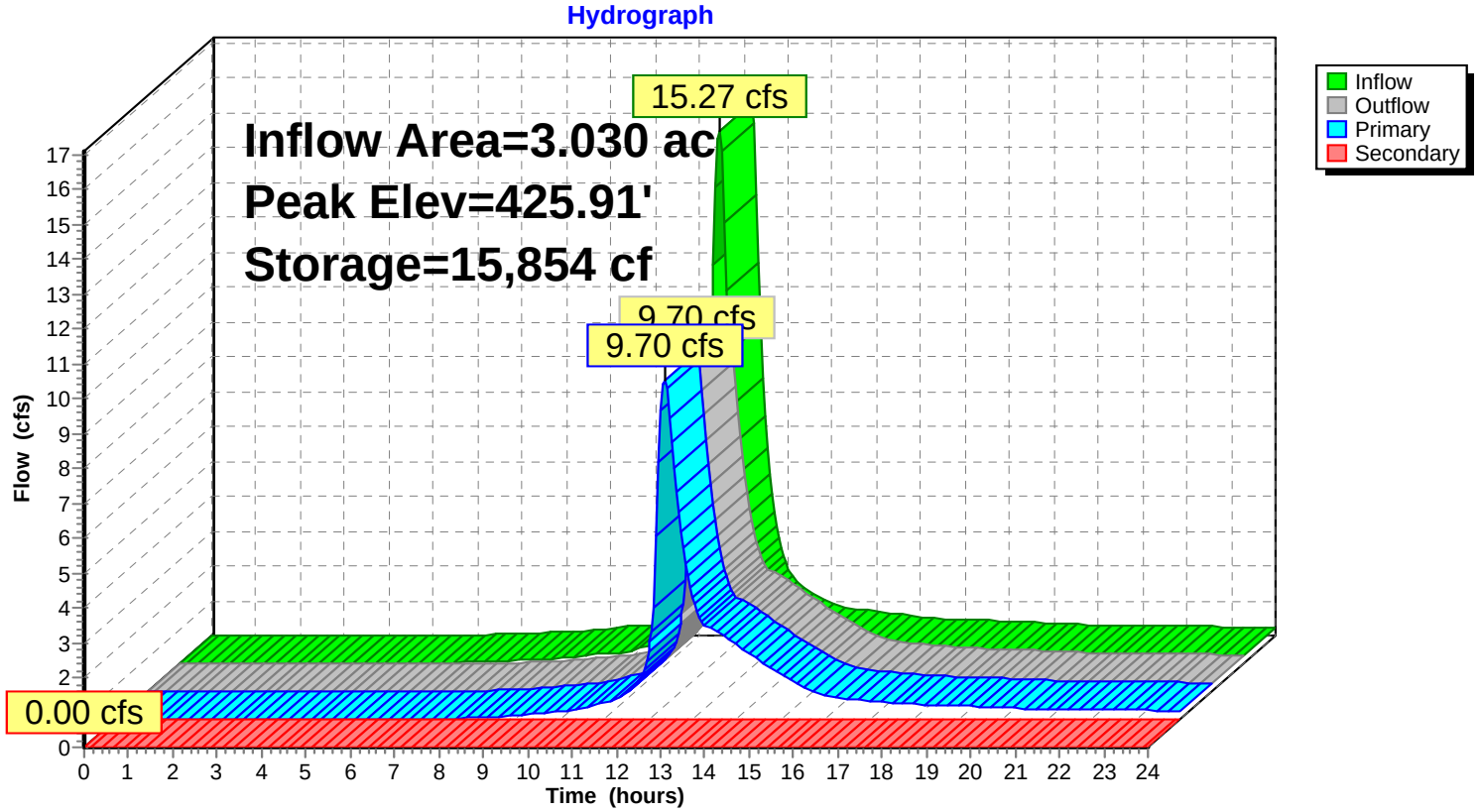
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=9.65 cfs @ 12.38 hrs HW=425.91' (Free Discharge)
└─**1=Culvert** (Passes 9.65 cfs of 12.49 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 3.38 cfs @ 7.66 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 6.27 cfs @ 3.80 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 6.05" for 50-yr event
Inflow = 4.52 cfs @ 12.07 hrs, Volume= 0.313 af
Outflow = 4.49 cfs @ 12.09 hrs, Volume= 0.252 af, Atten= 1%, Lag= 1.0 min
Primary = 4.49 cfs @ 12.09 hrs, Volume= 0.252 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.22' @ 12.09 hrs Surf.Area= 1,579 sf Storage= 2,977 cf

Plug-Flow detention time= 122.6 min calculated for 0.252 af (80% of inflow)
Center-of-Mass det. time= 45.3 min (835.6 - 790.3)

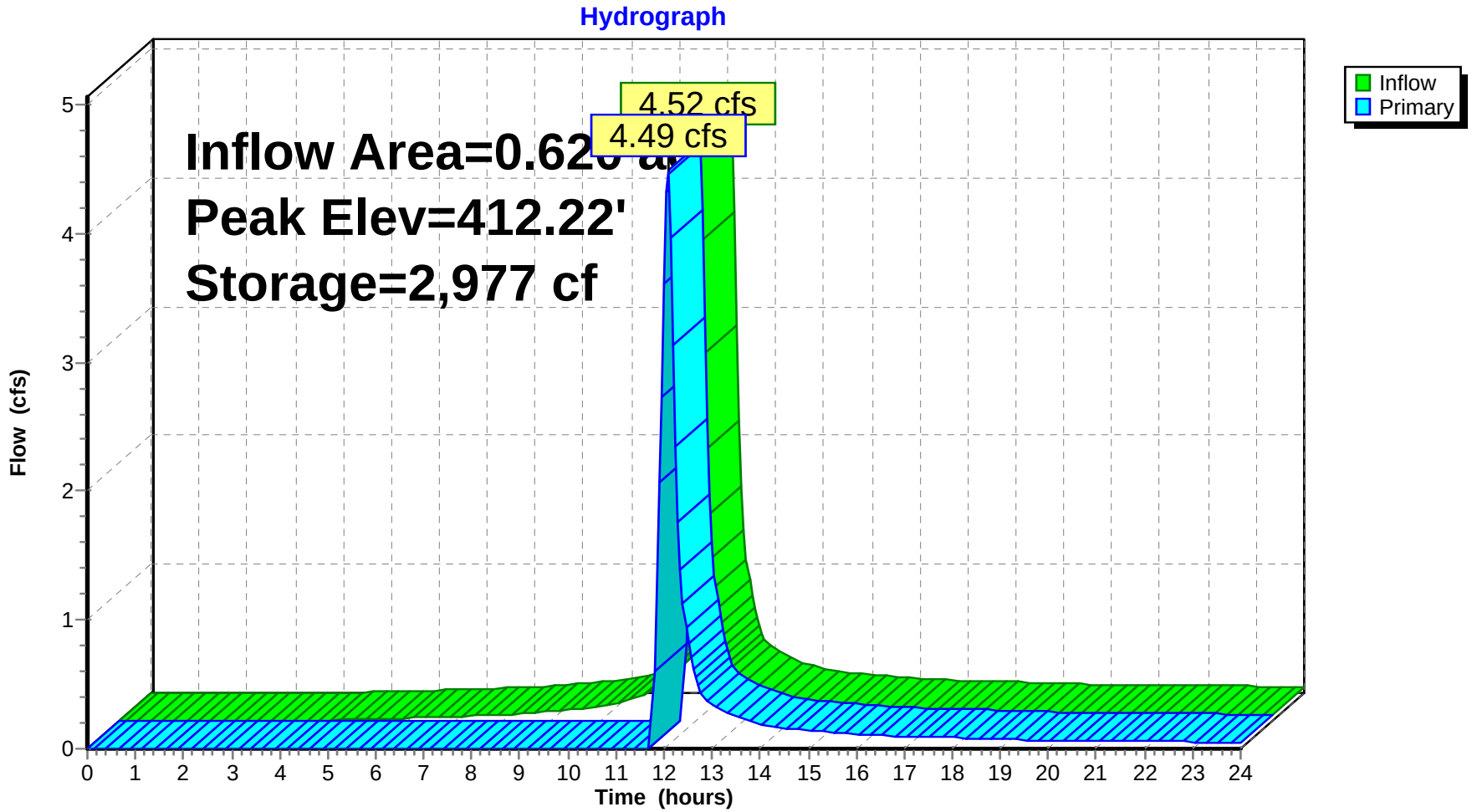
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=4.42 cfs @ 12.09 hrs HW=412.22' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.42 cfs @ 1.13 fps)

Pond WQB-1: WQB-1



Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.930 ac 0.00% Impervious Runoff Depth>5.40"
Flow Length=777' Tc=38.6 min CN=74 Runoff=91.25 cfs 10.315 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>5.66"
Flow Length=209' Tc=23.3 min CN=76 Runoff=92.48 cfs 7.602 af

Subcatchment P-1c: P-1c Runoff Area=10.480 ac 0.00% Impervious Runoff Depth>6.10"
Flow Length=1,482' Tc=48.8 min CN=80 Runoff=39.84 cfs 5.331 af

Subcatchment P-1d: P-1d Runoff Area=14.200 ac 0.00% Impervious Runoff Depth>6.09"
Flow Length=1,530' Tc=55.8 min CN=80 Runoff=49.06 cfs 7.212 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>7.61"
Tc=9.2 min CN=92 Runoff=11.29 cfs 0.672 af

Subcatchment P-1f: PDA-1f Runoff Area=0.620 ac 37.10% Impervious Runoff Depth>7.00"
Flow Length=274' Tc=15.6 min CN=87 Runoff=5.18 cfs 0.361 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>5.46"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=23.14 cfs 4.422 af

Subcatchment P-3: P-3 Runoff Area=3.030 ac 0.00% Impervious Runoff Depth>6.14"
Flow Length=234' Tc=25.2 min CN=80 Runoff=17.83 cfs 1.550 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>5.64"
Flow Length=590' Tc=36.5 min CN=76 Runoff=14.56 cfs 1.584 af

Reach R-1: R-1 Avg. Flow Depth=0.78' Max Vel=5.18 fps Inflow=26.68 cfs 7.447 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=26.65 cfs 7.426 af

Reach R-2: R-2 Avg. Flow Depth=3.41' Max Vel=2.15 fps Inflow=115.24 cfs 17.740 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=98.18 cfs 17.516 af

Reach R-3: R-3 Avg. Flow Depth=6.74' Max Vel=1.53 fps Inflow=141.66 cfs 28.486 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=140.77 cfs 28.409 af

Reach R-4: R-4 Avg. Flow Depth=7.27' Max Vel=1.41 fps Inflow=141.53 cfs 28.862 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=140.76 cfs 28.797 af

Pond Pond 1b: Pond 1b Peak Elev=445.91' Storage=118,084 cf Inflow=92.48 cfs 7.602 af
Outflow=26.68 cfs 7.447 af

Pond Pond 1c: Pond 1c Peak Elev=413.98' Storage=41,037 cf Inflow=39.84 cfs 5.331 af
Primary=33.74 cfs 5.043 af Secondary=0.00 cfs 0.000 af Outflow=33.74 cfs 5.043 af

Pond Pond 1d: Pond 1d Peak Elev=415.62' Storage=161,591 cf Inflow=49.86 cfs 7.512 af
Primary=17.71 cfs 5.927 af Secondary=0.00 cfs 0.000 af Outflow=17.71 cfs 5.927 af

Pond Pond 1e: Pond 1e Peak Elev=406.68' Storage=12,102 cf Inflow=11.29 cfs 0.672 af
Outflow=9.72 cfs 0.453 af

Pond Pond 3: Pond 3 Peak Elev=426.13' Storage=17,338 cf Inflow=17.83 cfs 1.550 af
Primary=12.37 cfs 1.522 af Secondary=0.00 cfs 0.000 af Outflow=12.37 cfs 1.522 af

Pond WQB-1: WQB-1 Peak Elev=412.24' Storage=3,009 cf Inflow=5.18 cfs 0.361 af
Outflow=5.16 cfs 0.300 af

Summary for Subcatchment P-1a: P-1a

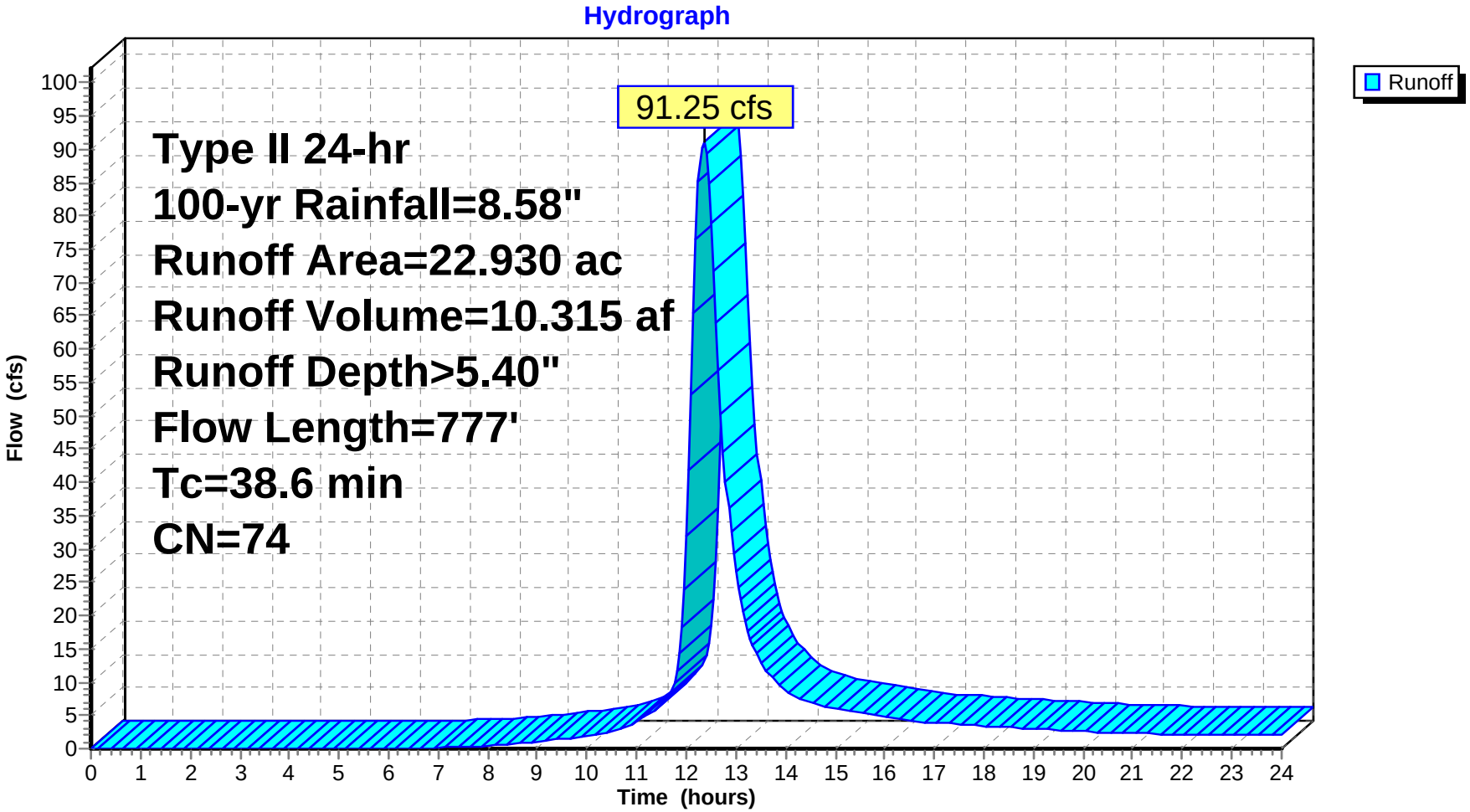
Runoff = 91.25 cfs @ 12.34 hrs, Volume= 10.315 af, Depth> 5.40"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
2.080	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.930	74	Weighted Average
22.930		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

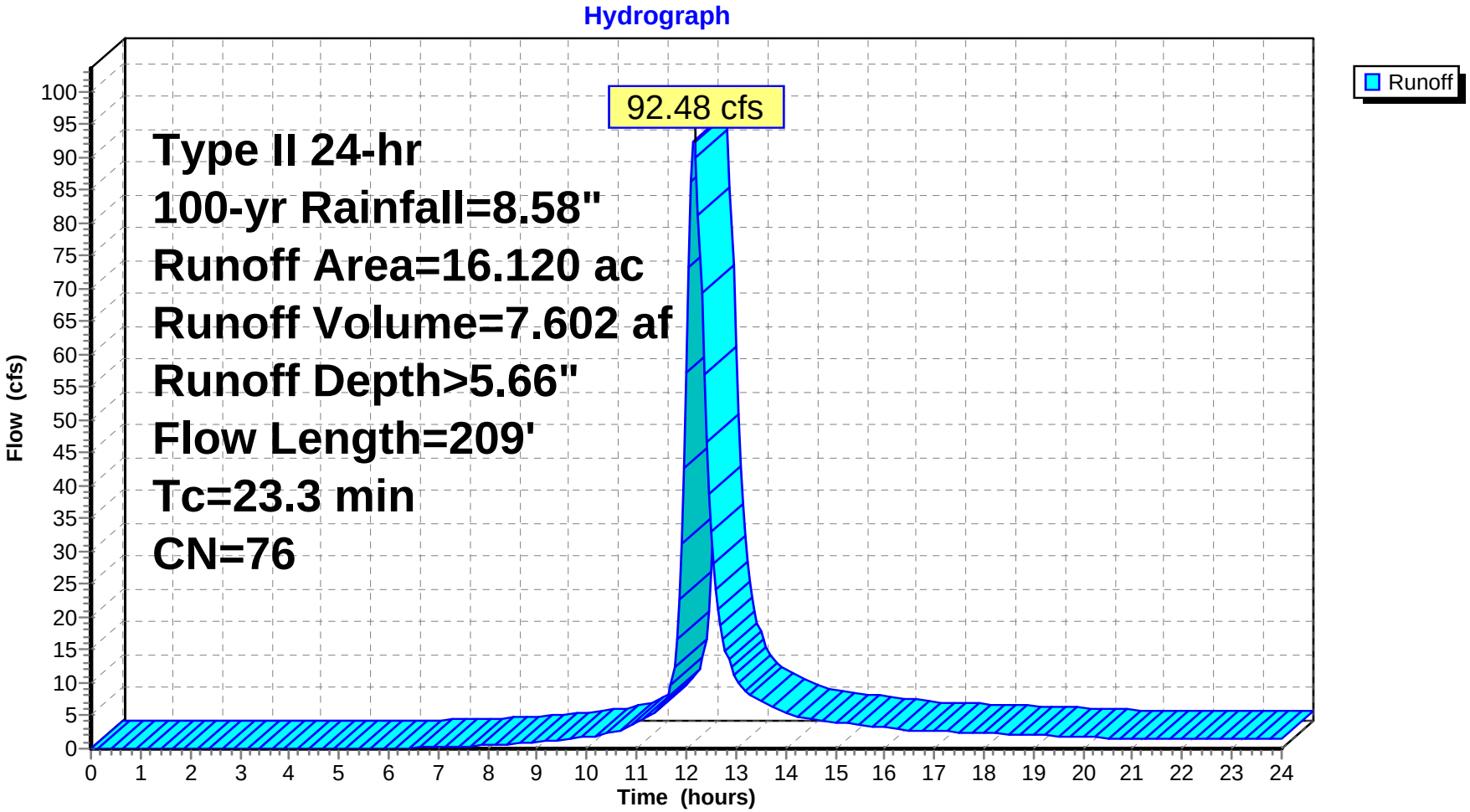
Runoff = 92.48 cfs @ 12.16 hrs, Volume= 7.602 af, Depth> 5.66"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

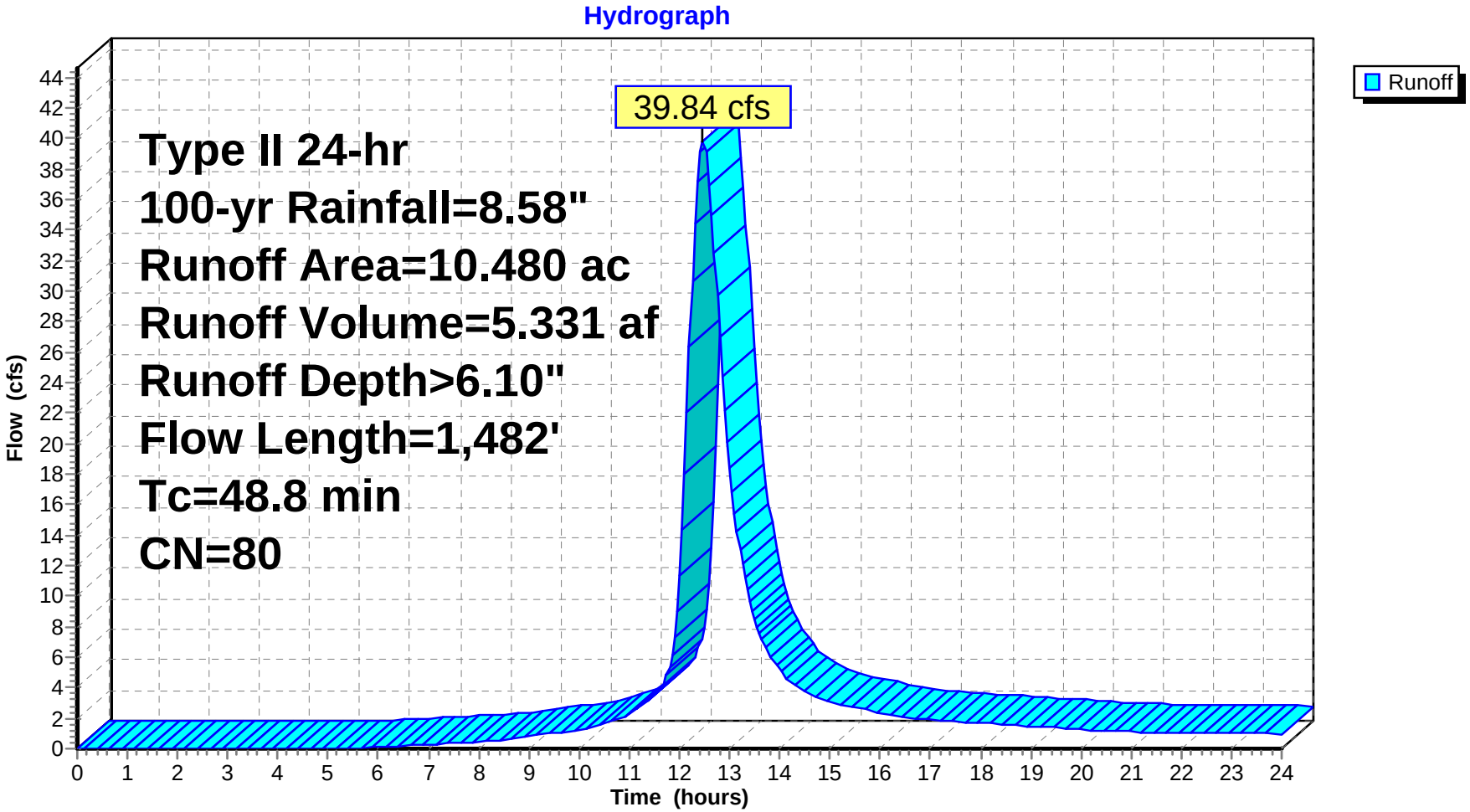
Runoff = 39.84 cfs @ 12.47 hrs, Volume= 5.331 af, Depth> 6.10"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
10.480	80	>75% Grass cover, Good, HSG D
10.480		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
23.6	993	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
48.8	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

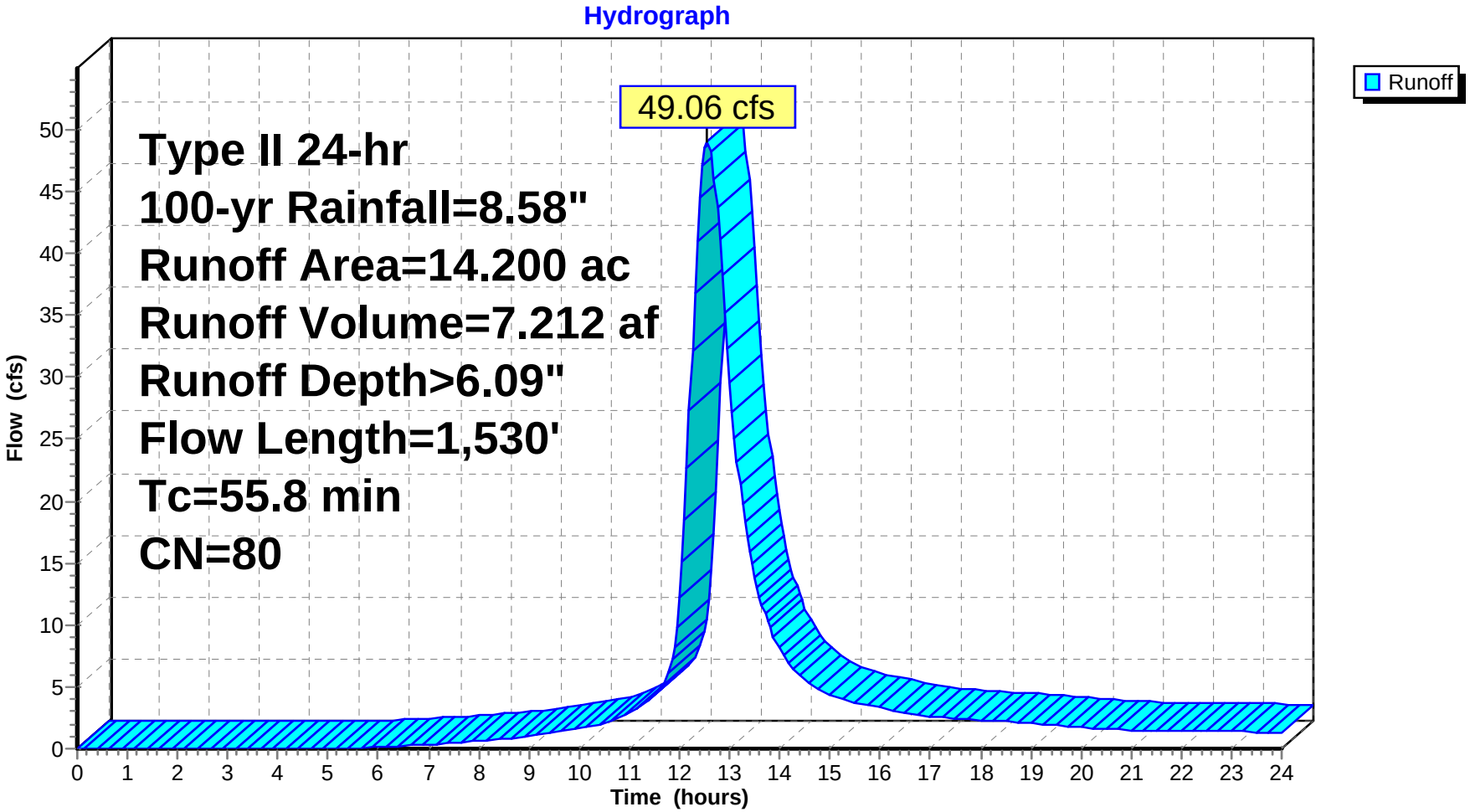
Runoff = 49.06 cfs @ 12.56 hrs, Volume= 7.212 af, Depth> 6.09"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
14.200		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

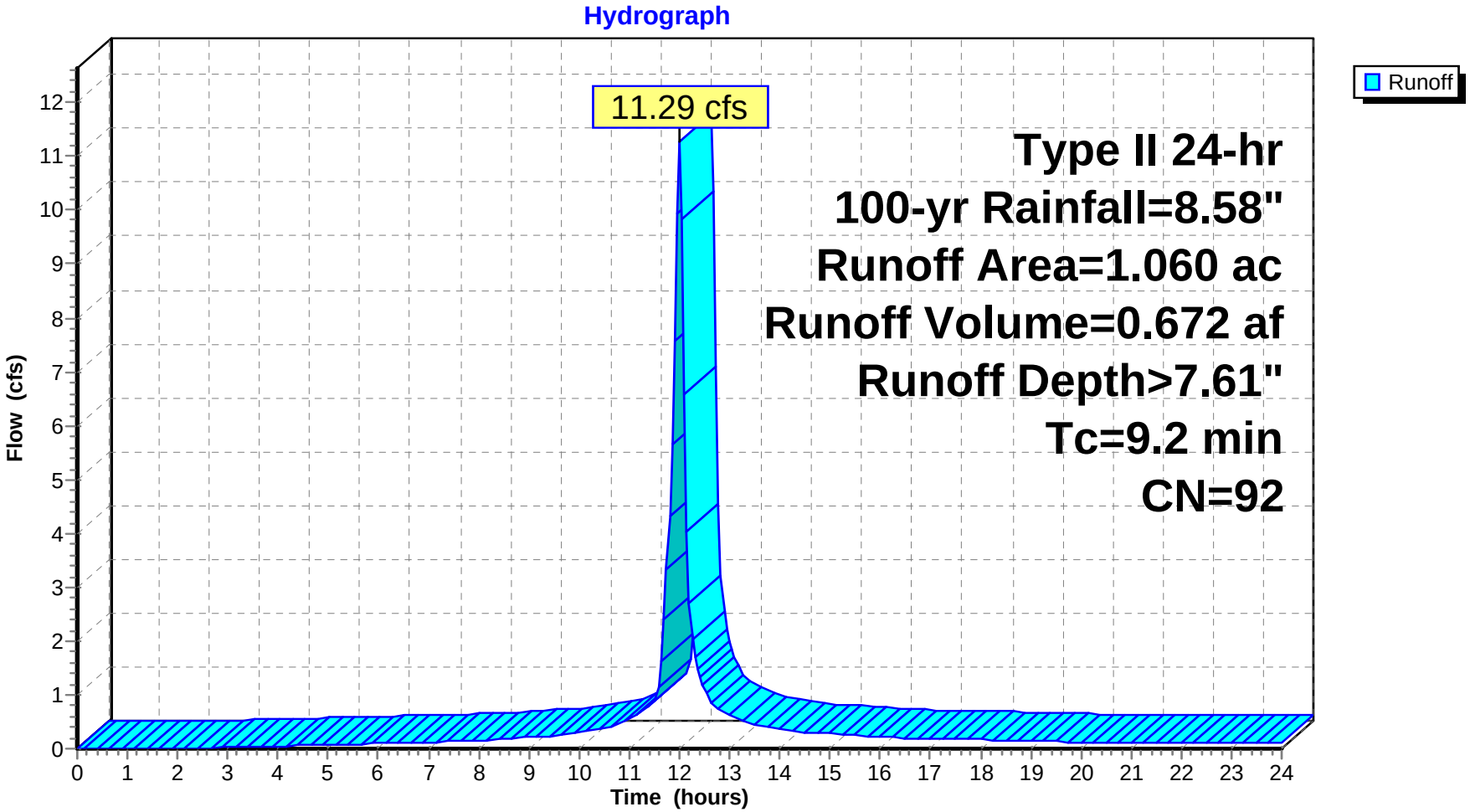
Runoff = 11.29 cfs @ 12.00 hrs, Volume= 0.672 af, Depth> 7.61"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: PDA-1f

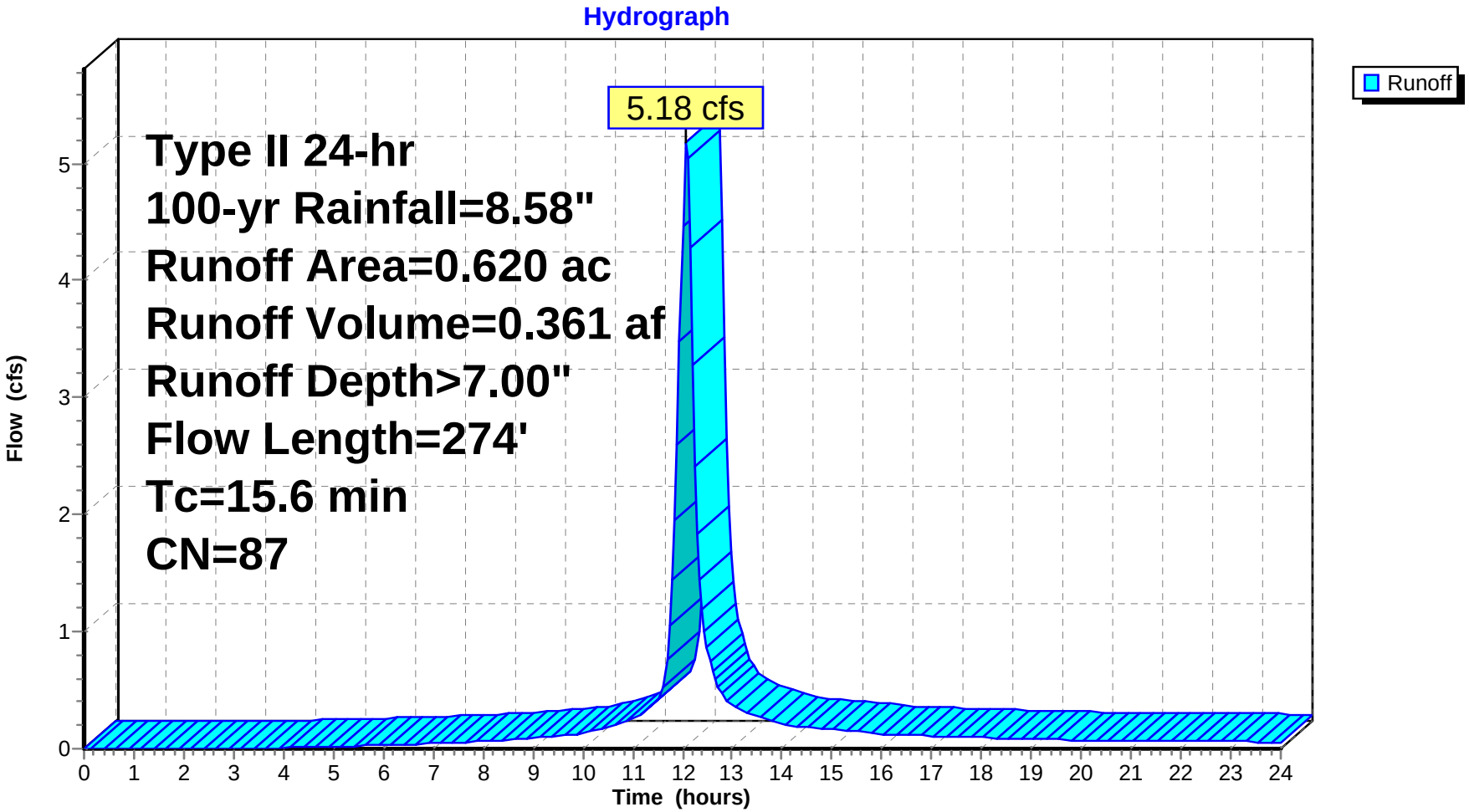
Runoff = 5.18 cfs @ 12.07 hrs, Volume= 0.361 af, Depth> 7.00"
Routed to Pond WQB-1 : WQB-1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
0.390	80	>75% Grass cover, Good, HSG D
0.230	98	Paved parking, HSG D
0.620	87	Weighted Average
0.390		62.90% Pervious Area
0.230		37.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	124	0.0242	0.14		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
0.7	140	0.0429	3.33		**Shallow Concentrated Flow, BC** Unpaved Kv= 16.1 fps
0.0	10	0.2000	7.20		**Shallow Concentrated Flow, CD** Unpaved Kv= 16.1 fps
15.6	274	Total			

Subcatchment P-1f: PDA-1f



Summary for Subcatchment P-2: P-2

Runoff = 23.14 cfs @ 12.88 hrs, Volume= 4.422 af, Depth> 5.46"

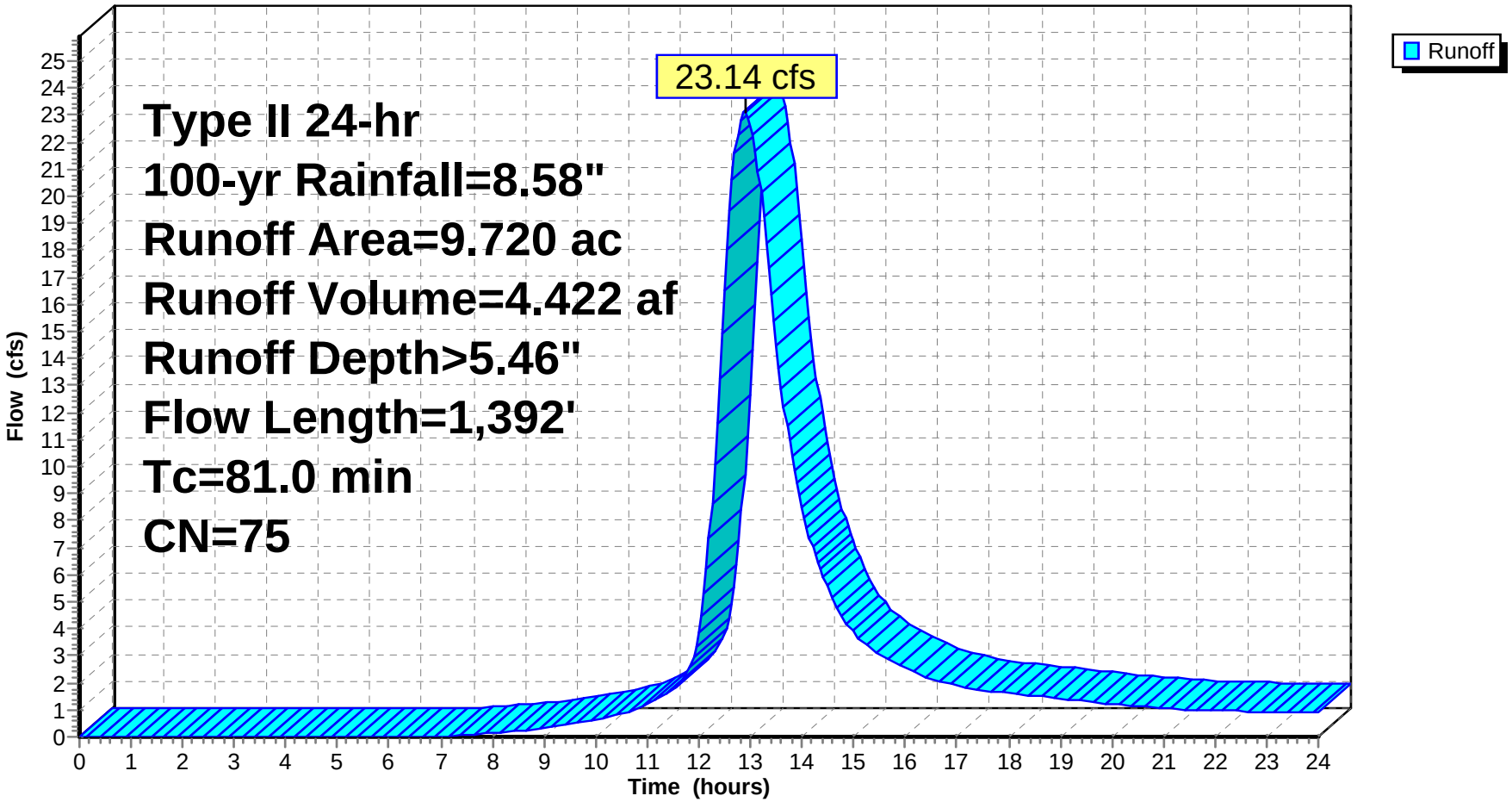
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2

Hydrograph



Summary for Subcatchment P-3: P-3

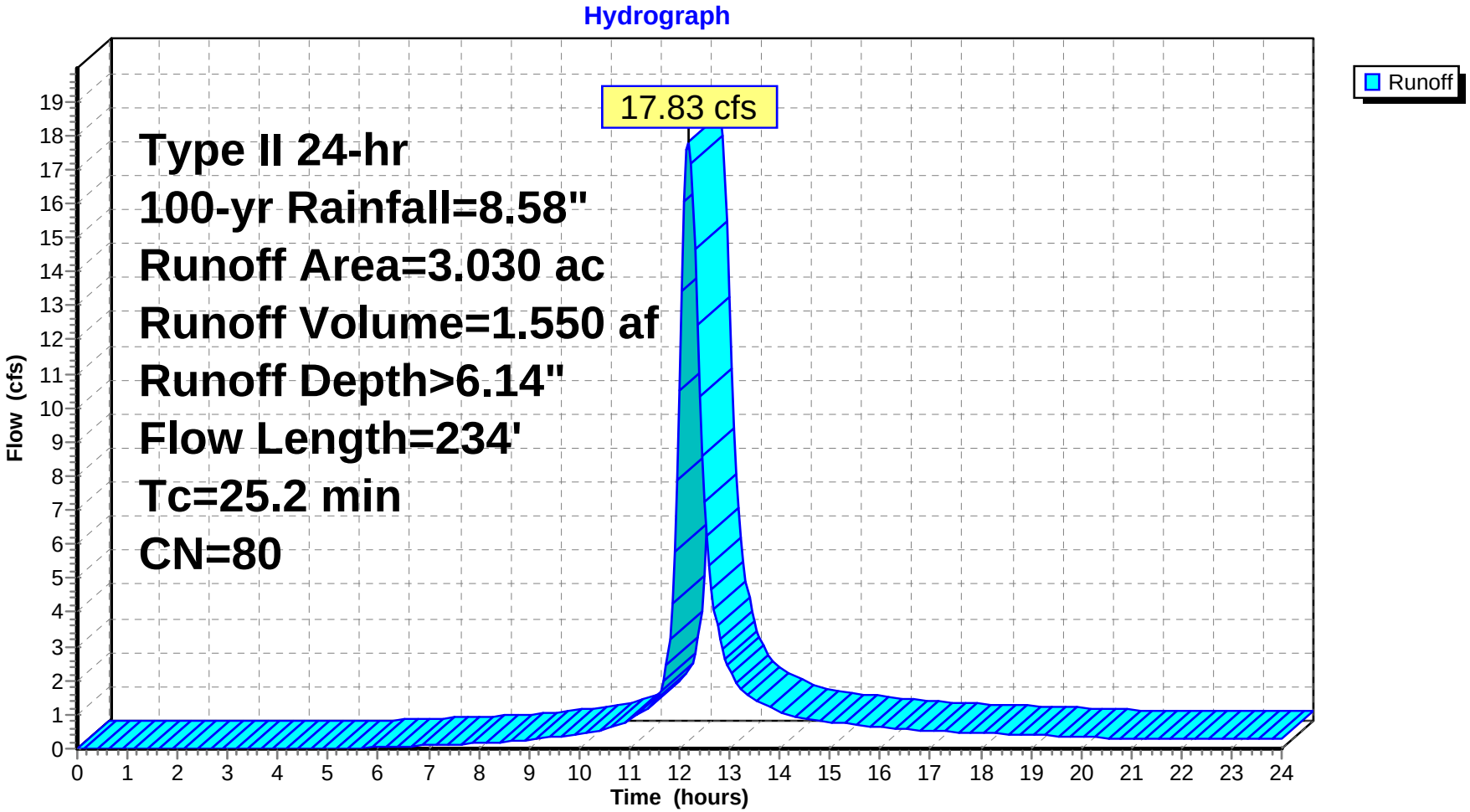
Runoff = 17.83 cfs @ 12.18 hrs, Volume= 1.550 af, Depth> 6.14"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.030	80	>75% Grass cover, Good, HSG D
3.030		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

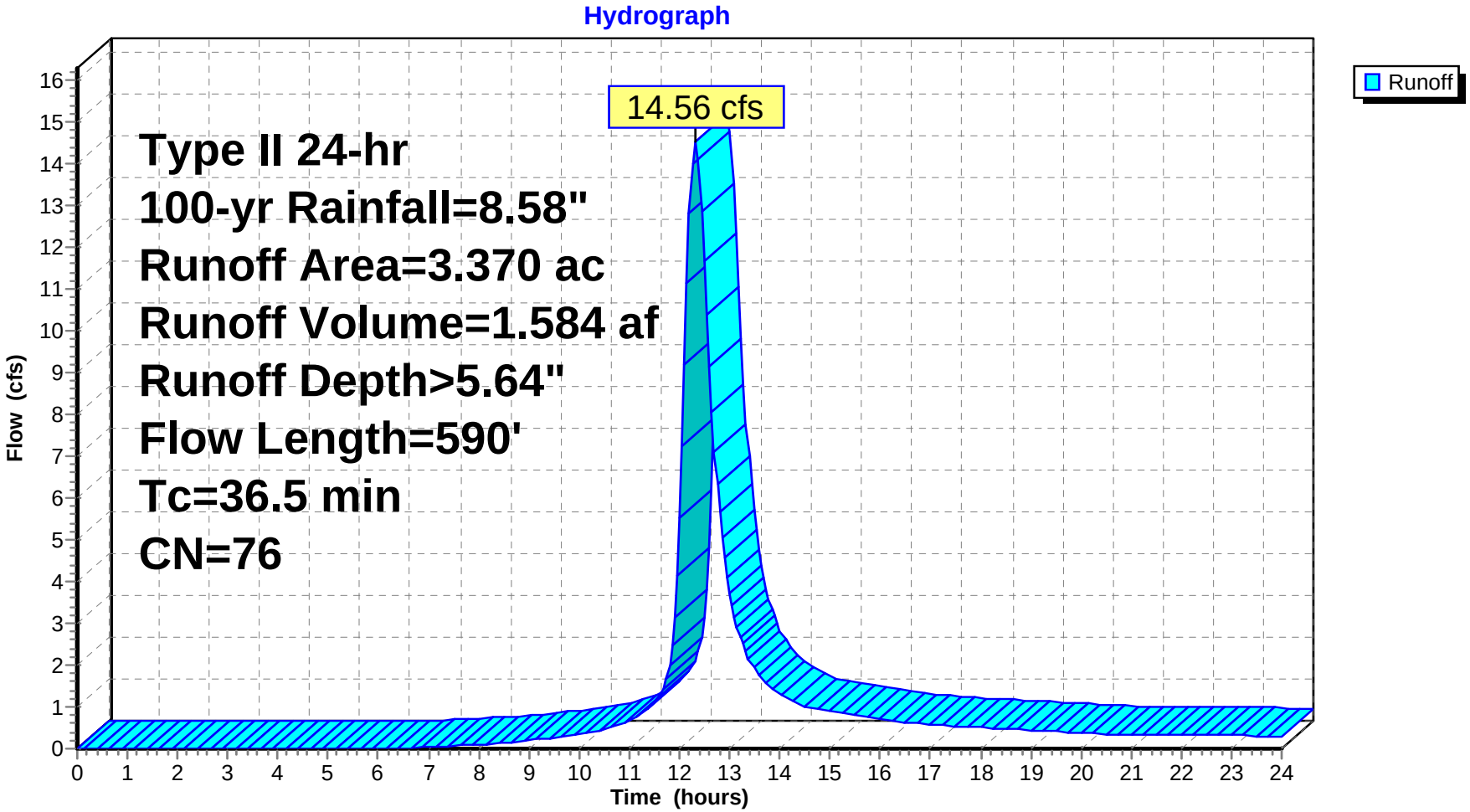
Runoff = 14.56 cfs @ 12.32 hrs, Volume= 1.584 af, Depth> 5.64"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB**
					Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC**
					Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 5.54" for 100-yr event
Inflow = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af
Outflow = 26.65 cfs @ 12.65 hrs, Volume= 7.426 af, Atten= 0%, Lag= 5.0 min
Routed to Reach R-2 : R-2

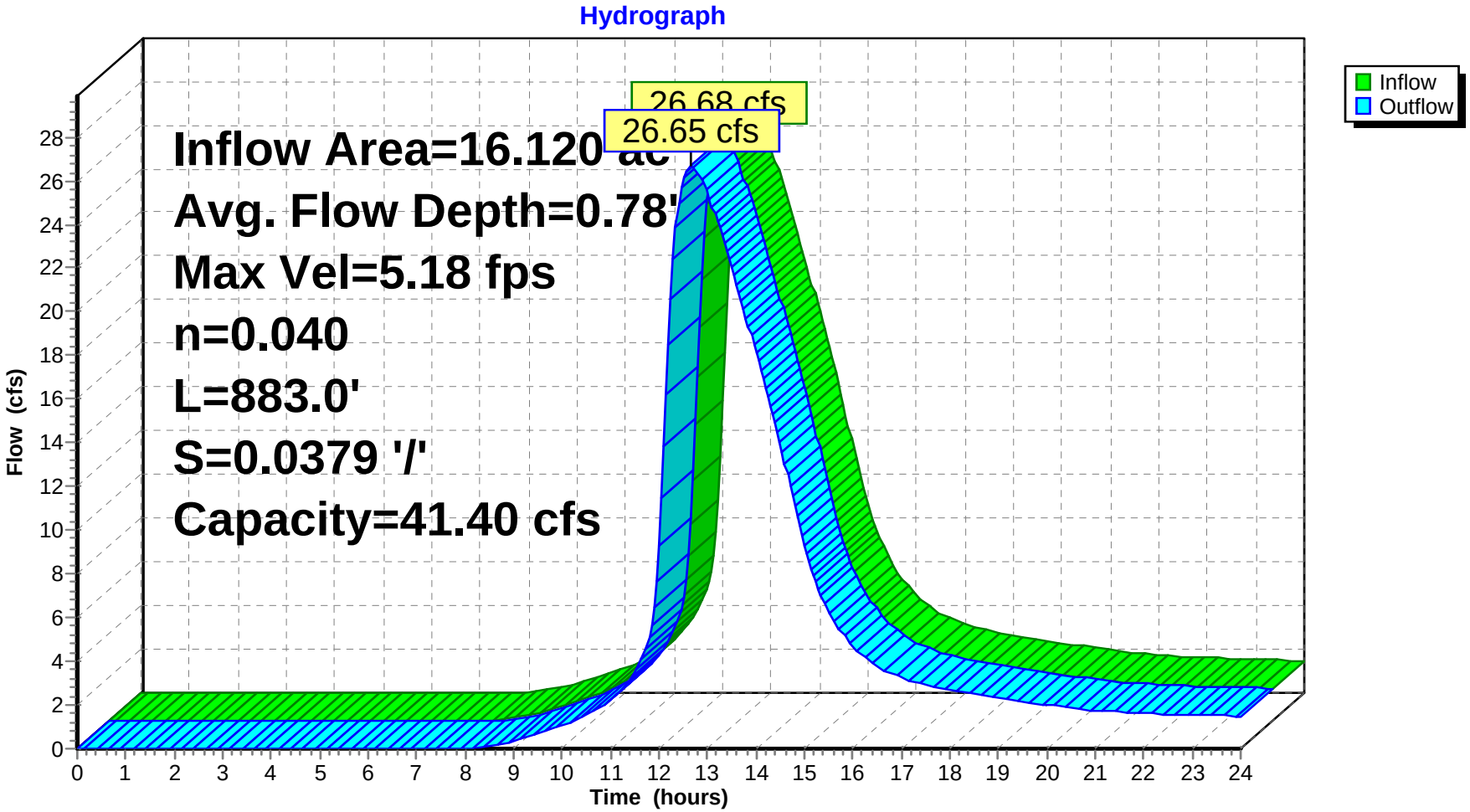
Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.18 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 2.56 fps, Avg. Travel Time= 5.8 min

Peak Storage= 4,546 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.78' , Surface Width= 8.14'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'



Reach R-1: R-1


Hydrograph
Inflow
Outflow
26.68 cfs
26.65 cfs
Inflow Area=16.120 ac
Avg. Flow Depth=0.78'
Max Vel=5.18 fps
n=0.040
L=883.0'
S=0.0379 '/'
Capacity=41.40 cfs
Flow (cfs)
Time (hours)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-1: R-1

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
441.00	0.00	0.00	441.37	3.38	7.18	441.74	5.02	24.05
441.01	0.33	0.02	441.38	3.43	7.51	441.75	5.05	24.63
441.02	0.53	0.05	441.39	3.49	7.86	441.76	5.09	25.22
441.03	0.69	0.11	441.40	3.54	8.21	441.77	5.13	25.82
441.04	0.84	0.17	441.41	3.59	8.56	441.78	5.16	26.42
441.05	0.97	0.25	441.42	3.64	8.93	441.79	5.20	27.03
441.06	1.09	0.33	441.43	3.69	9.29	441.80	5.24	27.65
441.07	1.20	0.43	441.44	3.74	9.67	441.81	5.27	28.27
441.08	1.31	0.54	441.45	3.79	10.05	441.82	5.31	28.90
441.09	1.41	0.66	441.46	3.84	10.44	441.83	5.34	29.54
441.10	1.51	0.79	441.47	3.88	10.84	441.84	5.38	30.18
441.11	1.61	0.92	441.48	3.93	11.24	441.85	5.41	30.83
441.12	1.70	1.07	441.49	3.98	11.65	441.86	5.45	31.49
441.13	1.78	1.22	441.50	4.02	12.07	441.87	5.48	32.15
441.14	1.87	1.38	441.51	4.07	12.49	441.88	5.52	32.82
441.15	1.95	1.55	441.52	4.11	12.92	441.89	5.55	33.50
441.16	2.03	1.73	441.53	4.16	13.36	441.90	5.59	34.18
441.17	2.11	1.92	441.54	4.20	13.80	441.91	5.62	34.87
441.18	2.19	2.11	441.55	4.25	14.25	441.92	5.65	35.57
441.19	2.26	2.31	441.56	4.29	14.71	441.93	5.69	36.28
441.20	2.33	2.52	441.57	4.33	15.17	441.94	5.72	36.99
441.21	2.41	2.74	441.58	4.38	15.64	441.95	5.75	37.71
441.22	2.47	2.96	441.59	4.42	16.11	441.96	5.79	38.43
441.23	2.54	3.19	441.60	4.46	16.60	441.97	5.82	39.16
441.24	2.61	3.43	441.61	4.50	17.09	441.98	5.85	39.90
441.25	2.67	3.68	441.62	4.54	17.58	441.99	5.88	40.65
441.26	2.74	3.93	441.63	4.59	18.08	442.00	**5.91**	**41.40**
441.27	2.80	4.19	441.64	4.63	18.59			
441.28	2.86	4.46	441.65	4.67	19.11			
441.29	2.92	4.73	441.66	4.71	19.63			
441.30	2.98	5.01	441.67	4.75	20.16			
441.31	3.04	5.30	441.68	4.79	20.70			
441.32	3.10	5.60	441.69	4.82	21.24			
441.33	3.16	5.90	441.70	4.86	21.79			
441.34	3.22	6.21	441.71	4.90	22.34			
441.35	3.27	6.52	441.72	4.94	22.91			
441.36	3.33	6.85	441.73	4.98	23.48			

Stage-Area-Storage for Reach R-1: R-1

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
441.00	0.0	0	441.37	2.1	1,875	441.74	4.8	4,234
441.01	0.1	44	441.38	2.2	1,933	441.75	4.9	4,305
441.02	0.1	89	441.39	2.3	1,990	441.76	5.0	4,375
441.03	0.2	134	441.40	2.3	2,049	441.77	5.0	4,447
441.04	0.2	179	441.41	2.4	2,107	441.78	5.1	4,518
441.05	0.3	225	441.42	2.5	2,166	441.79	5.2	4,590
441.06	0.3	271	441.43	2.5	2,225	441.80	5.3	4,662
441.07	0.4	318	441.44	2.6	2,284	441.81	5.4	4,735
441.08	0.4	365	441.45	2.7	2,344	441.82	5.4	4,808
441.09	0.5	412	441.46	2.7	2,405	441.83	5.5	4,881
441.10	0.5	459	441.47	2.8	2,465	441.84	5.6	4,955
441.11	0.6	507	441.48	2.9	2,526	441.85	5.7	5,029
441.12	0.6	555	441.49	2.9	2,587	441.86	5.8	5,103
441.13	0.7	604	441.50	3.0	2,649	441.87	5.9	5,178
441.14	0.7	653	441.51	3.1	2,711	441.88	5.9	5,253
441.15	0.8	702	441.52	3.1	2,773	441.89	6.0	5,328
441.16	0.9	752	441.53	3.2	2,836	441.90	6.1	5,404
441.17	0.9	802	441.54	3.3	2,899	441.91	6.2	5,480
441.18	1.0	852	441.55	3.4	2,962	441.92	6.3	5,557
441.19	1.0	903	441.56	3.4	3,026	441.93	6.4	5,633
441.20	1.1	954	441.57	3.5	3,090	441.94	6.5	5,711
441.21	1.1	1,005	441.58	3.6	3,155	441.95	6.6	5,788
441.22	1.2	1,057	441.59	3.6	3,220	441.96	6.6	5,866
441.23	1.3	1,109	441.60	3.7	3,285	441.97	6.7	5,944
441.24	1.3	1,161	441.61	3.8	3,350	441.98	6.8	6,023
441.25	1.4	1,214	441.62	3.9	3,416	441.99	6.9	6,102
441.26	1.4	1,267	441.63	3.9	3,482	442.00	**7.0**	**6,181**
441.27	1.5	1,321	441.64	4.0	3,549			
441.28	1.6	1,375	441.65	4.1	3,616			
441.29	1.6	1,429	441.66	4.2	3,683			
441.30	1.7	1,483	441.67	4.2	3,751			
441.31	1.7	1,538	441.68	4.3	3,819			
441.32	1.8	1,594	441.69	4.4	3,887			
441.33	1.9	1,649	441.70	4.5	3,956			
441.34	1.9	1,705	441.71	4.6	4,025			
441.35	2.0	1,762	441.72	4.6	4,094			
441.36	2.1	1,818	441.73	4.7	4,164			

Summary for Reach R-2: R-2

Inflow Area = 39.050 ac, 11.40% Impervious, Inflow Depth > 5.45" for 100-yr event
Inflow = 115.24 cfs @ 12.36 hrs, Volume= 17.740 af
Outflow = 98.18 cfs @ 12.77 hrs, Volume= 17.516 af, Atten= 15%, Lag= 24.5 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 13.3 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 27.4 min

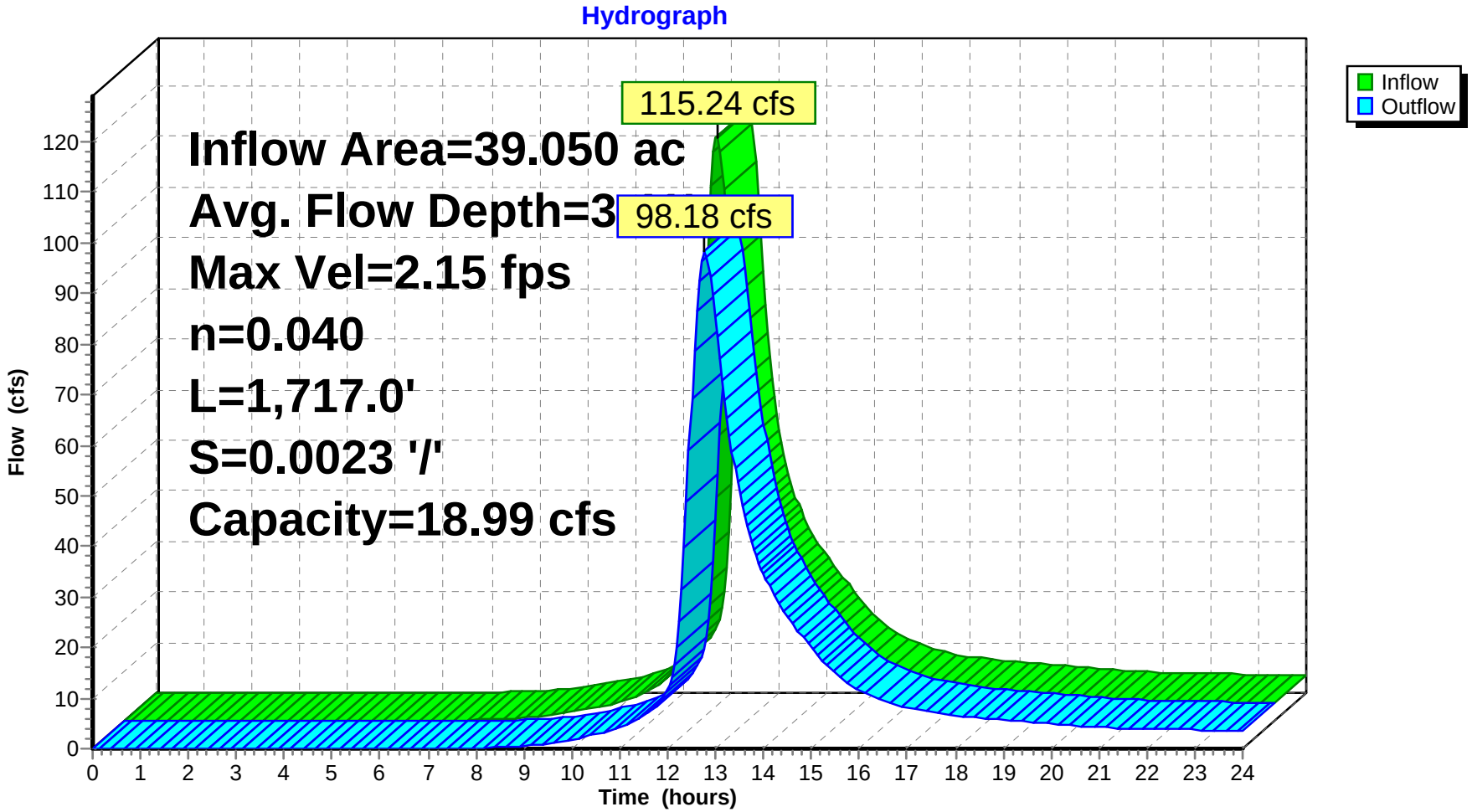
Peak Storage= 78,557 cf @ 12.55 hrs
Average Depth at Peak Storage= 3.41' , Surface Width= 23.66'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'



‡

Reach R-2: R-2


Hydrograph
115.24 cfs
98.18 cfs
Inflow Area=39.050 ac
Avg. Flow Depth=3
Max Vel=2.15 fps
n=0.040
L=1,717.0'
S=0.0023 '/'
Capacity=18.99 cfs
Inflow
Outflow
Flow (cfs)
Time (hours)
0 10 20 30 40 50 60 70 80 90 100 110 120
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-2: R-2

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
407.50	0.00	0.00	407.87	0.88	3.48	408.24	1.33	11.29
407.51	0.08	0.01	407.88	0.89	3.64	408.25	1.34	11.56
407.52	0.13	0.03	407.89	0.90	3.80	408.26	1.35	11.82
407.53	0.17	0.05	407.90	0.92	3.97	408.27	1.36	12.09
407.54	0.21	0.08	407.91	0.93	4.14	408.28	1.37	12.36
407.55	0.24	0.12	407.92	0.95	4.31	408.29	1.38	12.63
407.56	0.27	0.17	407.93	0.96	4.48	408.30	1.39	12.91
407.57	0.30	0.21	407.94	0.97	4.66	408.31	1.40	13.19
407.58	0.33	0.27	407.95	0.99	4.84	408.32	1.41	13.47
407.59	0.35	0.33	407.96	1.00	5.02	408.33	1.42	13.76
407.60	0.38	0.39	407.97	1.01	5.21	408.34	1.43	14.04
407.61	0.40	0.45	407.98	1.03	5.40	408.35	1.44	14.33
407.62	0.43	0.53	407.99	1.04	5.59	408.36	1.45	14.63
407.63	0.45	0.60	408.00	1.05	5.79	408.37	1.46	14.92
407.64	0.47	0.68	408.01	1.06	5.98	408.38	1.47	15.22
407.65	0.49	0.76	408.02	1.08	6.19	408.39	1.48	15.52
407.66	0.52	0.85	408.03	1.09	6.39	408.40	1.49	15.82
407.67	0.54	0.94	408.04	1.10	6.59	408.41	1.50	16.13
407.68	0.56	1.04	408.05	1.11	6.80	408.42	1.51	16.43
407.69	0.58	1.13	408.06	1.13	7.02	408.43	1.52	16.74
407.70	0.59	1.24	408.07	1.14	7.23	408.44	1.53	17.06
407.71	0.61	1.34	408.08	1.15	7.45	408.45	1.54	17.37
407.72	0.63	1.45	408.09	1.16	7.67	408.46	1.55	17.69
407.73	0.65	1.56	408.10	1.17	7.89	408.47	1.56	18.01
407.74	0.67	1.68	408.11	1.19	8.12	408.48	1.56	18.34
407.75	0.68	1.80	408.12	1.20	8.34	408.49	1.57	18.66
407.76	0.70	1.92	408.13	1.21	8.57	408.50	**1.58**	**18.99**
407.77	0.72	2.05	408.14	1.22	8.81			
407.78	0.74	2.18	408.15	1.23	9.04			
407.79	0.75	2.31	408.16	1.24	9.28			
407.80	0.77	2.44	408.17	1.25	9.53			
407.81	0.78	2.58	408.18	1.26	9.77			
407.82	0.80	2.72	408.19	1.28	10.02			
407.83	0.82	2.87	408.20	1.29	10.27			
407.84	0.83	3.02	408.21	1.30	10.52			
407.85	0.85	3.17	408.22	1.31	10.77			
407.86	0.86	3.32	408.23	1.32	11.03			

Stage-Area-Storage for Reach R-2: R-2

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
407.50	0.0	0	407.87	4.0	6,823	408.24	8.5	14,586
407.51	0.1	172	407.88	4.1	7,020	408.25	8.6	14,809
407.52	0.2	345	407.89	4.2	7,219	408.26	8.8	15,033
407.53	0.3	518	407.90	4.3	7,417	408.27	8.9	15,257
407.54	0.4	692	407.91	4.4	7,617	408.28	9.0	15,482
407.55	0.5	867	407.92	4.6	7,817	408.29	9.1	15,707
407.56	0.6	1,043	407.93	4.7	8,018	408.30	9.3	15,934
407.57	0.7	1,219	407.94	4.8	8,220	408.31	9.4	16,161
407.58	0.8	1,396	407.95	4.9	8,422	408.32	9.5	16,388
407.59	0.9	1,573	407.96	5.0	8,625	408.33	9.7	16,617
407.60	1.0	1,751	407.97	5.1	8,828	408.34	9.8	16,846
407.61	1.1	1,930	407.98	5.3	9,033	408.35	9.9	17,076
407.62	1.2	2,110	407.99	5.4	9,238	408.36	10.1	17,306
407.63	1.3	2,290	408.00	5.5	9,444	408.37	10.2	17,537
407.64	1.4	2,471	408.01	5.6	9,650	408.38	10.3	17,769
407.65	1.5	2,653	408.02	5.7	9,857	408.39	10.5	18,001
407.66	1.7	2,835	408.03	5.9	10,065	408.40	10.6	18,235
407.67	1.8	3,018	408.04	6.0	10,273	408.41	10.8	18,468
407.68	1.9	3,202	408.05	6.1	10,482	408.42	10.9	18,703
407.69	2.0	3,386	408.06	6.2	10,692	408.43	11.0	18,938
407.70	2.1	3,571	408.07	6.3	10,903	408.44	11.2	19,174
407.71	2.2	3,757	408.08	6.5	11,114	408.45	11.3	19,411
407.72	2.3	3,944	408.09	6.6	11,326	408.46	11.4	19,648
407.73	2.4	4,131	408.10	6.7	11,538	408.47	11.6	19,886
407.74	2.5	4,319	408.11	6.8	11,751	408.48	11.7	20,125
407.75	2.6	4,507	408.12	7.0	11,965	408.49	11.9	20,364
407.76	2.7	4,696	408.13	7.1	12,180	408.50	**12.0**	**20,604**
407.77	2.8	4,886	408.14	7.2	12,395			
407.78	3.0	5,077	408.15	7.3	12,611			
407.79	3.1	5,268	408.16	7.5	12,828			
407.80	3.2	5,460	408.17	7.6	13,045			
407.81	3.3	5,653	408.18	7.7	13,263			
407.82	3.4	5,846	408.19	7.9	13,482			
407.83	3.5	6,040	408.20	8.0	13,702			
407.84	3.6	6,235	408.21	8.1	13,922			
407.85	3.7	6,430	408.22	8.2	14,143			
407.86	3.9	6,626	408.23	8.4	14,364			

Summary for Reach R-3: R-3

Inflow Area = 64.350 ac, 7.27% Impervious, Inflow Depth > 5.31" for 100-yr event
Inflow = 141.66 cfs @ 12.79 hrs, Volume= 28.486 af
Outflow = 140.77 cfs @ 12.89 hrs, Volume= 28.409 af, Atten= 1%, Lag= 6.0 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.53 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.87 fps, Avg. Travel Time= 5.4 min

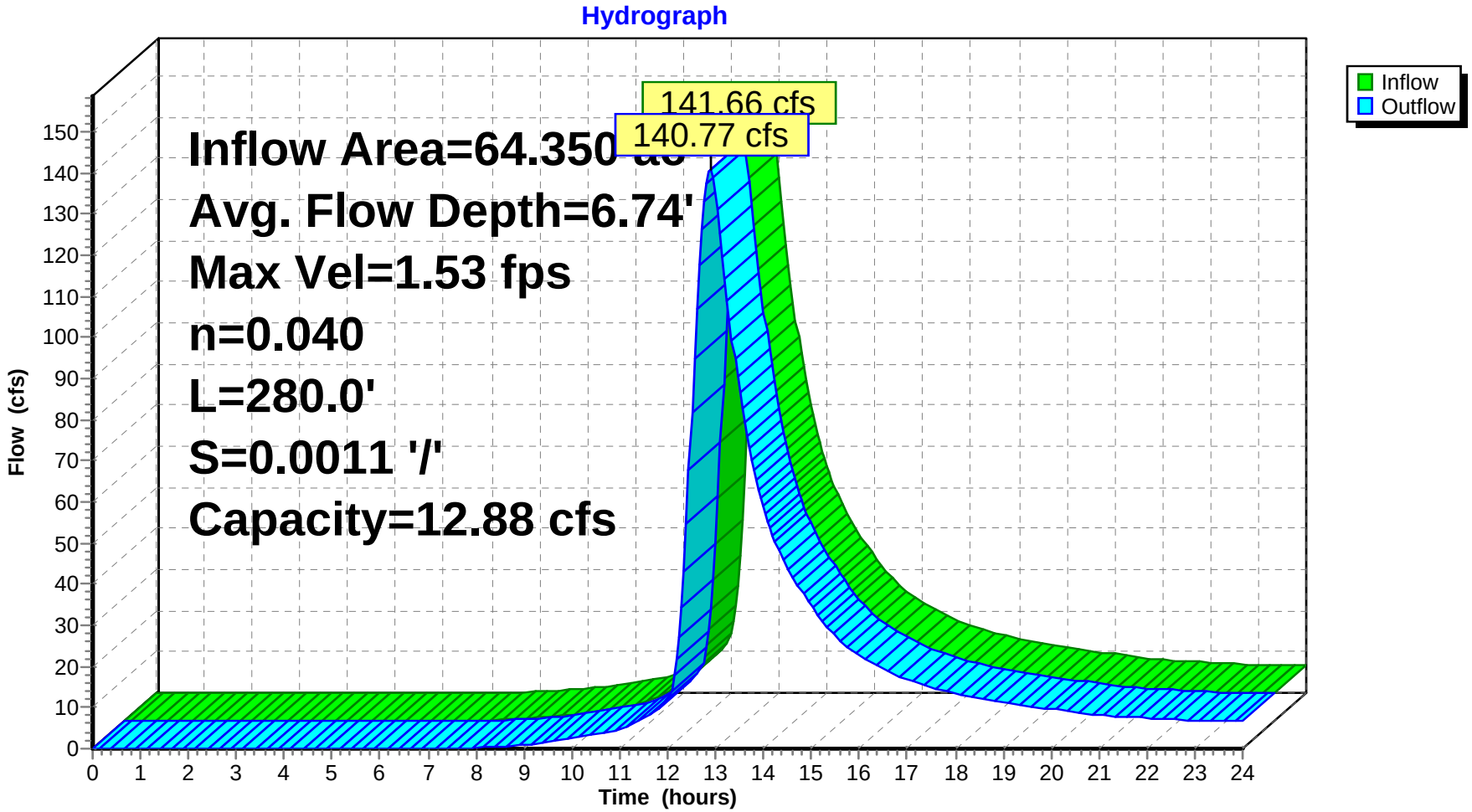
Peak Storage= 25,812 cf @ 12.84 hrs
Average Depth at Peak Storage= 6.74' , Surface Width= 36.94'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'



‡

Reach R-3: R-3


Hydrograph
Inflow
Outflow
141.66 cfs
140.77 cfs
Inflow Area=64.350 ac
Avg. Flow Depth=6.74'
Max Vel=1.53 fps
n=0.040
L=280.0'
S=0.0011 '/'
Capacity=12.88 cfs
Flow (cfs)
Time (hours)
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-3: R-3

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.50	0.00	0.00	403.87	0.59	2.36	404.24	0.90	7.66
403.51	0.06	0.01	403.88	0.60	2.47	404.25	0.91	7.84
403.52	0.09	0.02	403.89	0.61	2.58	404.26	0.92	8.02
403.53	0.12	0.04	403.90	0.62	2.69	404.27	0.92	8.20
403.54	0.14	0.06	403.91	0.63	2.80	404.28	0.93	8.38
403.55	0.16	0.08	403.92	0.64	2.92	404.29	0.94	8.57
403.56	0.18	0.11	403.93	0.65	3.04	404.30	0.94	8.76
403.57	0.20	0.14	403.94	0.66	3.16	404.31	0.95	8.95
403.58	0.22	0.18	403.95	0.67	3.28	404.32	0.96	9.14
403.59	0.24	0.22	403.96	0.68	3.41	404.33	0.96	9.33
403.60	0.26	0.26	403.97	0.69	3.53	404.34	0.97	9.52
403.61	0.27	0.31	403.98	0.70	3.66	404.35	0.98	9.72
403.62	0.29	0.36	403.99	0.70	3.79	404.36	0.98	9.92
403.63	0.31	0.41	404.00	0.71	3.92	404.37	0.99	10.12
403.64	0.32	0.46	404.01	0.72	4.06	404.38	1.00	10.32
403.65	0.34	0.52	404.02	0.73	4.19	404.39	1.00	10.52
403.66	0.35	0.58	404.03	0.74	4.33	404.40	1.01	10.73
403.67	0.36	0.64	404.04	0.75	4.47	404.41	1.02	10.94
403.68	0.38	0.70	404.05	0.76	4.61	404.42	1.02	11.14
403.69	0.39	0.77	404.06	0.76	4.76	404.43	1.03	11.36
403.70	0.40	0.84	404.07	0.77	4.90	404.44	1.04	11.57
403.71	0.42	0.91	404.08	0.78	5.05	404.45	1.04	11.78
403.72	0.43	0.98	404.09	0.79	5.20	404.46	1.05	12.00
403.73	0.44	1.06	404.10	0.80	5.35	404.47	1.05	12.22
403.74	0.45	1.14	404.11	0.80	5.50	404.48	1.06	12.43
403.75	0.46	1.22	404.12	0.81	5.66	404.49	1.07	12.66
403.76	0.48	1.30	404.13	0.82	5.81	404.50	**1.07**	**12.88**
403.77	0.49	1.39	404.14	0.83	5.97			
403.78	0.50	1.48	404.15	0.84	6.13			
403.79	0.51	1.56	404.16	0.84	6.30			
403.80	0.52	1.66	404.17	0.85	6.46			
403.81	0.53	1.75	404.18	0.86	6.63			
403.82	0.54	1.85	404.19	0.87	6.79			
403.83	0.55	1.94	404.20	0.87	6.96			
403.84	0.56	2.05	404.21	0.88	7.13			
403.85	0.57	2.15	404.22	0.89	7.31			
403.86	0.58	2.25	404.23	0.89	7.48			

Stage-Area-Storage for Reach R-3: R-3

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.50	0.0	0	403.87	4.0	1,113	404.24	8.5	2,379
403.51	0.1	28	403.88	4.1	1,145	404.25	8.6	2,415
403.52	0.2	56	403.89	4.2	1,177	404.26	8.8	2,451
403.53	0.3	85	403.90	4.3	1,210	404.27	8.9	2,488
403.54	0.4	113	403.91	4.4	1,242	404.28	9.0	2,525
403.55	0.5	141	403.92	4.6	1,275	404.29	9.1	2,561
403.56	0.6	170	403.93	4.7	1,308	404.30	9.3	2,598
403.57	0.7	199	403.94	4.8	1,340	404.31	9.4	2,635
403.58	0.8	228	403.95	4.9	1,373	404.32	9.5	2,673
403.59	0.9	257	403.96	5.0	1,406	404.33	9.7	2,710
403.60	1.0	286	403.97	5.1	1,440	404.34	9.8	2,747
403.61	1.1	315	403.98	5.3	1,473	404.35	9.9	2,785
403.62	1.2	344	403.99	5.4	1,506	404.36	10.1	2,822
403.63	1.3	373	404.00	5.5	1,540	404.37	10.2	2,860
403.64	1.4	403	404.01	5.6	1,574	404.38	10.3	2,898
403.65	1.5	433	404.02	5.7	1,607	404.39	10.5	2,936
403.66	1.7	462	404.03	5.9	1,641	404.40	10.6	2,974
403.67	1.8	492	404.04	6.0	1,675	404.41	10.8	3,012
403.68	1.9	522	404.05	6.1	1,709	404.42	10.9	3,050
403.69	2.0	552	404.06	6.2	1,744	404.43	11.0	3,088
403.70	2.1	582	404.07	6.3	1,778	404.44	11.2	3,127
403.71	2.2	613	404.08	6.5	1,812	404.45	11.3	3,165
403.72	2.3	643	404.09	6.6	1,847	404.46	11.4	3,204
403.73	2.4	674	404.10	6.7	1,882	404.47	11.6	3,243
403.74	2.5	704	404.11	6.8	1,916	404.48	11.7	3,282
403.75	2.6	735	404.12	7.0	1,951	404.49	11.9	3,321
403.76	2.7	766	404.13	7.1	1,986	404.50	**12.0**	**3,360**
403.77	2.8	797	404.14	7.2	2,021			
403.78	3.0	828	404.15	7.3	2,057			
403.79	3.1	859	404.16	7.5	2,092			
403.80	3.2	890	404.17	7.6	2,127			
403.81	3.3	922	404.18	7.7	2,163			
403.82	3.4	953	404.19	7.9	2,199			
403.83	3.5	985	404.20	8.0	2,234			
403.84	3.6	1,017	404.21	8.1	2,270			
403.85	3.7	1,049	404.22	8.2	2,306			
403.86	3.9	1,081	404.23	8.4	2,342			

Summary for Reach R-4: R-4

Inflow Area = 65.410 ac, 8.21% Impervious, Inflow Depth > 5.29" for 100-yr event
Inflow = 141.53 cfs @ 12.89 hrs, Volume= 28.862 af
Outflow = 140.76 cfs @ 12.98 hrs, Volume= 28.797 af, Atten= 1%, Lag= 5.0 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.41 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 4.4 min

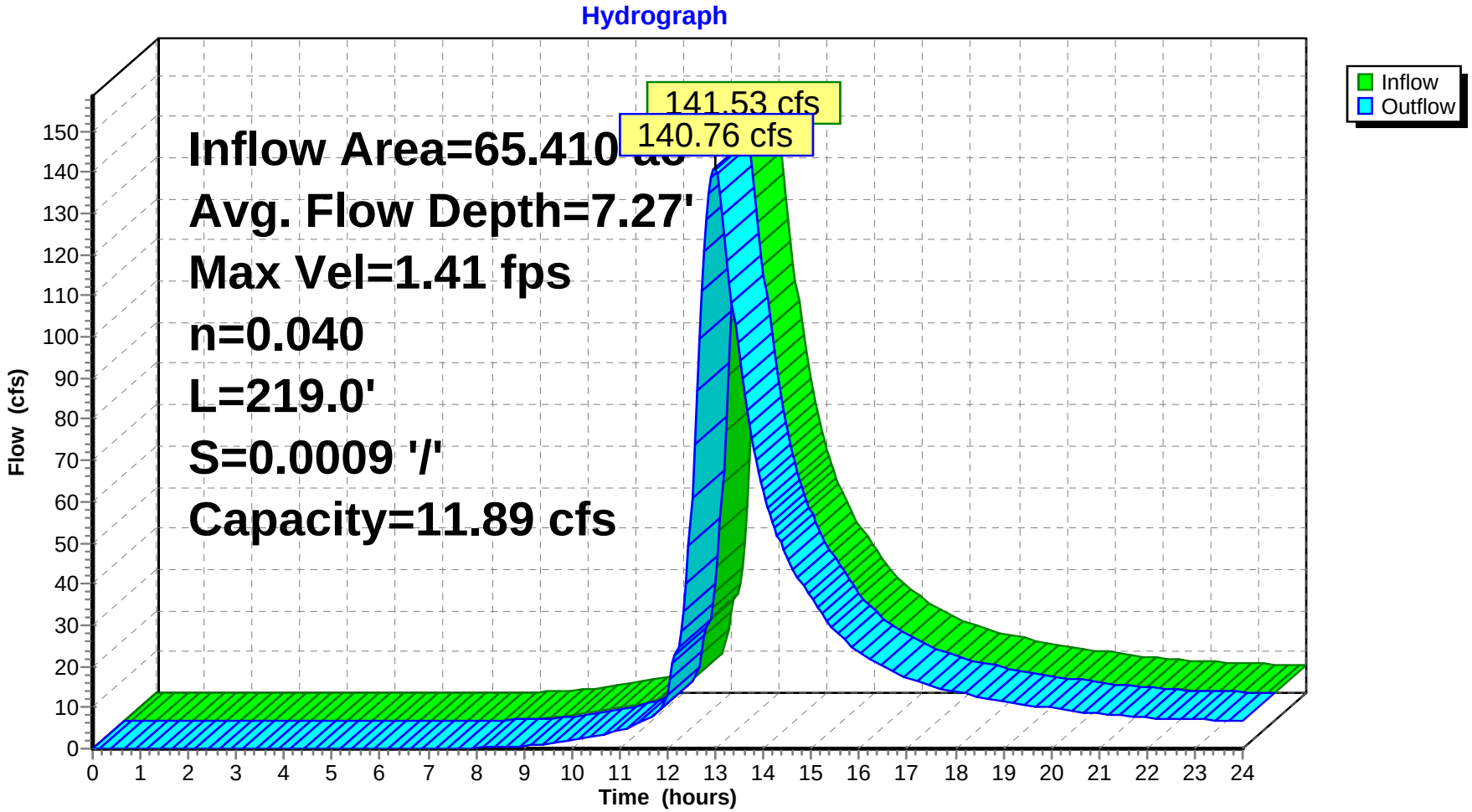
Peak Storage= 21,810 cf @ 12.93 hrs
Average Depth at Peak Storage= 7.27' , Surface Width= 39.06'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'



‡

Reach R-4: R-4


Hydrograph
Inflow
Outflow
141.53 cfs
140.76 cfs
Inflow Area=65.410 ac
Avg. Flow Depth=7.27'
Max Vel=1.41 fps
n=0.040
L=219.0'
S=0.0009 '/'
Capacity=11.89 cfs
Flow (cfs)
Time (hours)
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Stage-Discharge for Reach R-4: R-4

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
403.20	0.00	0.00	403.57	0.55	2.18	403.94	0.83	7.07
403.21	0.05	0.01	403.58	0.56	2.28	403.95	0.84	7.24
403.22	0.08	0.02	403.59	0.57	2.38	403.96	0.85	7.40
403.23	0.11	0.03	403.60	0.57	2.48	403.97	0.85	7.57
403.24	0.13	0.05	403.61	0.58	2.59	403.98	0.86	7.74
403.25	0.15	0.08	403.62	0.59	2.70	403.99	0.86	7.91
403.26	0.17	0.10	403.63	0.60	2.81	404.00	0.87	8.08
403.27	0.19	0.13	403.64	0.61	2.92	404.01	0.88	8.26
403.28	0.21	0.17	403.65	0.62	3.03	404.02	0.88	8.43
403.29	0.22	0.20	403.66	0.63	3.15	404.03	0.89	8.61
403.30	0.24	0.24	403.67	0.63	3.26	404.04	0.90	8.79
403.31	0.25	0.28	403.68	0.64	3.38	404.05	0.90	8.97
403.32	0.27	0.33	403.69	0.65	3.50	404.06	0.91	9.16
403.33	0.28	0.38	403.70	0.66	3.62	404.07	0.91	9.34
403.34	0.30	0.43	403.71	0.67	3.75	404.08	0.92	9.53
403.35	0.31	0.48	403.72	0.67	3.87	404.09	0.93	9.72
403.36	0.32	0.53	403.73	0.68	4.00	404.10	0.93	9.91
403.37	0.34	0.59	403.74	0.69	4.13	404.11	0.94	10.10
403.38	0.35	0.65	403.75	0.70	4.26	404.12	0.94	10.29
403.39	0.36	0.71	403.76	0.71	4.39	404.13	0.95	10.48
403.40	0.37	0.77	403.77	0.71	4.53	404.14	0.96	10.68
403.41	0.38	0.84	403.78	0.72	4.66	404.15	0.96	10.88
403.42	0.40	0.91	403.79	0.73	4.80	404.16	0.97	11.08
403.43	0.41	0.98	403.80	0.74	4.94	404.17	0.97	11.28
403.44	0.42	1.05	403.81	0.74	5.08	404.18	0.98	11.48
403.45	0.43	1.13	403.82	0.75	5.22	404.19	0.99	11.68
403.46	0.44	1.20	403.83	0.76	5.37	404.20	**0.99**	**11.89**
403.47	0.45	1.28	403.84	0.76	5.51			
403.48	0.46	1.36	403.85	0.77	5.66			
403.49	0.47	1.44	403.86	0.78	5.81			
403.50	0.48	1.53	403.87	0.78	5.96			
403.51	0.49	1.62	403.88	0.79	6.12			
403.52	0.50	1.70	403.89	0.80	6.27			
403.53	0.51	1.80	403.90	0.81	6.43			
403.54	0.52	1.89	403.91	0.81	6.59			
403.55	0.53	1.98	403.92	0.82	6.75			
403.56	0.54	2.08	403.93	0.83	6.91			

Stage-Area-Storage for Reach R-4: R-4

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)	Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
403.20	0.0	0	403.57	4.0	870	403.94	8.5	1,860
403.21	0.1	22	403.58	4.1	895	403.95	8.6	1,889
403.22	0.2	44	403.59	4.2	921	403.96	8.8	1,917
403.23	0.3	66	403.60	4.3	946	403.97	8.9	1,946
403.24	0.4	88	403.61	4.4	972	403.98	9.0	1,975
403.25	0.5	111	403.62	4.6	997	403.99	9.1	2,003
403.26	0.6	133	403.63	4.7	1,023	404.00	9.3	2,032
403.27	0.7	155	403.64	4.8	1,048	404.01	9.4	2,061
403.28	0.8	178	403.65	4.9	1,074	404.02	9.5	2,090
403.29	0.9	201	403.66	5.0	1,100	404.03	9.7	2,119
403.30	1.0	223	403.67	5.1	1,126	404.04	9.8	2,149
403.31	1.1	246	403.68	5.3	1,152	404.05	9.9	2,178
403.32	1.2	269	403.69	5.4	1,178	404.06	10.1	2,207
403.33	1.3	292	403.70	5.5	1,205	404.07	10.2	2,237
403.34	1.4	315	403.71	5.6	1,231	404.08	10.3	2,266
403.35	1.5	338	403.72	5.7	1,257	404.09	10.5	2,296
403.36	1.7	362	403.73	5.9	1,284	404.10	10.6	2,326
403.37	1.8	385	403.74	6.0	1,310	404.11	10.8	2,356
403.38	1.9	408	403.75	6.1	1,337	404.12	10.9	2,386
403.39	2.0	432	403.76	6.2	1,364	404.13	11.0	2,416
403.40	2.1	456	403.77	6.3	1,391	404.14	11.2	2,446
403.41	2.2	479	403.78	6.5	1,418	404.15	11.3	2,476
403.42	2.3	503	403.79	6.6	1,445	404.16	11.4	2,506
403.43	2.4	527	403.80	6.7	1,472	404.17	11.6	2,536
403.44	2.5	551	403.81	6.8	1,499	404.18	11.7	2,567
403.45	2.6	575	403.82	7.0	1,526	404.19	11.9	2,597
403.46	2.7	599	403.83	7.1	1,554	404.20	**12.0**	**2,628**
403.47	2.8	623	403.84	7.2	1,581			
403.48	3.0	648	403.85	7.3	1,609			
403.49	3.1	672	403.86	7.5	1,636			
403.50	3.2	696	403.87	7.6	1,664			
403.51	3.3	721	403.88	7.7	1,692			
403.52	3.4	746	403.89	7.9	1,720			
403.53	3.5	770	403.90	8.0	1,748			
403.54	3.6	795	403.91	8.1	1,776			
403.55	3.7	820	403.92	8.2	1,804			
403.56	3.9	845	403.93	8.4	1,832			

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 5.66" for 100-yr event
Inflow = 92.48 cfs @ 12.16 hrs, Volume= 7.602 af
Outflow = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af, Atten= 71%, Lag= 24.6 min
Primary = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 445.91' @ 12.57 hrs Surf.Area= 38,011 sf Storage= 118,084 cf

Plug-Flow detention time= 59.8 min calculated for 7.432 af (98% of inflow)
Center-of-Mass det. time= 47.8 min (866.7 - 818.9)

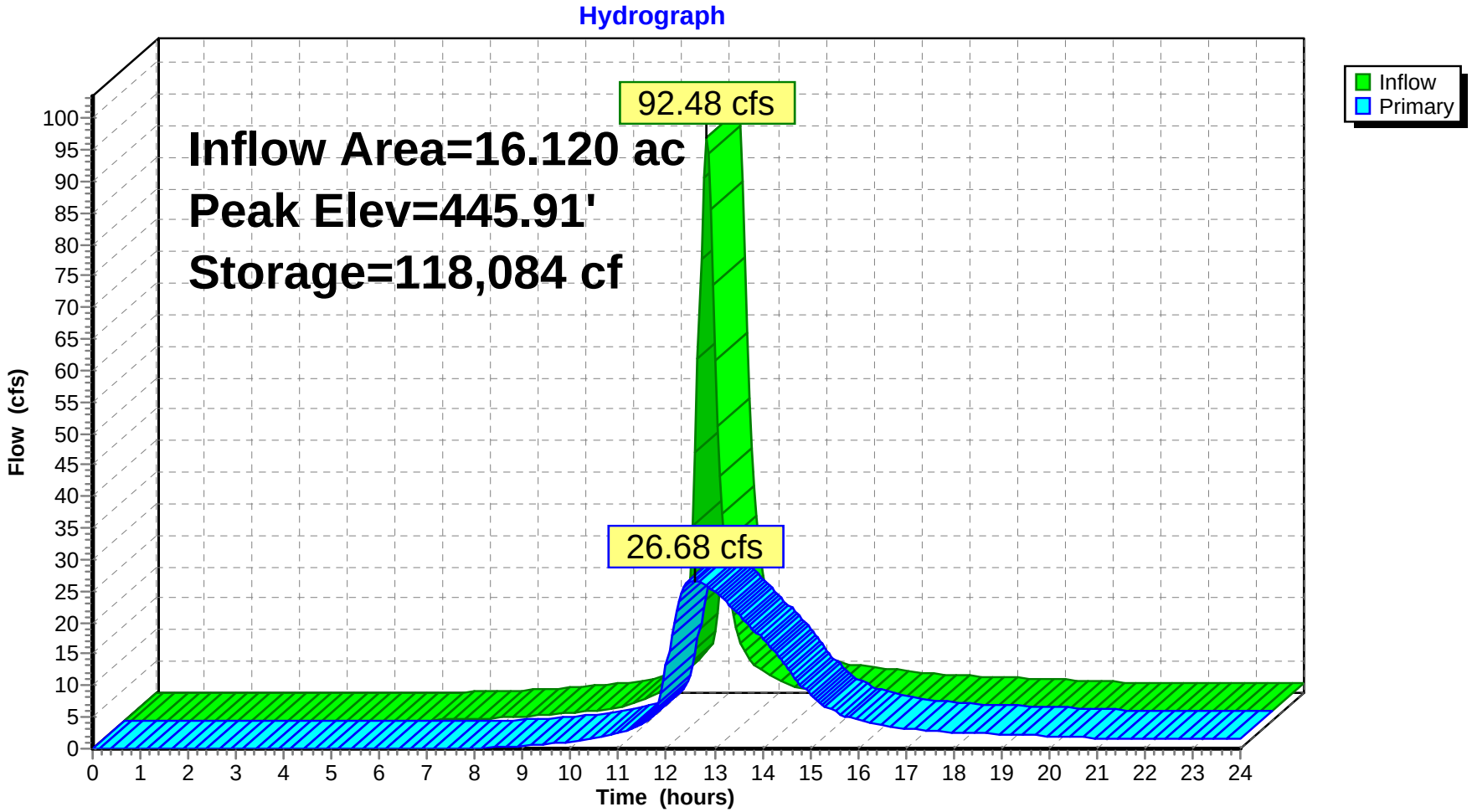
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=26.67 cfs @ 12.57 hrs HW=445.91' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 26.67 cfs @ 8.49 fps)
  ├**2=Sharp-Crested Vee/Trap Weir** (Passes < 79.87 cfs potential flow)
  ├**3=Orifice/Grate** (Passes < 7.76 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Stage-Discharge for Pond Pond 1b: Pond 1b

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
441.50	0.00	443.35	11.07	445.20	23.43	447.05	31.18	448.90	37.36
441.55	0.00	443.40	11.60	445.25	23.68	447.10	31.37	448.95	37.51
441.60	0.00	443.45	12.12	445.30	23.92	447.15	31.55	449.00	37.67
441.65	0.00	443.50	12.63	445.35	24.16	447.20	31.73	449.05	37.82
441.70	0.00	443.55	13.13	445.40	24.39	447.25	31.91	449.10	37.97
441.75	0.00	443.60	13.60	445.45	24.62	447.30	32.09	449.15	38.12
441.80	0.00	443.65	14.05	445.50	24.86	447.35	32.27	449.20	38.27
441.85	0.02	443.70	14.47	445.55	25.08	447.40	32.44	449.25	38.42
441.90	0.06	443.75	14.84	445.60	25.31	447.45	32.62	449.30	38.57
441.95	0.14	443.80	15.13	445.65	25.54	447.50	32.79	449.35	38.71
442.00	0.25	443.85	15.50	445.70	25.76	447.55	32.97	449.40	38.86
442.05	0.39	443.90	15.87	445.75	25.98	447.60	33.14	449.45	39.01
442.10	0.55	443.95	16.22	445.80	26.20	447.65	33.31	449.50	39.15
442.15	0.74	444.00	16.57	445.85	26.42	447.70	33.48	449.55	39.30
442.20	0.96	444.05	16.91	445.90	26.63	447.75	33.65	449.60	39.45
442.25	1.21	444.10	17.25	445.95	26.85	447.80	33.82	449.65	39.59
442.30	1.48	444.15	17.58	446.00	27.06	447.85	33.99	449.70	39.73
442.35	1.77	444.20	17.90	446.05	27.27	447.90	34.16	449.75	39.88
442.40	2.09	444.25	18.21	446.10	27.48	447.95	34.33	449.80	40.02
442.45	2.43	444.30	18.53	446.15	27.69	448.00	34.49	449.85	40.16
442.50	2.79	444.35	18.83	446.20	27.89	448.05	34.66	449.90	40.31
442.55	3.17	444.40	19.13	446.25	28.10	448.10	34.82	449.95	40.45
442.60	3.57	444.45	19.43	446.30	28.30	448.15	34.99	450.00	40.59
442.65	3.99	444.50	19.72	446.35	28.50	448.20	35.15	450.05	40.73
442.70	4.43	444.55	20.01	446.40	28.70	448.25	35.31	450.10	40.87
442.75	4.88	444.60	20.29	446.45	28.90	448.30	35.48	450.15	41.01
442.80	5.35	444.65	20.57	446.50	29.10	448.35	35.64	450.20	41.15
442.85	5.83	444.70	20.85	446.55	29.29	448.40	35.80	450.25	41.29
442.90	6.32	444.75	21.12	446.60	29.49	448.45	35.96	450.30	41.43
442.95	6.83	444.80	21.39	446.65	29.68	448.50	36.11	450.35	41.56
443.00	7.34	444.85	21.66	446.70	29.87	448.55	36.27	450.40	41.70
443.05	7.86	444.90	21.92	446.75	30.06	448.60	36.43	450.45	41.84
443.10	8.39	444.95	22.18	446.80	30.25	448.65	36.59	450.50	41.97
443.15	8.93	445.00	22.44	446.85	30.44	448.70	36.74	450.55	**42.11**
443.20	9.46	445.05	22.69	446.90	30.63	448.75	36.90		
443.25	10.00	445.10	22.94	446.95	30.82	448.80	37.05		
443.30	10.54	445.15	23.19	447.00	31.00	448.85	37.21		

Stage-Area-Storage for Pond Pond 1b: Pond 1b

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
441.50	1,192	0
441.60	3,108	215
441.70	5,024	622
441.80	6,940	1,220
441.90	8,856	2,010
442.00	10,772	2,991
442.10	11,973	4,128
442.20	13,174	5,386
442.30	14,375	6,763
442.40	15,576	8,261
442.50	16,778	9,878
442.60	17,979	11,616
442.70	19,180	13,474
442.80	20,381	15,452
442.90	21,582	17,550
443.00	22,783	19,769
443.10	23,984	22,107
443.20	25,185	24,565
443.30	26,386	27,144
443.40	27,587	29,843
443.50	28,789	32,661
443.60	29,990	35,600
443.70	31,191	38,659
443.80	32,392	41,838
443.90	33,593	45,138
444.00	34,794	48,557
444.10	34,962	52,045
444.20	35,131	55,549
444.30	35,299	59,071
444.40	35,468	62,609
444.50	35,636	66,165
444.60	35,805	69,737
444.70	35,973	73,326
444.80	36,142	76,931
444.90	36,310	80,554
445.00	36,479	84,193
445.10	36,647	87,850
445.20	36,815	91,523
445.30	36,984	95,213
445.40	37,152	98,919
445.50	37,321	102,643
445.60	37,489	106,384
445.70	37,658	110,141
445.80	37,826	113,915
445.90	37,995	117,706
446.00	38,163	121,514
446.10	38,674	125,356
446.20	39,185	129,249
446.30	39,696	133,193
446.40	40,207	137,188
446.50	**40,718**	**141,234**
446.60	40,718	141,234
446.70	40,718	141,234
446.80	40,718	141,234
446.90	40,718	141,234
447.00	40,718	141,234
447.10	40,718	141,234
447.20	40,718	141,234
447.30	40,718	141,234
447.40	40,718	141,234
447.50	40,718	141,234
447.60	40,718	141,234
447.70	40,718	141,234
447.80	40,718	141,234
447.90	40,718	141,234
448.00	40,718	141,234
448.10	40,718	141,234
448.20	40,718	141,234
448.30	40,718	141,234
448.40	40,718	141,234
448.50	40,718	141,234
448.60	40,718	141,234
448.70	40,718	141,234
448.80	40,718	141,234
448.90	40,718	141,234
449.00	40,718	141,234
449.10	40,718	141,234
449.20	40,718	141,234
449.30	40,718	141,234
449.40	40,718	141,234
449.50	40,718	141,234
449.60	40,718	141,234
449.70	40,718	141,234
449.80	40,718	141,234
449.90	40,718	141,234
450.00	40,718	141,234
450.10	40,718	141,234
450.20	40,718	141,234
450.30	40,718	141,234
450.40	40,718	141,234
450.50	40,718	141,234

Summary for Pond Pond 1c: Pond 1c

Inflow Area = 10.480 ac, 0.00% Impervious, Inflow Depth > 6.10" for 100-yr event
Inflow = 39.84 cfs @ 12.47 hrs, Volume= 5.331 af
Outflow = 33.74 cfs @ 12.67 hrs, Volume= 5.043 af, Atten= 15%, Lag= 12.4 min
Primary = 33.74 cfs @ 12.67 hrs, Volume= 5.043 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.98' @ 12.67 hrs Surf.Area= 11,086 sf Storage= 41,037 cf

Plug-Flow detention time= 62.1 min calculated for 5.043 af (95% of inflow)
Center-of-Mass det. time= 33.1 min (863.0 - 830.0)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

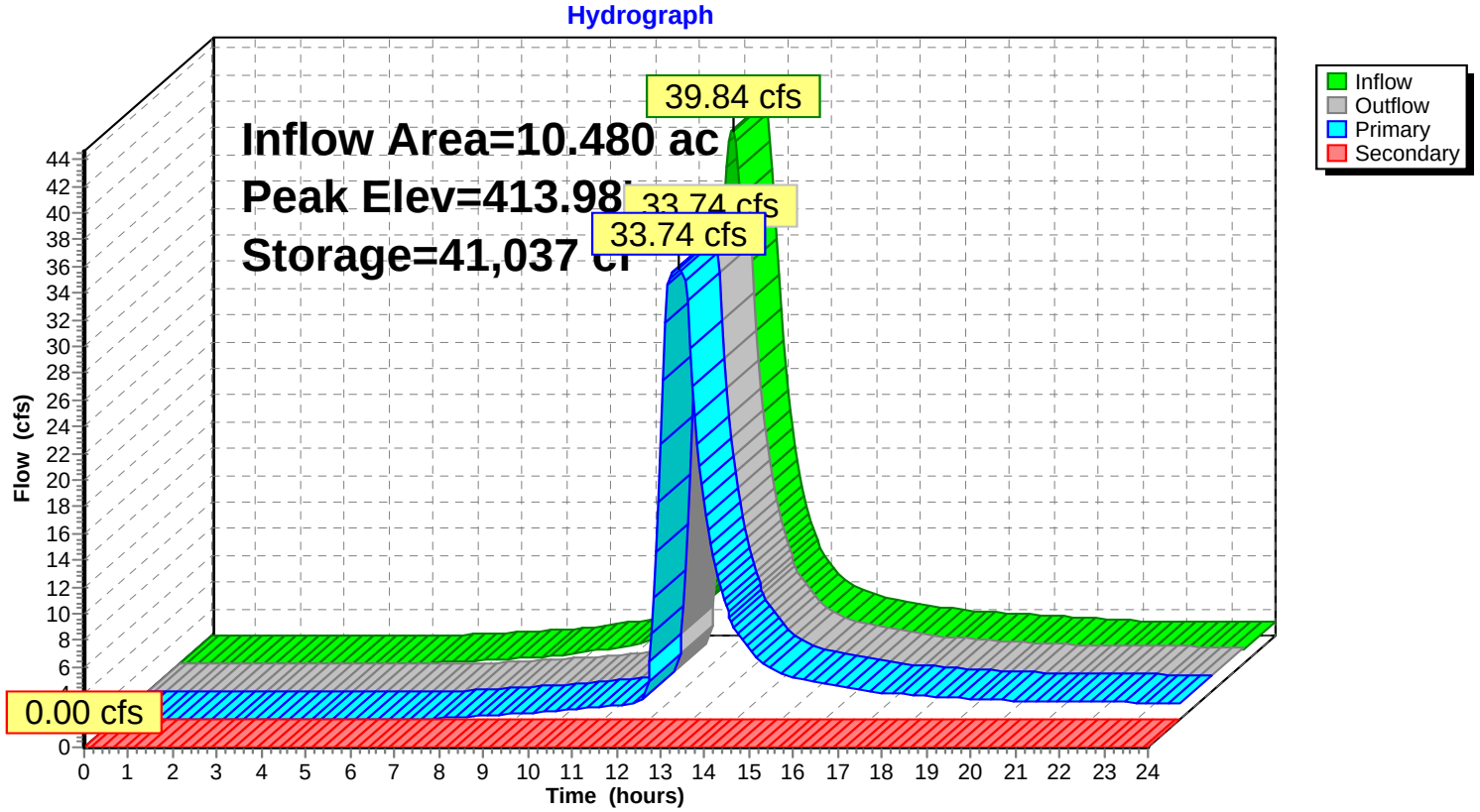
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	409.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	411.30'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

Primary OutFlow Max=33.73 cfs @ 12.67 hrs HW=413.97' (Free Discharge)
└─**1=Culvert** (Inlet Controls 33.73 cfs @ 10.74 fps)
  └─**2=Orifice/Grate** (Passes < 2.05 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 34.60 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 5.22 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1c: Pond 1c



Stage-Discharge for Pond Pond 1c: Pond 1c

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
409.00	0.00	0.00	0.00
409.10	0.03	0.03	0.00
409.20	0.11	0.11	0.00
409.30	0.23	0.23	0.00
409.40	0.36	0.36	0.00
409.50	0.47	0.47	0.00
409.60	0.56	0.56	0.00
409.70	0.63	0.63	0.00
409.80	0.70	0.70	0.00
409.90	0.76	0.76	0.00
410.00	0.82	0.82	0.00
410.10	0.87	0.87	0.00
410.20	0.92	0.92	0.00
410.30	0.97	0.97	0.00
410.40	1.01	1.01	0.00
410.50	1.06	1.06	0.00
410.60	1.10	1.10	0.00
410.70	1.14	1.14	0.00
410.80	1.18	1.18	0.00
410.90	1.21	1.21	0.00
411.00	1.25	1.25	0.00
411.10	1.29	1.29	0.00
411.20	1.32	1.32	0.00
411.30	1.35	1.35	0.00
411.40	1.60	1.60	0.00
411.50	2.02	2.02	0.00
411.60	2.57	2.57	0.00
411.70	3.22	3.22	0.00
411.80	3.98	3.98	0.00
411.90	4.82	4.82	0.00
412.00	5.74	5.74	0.00
412.10	6.74	6.74	0.00
412.20	7.82	7.82	0.00
412.30	8.98	8.98	0.00
412.40	10.20	10.20	0.00
412.50	11.49	11.49	0.00
412.60	12.85	12.85	0.00
412.70	14.26	14.26	0.00
412.80	15.74	15.74	0.00
412.90	17.28	17.28	0.00
413.00	18.87	18.87	0.00
413.10	20.68	20.68	0.00
413.20	22.69	22.69	0.00
413.30	24.84	24.84	0.00
413.40	27.11	27.11	0.00
413.50	29.48	29.48	0.00
413.60	31.96	31.96	0.00
413.70	32.79	32.79	0.00
413.80	33.14	33.14	0.00
413.90	33.48	33.48	0.00
414.00	33.82	33.82	0.00
414.10	35.83	34.16	1.67
414.20	39.22	34.49	4.72
414.30	43.55	34.82	8.73
414.40	48.66	35.15	13.51
414.50	54.46	35.48	18.99
414.60	60.89	35.80	25.10
414.70	67.45	36.11	31.33
414.80	74.35	36.43	37.92
414.90	81.91	36.74	45.17
415.00	89.85	37.05	52.80
415.10	98.39	37.36	61.03
415.20	107.34	37.67	69.67
415.30	116.53	37.97	78.56
415.40	126.06	38.27	87.79
415.50	135.57	38.57	97.00
415.60	145.32	38.86	106.45
415.70	155.74	39.15	116.59
415.80	166.47	39.45	127.03
415.90	177.49	39.73	137.76
416.00	188.80	40.02	148.78
416.10	**200.38**	**40.31**	**160.07**

Stage-Area-Storage for Pond Pond 1c: Pond 1c

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	5,642	0	412.70	9,566	27,862
409.10	5,738	569	412.80	9,685	28,824
409.20	5,834	1,148	412.90	9,804	29,799
409.30	5,930	1,736	413.00	9,924	30,785
409.40	6,026	2,334	413.10	10,043	31,784
409.50	6,123	2,941	413.20	10,162	32,794
409.60	6,219	3,558	413.30	10,281	33,816
409.70	6,315	4,185	413.40	10,400	34,850
409.80	6,411	4,821	413.50	10,519	35,896
409.90	6,507	5,467	413.60	10,638	36,954
410.00	6,603	6,123	413.70	10,758	38,024
410.10	6,709	6,788	413.80	10,877	39,105
410.20	6,816	7,464	413.90	10,996	40,199
410.30	6,922	8,151	414.00	11,115	41,305
410.40	7,029	8,849	414.10	11,242	42,422
410.50	7,135	9,557	414.20	11,369	43,553
410.60	7,242	10,276	414.30	11,495	44,696
410.70	7,348	11,005	414.40	11,622	45,852
410.80	7,455	11,746	414.50	11,749	47,021
410.90	7,561	12,496	414.60	11,876	48,202
411.00	7,668	13,258	414.70	12,003	49,396
411.10	7,774	14,030	414.80	12,129	50,602
411.20	7,880	14,813	414.90	12,256	51,822
411.30	7,987	15,606	415.00	**12,383**	**53,054**
411.40	8,093	16,410	415.10	12,383	53,054
411.50	8,200	17,225	415.20	12,383	53,054
411.60	8,306	18,050	415.30	12,383	53,054
411.70	8,413	18,886	415.40	12,383	53,054
411.80	8,519	19,732	415.50	12,383	53,054
411.90	8,626	20,590	415.60	12,383	53,054
412.00	8,732	21,458	415.70	12,383	53,054
412.10	8,851	22,337	415.80	12,383	53,054
412.20	8,970	23,228	415.90	12,383	53,054
412.30	9,089	24,131	416.00	12,383	53,054
412.40	9,209	25,046	416.10	12,383	53,054
412.50	9,328	25,972			
412.60	9,447	26,911			

Summary for Pond Pond 1d: Pond 1d

Inflow Area = 14.820 ac, 1.55% Impervious, Inflow Depth > 6.08" for 100-yr event
Inflow = 49.86 cfs @ 12.55 hrs, Volume= 7.512 af
Outflow = 17.71 cfs @ 13.34 hrs, Volume= 5.927 af, Atten= 64%, Lag= 47.2 min
Primary = 17.71 cfs @ 13.34 hrs, Volume= 5.927 af
Routed to Reach R-3 : R-3
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 415.62' @ 13.34 hrs Surf.Area= 32,775 sf Storage= 161,591 cf

Plug-Flow detention time= 201.3 min calculated for 5.915 af (79% of inflow)
Center-of-Mass det. time= 124.4 min (959.6 - 835.2)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	209,097 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	33,677	62,593	174,187
417.00	36,142	34,910	209,097

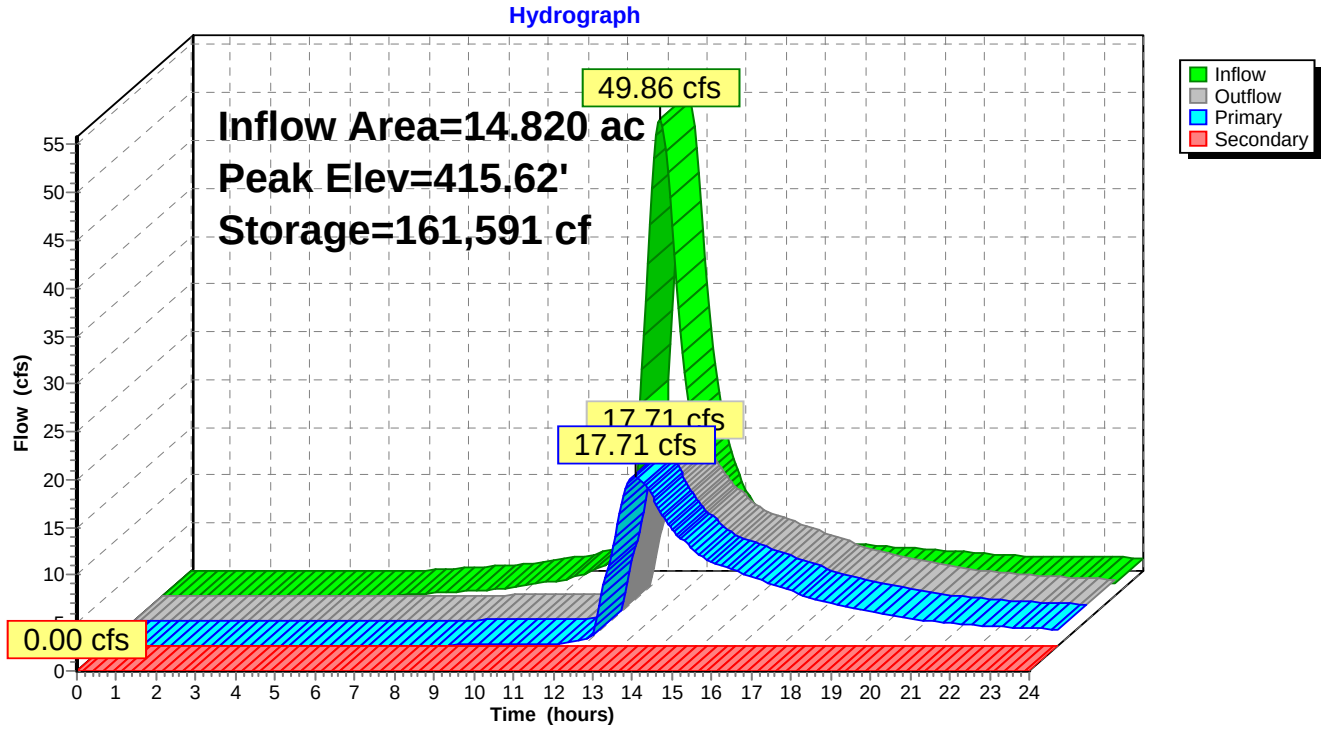
Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 235.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 406.00' S= 0.0085 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 3.14 sf
#2	Device 1	408.00'	**2.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	410.00'	**4.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	412.00'	**1.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 2.0' Crest Height
#5	Device 1	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Secondary	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir**

Head (feet)	0.20	0.40	0.60	0.80	1.00	1.20	1.40	1.60
Coef. (English)	2.57	2.62	2.70	2.67	2.66	2.67	2.66	2.64

Primary OutFlow Max=17.69 cfs @ 13.34 hrs HW=415.62' (Free Discharge)
- **1=Culvert** (Passes 17.69 cfs of 38.71 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.29 cfs @ 13.22 fps)
  - **3=Orifice/Grate** (Orifice Controls 0.98 cfs @ 11.24 fps)
  - **4=Sharp-Crested Rectangular Weir** (Weir Controls 13.76 cfs @ 7.60 fps)
  - **5=Orifice/Grate** (Orifice Controls 2.67 cfs @ 2.53 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
- **6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Stage-Discharge for Pond Pond 1d: Pond 1d

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
408.00	0.00	0.00	0.00
408.10	0.01	0.01	0.00
408.20	0.04	0.04	0.00
408.30	0.05	0.05	0.00
408.40	0.06	0.06	0.00
408.50	0.07	0.07	0.00
408.60	0.08	0.08	0.00
408.70	0.08	0.08	0.00
408.80	0.09	0.09	0.00
408.90	0.09	0.09	0.00
409.00	0.10	0.10	0.00
409.10	0.11	0.11	0.00
409.20	0.11	0.11	0.00
409.30	0.12	0.12	0.00
409.40	0.12	0.12	0.00
409.50	0.13	0.13	0.00
409.60	0.13	0.13	0.00
409.70	0.13	0.13	0.00
409.80	0.14	0.14	0.00
409.90	0.14	0.14	0.00
410.00	0.15	0.15	0.00
410.10	0.17	0.17	0.00
410.20	0.24	0.24	0.00
410.30	0.31	0.31	0.00
410.40	0.36	0.36	0.00
410.50	0.41	0.41	0.00
410.60	0.44	0.44	0.00
410.70	0.48	0.48	0.00
410.80	0.51	0.51	0.00
410.90	0.54	0.54	0.00
411.00	0.56	0.56	0.00
411.10	0.59	0.59	0.00
411.20	0.61	0.61	0.00
411.30	0.64	0.64	0.00
411.40	0.66	0.66	0.00
411.50	0.68	0.68	0.00
411.60	0.70	0.70	0.00
411.70	0.72	0.72	0.00
411.80	0.74	0.74	0.00
411.90	0.76	0.76	0.00
412.00	0.78	0.78	0.00
412.10	0.90	0.90	0.00
412.20	1.10	1.10	0.00
412.30	1.34	1.34	0.00
412.40	1.63	1.63	0.00
412.50	1.93	1.93	0.00
412.60	2.27	2.27	0.00
412.70	2.61	2.61	0.00
412.80	2.97	2.97	0.00
412.90	3.34	3.34	0.00
413.00	3.72	3.72	0.00
413.10	4.10	4.10	0.00
413.20	4.48	4.48	0.00
413.30	4.86	4.86	0.00
413.40	5.23	5.23	0.00
413.50	5.60	5.60	0.00
413.60	5.97	5.97	0.00
413.70	6.32	6.32	0.00
413.80	6.66	6.66	0.00
413.90	6.99	6.99	0.00
414.00	7.31	7.31	0.00
414.10	7.60	7.60	0.00
414.20	7.88	7.88	0.00
414.30	8.14	8.14	0.00
414.40	8.38	8.38	0.00
414.50	8.59	8.59	0.00
414.60	9.10	9.10	0.00
414.70	9.62	9.62	0.00
414.80	10.15	10.15	0.00
414.90	10.70	10.70	0.00
415.00	11.25	11.25	0.00
415.10	12.00	12.00	0.00
415.20	12.90	12.90	0.00
415.30	13.91	13.91	0.00
415.40	15.01	15.01	0.00
415.50	16.18	16.18	0.00
415.60	17.43	17.43	0.00
415.70	18.74	18.74	0.00
415.80	20.12	20.12	0.00
415.90	21.56	21.56	0.00
416.00	23.05	23.05	0.00
416.10	27.44	24.59	2.84
416.20	34.24	26.19	8.05
416.30	42.77	27.84	14.92
416.40	52.74	29.54	23.20
416.50	64.21	31.29	32.92
416.60	77.01	33.09	43.92
416.70	89.96	34.93	55.04
416.80	103.68	36.81	66.87
416.90	118.38	38.74	79.64
417.00	133.82	40.72	93.10
417.10	149.91	42.30	107.61
417.20	165.37	42.53	122.84
417.30	181.01	42.76	138.25
417.40	197.21	42.99	154.22
417.50	213.61	43.22	170.39
417.60	230.45	43.44	187.00
417.70	248.48	43.67	204.81
417.80	267.04	43.89	223.14
417.90	286.11	44.12	241.99
418.00	305.69	44.34	261.35
418.10	**325.75**	**44.56**	**281.19**

Stage-Area-Storage for Pond Pond 1d: Pond 1d

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
408.00	800	0	411.70	23,173	51,220	415.40	32,249	154,409
408.10	1,590	120	411.80	23,560	53,557	415.50	32,487	157,646
408.20	2,381	318	411.90	23,946	55,932	415.60	32,725	160,907
408.30	3,171	596	412.00	24,332	58,346	415.70	32,963	164,191
408.40	3,961	952	412.10	24,561	60,791	415.80	33,201	167,499
408.50	4,752	1,388	412.20	24,790	63,258	415.90	33,439	170,831
408.60	5,542	1,903	412.30	25,020	65,749	416.00	33,677	174,187
408.70	6,332	2,496	412.40	25,249	68,262	416.10	33,924	177,567
408.80	7,123	3,169	412.50	25,478	70,799	416.20	34,170	180,972
408.90	7,913	3,921	412.60	25,707	73,358	416.30	34,417	184,401
409.00	8,704	4,752	412.70	25,936	75,940	416.40	34,663	187,855
409.10	9,494	5,662	412.80	26,166	78,545	416.50	34,910	191,334
409.20	10,284	6,651	412.90	26,395	81,173	416.60	35,156	194,837
409.30	11,075	7,718	413.00	26,624	83,824	416.70	35,402	198,365
409.40	11,865	8,865	413.10	26,853	86,498	416.80	35,649	201,917
409.50	12,655	10,091	413.20	27,082	89,195	416.90	35,895	205,495
409.60	13,446	11,396	413.30	27,312	91,914	417.00	**36,142**	**209,097**
409.70	14,236	12,781	413.40	27,541	94,657	417.10	36,142	209,097
409.80	15,026	14,244	413.50	27,770	97,423	417.20	36,142	209,097
409.90	15,817	15,786	413.60	27,999	100,211	417.30	36,142	209,097
410.00	16,607	17,407	413.70	28,228	103,022	417.40	36,142	209,097
410.10	16,993	19,087	413.80	28,458	105,857	417.50	36,142	209,097
410.20	17,379	20,806	413.90	28,687	108,714	417.60	36,142	209,097
410.30	17,766	22,563	414.00	28,916	111,594	417.70	36,142	209,097
410.40	18,152	24,359	414.10	29,154	114,498	417.80	36,142	209,097
410.50	18,538	26,193	414.20	29,392	117,425	417.90	36,142	209,097
410.60	18,925	28,066	414.30	29,630	120,376	418.00	36,142	209,097
410.70	19,311	29,978	414.40	29,868	123,351	418.10	36,142	209,097
410.80	19,697	31,929	414.50	30,106	126,350			
410.90	20,083	33,918	414.60	30,344	129,372			
411.00	20,470	35,945	414.70	30,582	132,418			
411.10	20,856	38,012	414.80	30,820	135,489			
411.20	21,242	40,116	414.90	31,058	138,583			
411.30	21,628	42,260	415.00	31,297	141,700			
411.40	22,014	44,442	415.10	31,535	144,842			
411.50	22,401	46,663	415.20	31,773	148,007			
411.60	22,787	48,922	415.30	32,011	151,196			

Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 7.61" for 100-yr event
Inflow = 11.29 cfs @ 12.00 hrs, Volume= 0.672 af
Outflow = 9.72 cfs @ 12.06 hrs, Volume= 0.453 af, Atten= 14%, Lag= 3.4 min
Primary = 9.72 cfs @ 12.06 hrs, Volume= 0.453 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.68' @ 12.06 hrs Surf.Area= 8,303 sf Storage= 12,102 cf

Plug-Flow detention time= 178.4 min calculated for 0.453 af (67% of inflow)
Center-of-Mass det. time= 81.3 min (846.9 - 765.6)

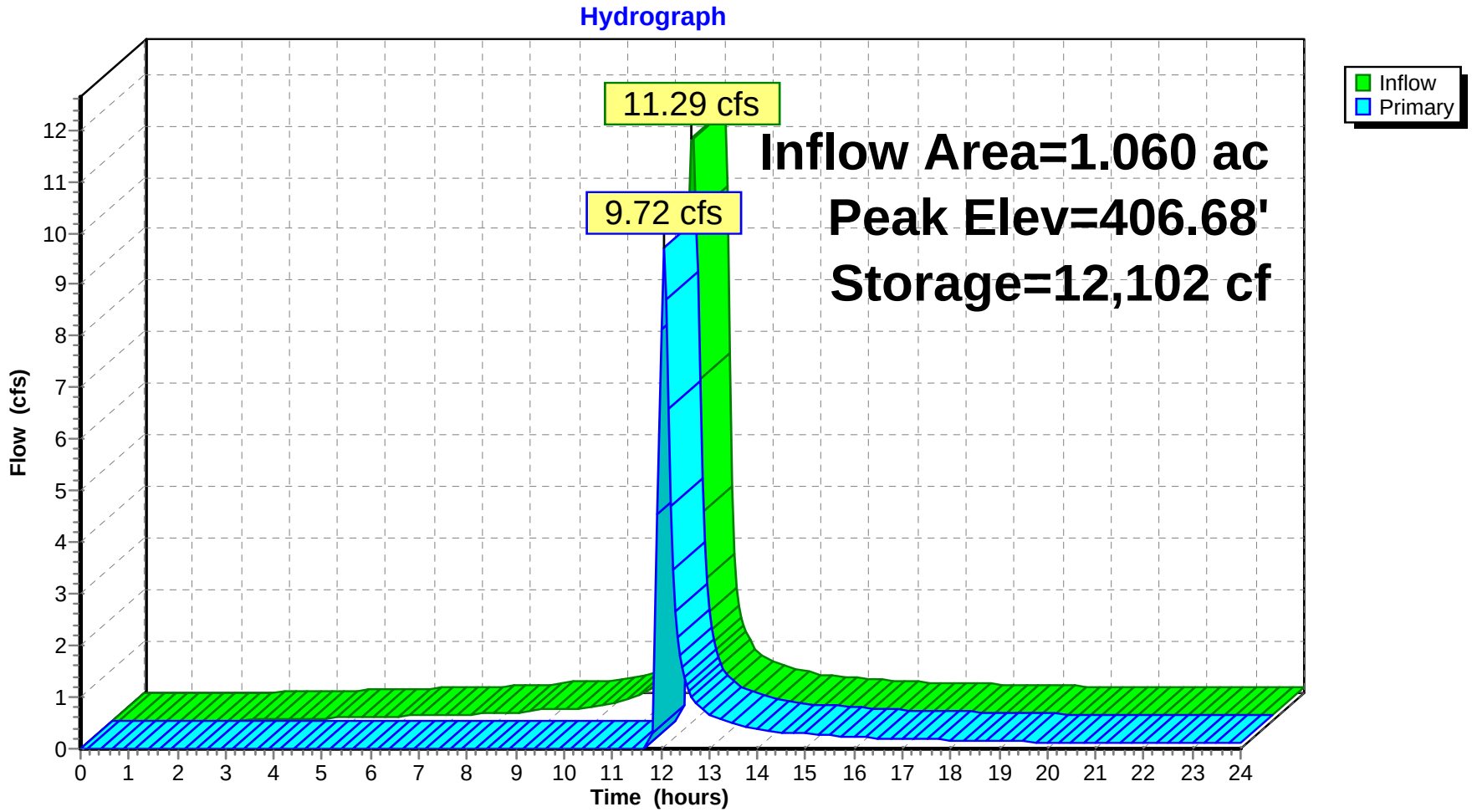
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.58 cfs @ 12.06 hrs HW=406.68' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 9.58 cfs @ 1.45 fps)

Pond Pond 1e: Pond 1e



Stage-Discharge for Pond Pond 1e: Pond 1e

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
405.00	0.00	405.37	0.00	405.74	0.00	406.11	0.00	406.48	2.33
405.01	0.00	405.38	0.00	405.75	0.00	406.12	0.00	406.49	2.61
405.02	0.00	405.39	0.00	405.76	0.00	406.13	0.00	406.50	2.89
405.03	0.00	405.40	0.00	405.77	0.00	406.14	0.00	406.51	3.19
405.04	0.00	405.41	0.00	405.78	0.00	406.15	0.00	406.52	3.49
405.05	0.00	405.42	0.00	405.79	0.00	406.16	0.00	406.53	3.80
405.06	0.00	405.43	0.00	405.80	0.00	406.17	0.00	406.54	4.12
405.07	0.00	405.44	0.00	405.81	0.00	406.18	0.00	406.55	4.45
405.08	0.00	405.45	0.00	405.82	0.00	406.19	0.00	406.56	4.80
405.09	0.00	405.46	0.00	405.83	0.00	406.20	0.00	406.57	5.15
405.10	0.00	405.47	0.00	405.84	0.00	406.21	0.00	406.58	5.52
405.11	0.00	405.48	0.00	405.85	0.00	406.22	0.00	406.59	5.89
405.12	0.00	405.49	0.00	405.86	0.00	406.23	0.00	406.60	6.27
405.13	0.00	405.50	0.00	405.87	0.00	406.24	0.00	406.61	6.66
405.14	0.00	405.51	0.00	405.88	0.00	406.25	0.00	406.62	7.06
405.15	0.00	405.52	0.00	405.89	0.00	406.26	0.00	406.63	7.46
405.16	0.00	405.53	0.00	405.90	0.00	406.27	0.00	406.64	7.88
405.17	0.00	405.54	0.00	405.91	0.00	406.28	0.00	406.65	8.30
405.18	0.00	405.55	0.00	405.92	0.00	406.29	0.00	406.66	8.73
405.19	0.00	405.56	0.00	405.93	0.00	406.30	0.00	406.67	9.17
405.20	0.00	405.57	0.00	405.94	0.00	406.31	0.00	406.68	9.61
405.21	0.00	405.58	0.00	405.95	0.00	406.32	0.00	406.69	10.07
405.22	0.00	405.59	0.00	405.96	0.00	406.33	0.00	406.70	10.53
405.23	0.00	405.60	0.00	405.97	0.00	406.34	0.00	406.71	11.00
405.24	0.00	405.61	0.00	405.98	0.00	406.35	0.00	406.72	11.48
405.25	0.00	405.62	0.00	405.99	0.00	406.36	0.05	406.73	11.96
405.26	0.00	405.63	0.00	406.00	0.00	406.37	0.14	406.74	12.45
405.27	0.00	405.64	0.00	406.01	0.00	406.38	0.26	406.75	**12.95**
405.28	0.00	405.65	0.00	406.02	0.00	406.39	0.40		
405.29	0.00	405.66	0.00	406.03	0.00	406.40	0.56		
405.30	0.00	405.67	0.00	406.04	0.00	406.41	0.73		
405.31	0.00	405.68	0.00	406.05	0.00	406.42	0.92		
405.32	0.00	405.69	0.00	406.06	0.00	406.43	1.13		
405.33	0.00	405.70	0.00	406.07	0.00	406.44	1.34		
405.34	0.00	405.71	0.00	406.08	0.00	406.45	1.57		
405.35	0.00	405.72	0.00	406.09	0.00	406.46	1.82		
405.36	0.00	405.73	0.00	406.10	0.00	406.47	2.07		

Stage-Area-Storage for Pond Pond 1e: Pond 1e

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
405.00	6,101	0	405.74	7,059	4,869	406.48	8,032	10,450
405.02	6,127	122	405.76	7,084	5,010	406.50	8,058	10,611
405.04	6,153	245	405.78	7,110	5,152	406.52	8,085	10,772
405.06	6,179	368	405.80	7,136	5,295	406.54	8,112	10,934
405.08	6,205	492	405.82	7,162	5,438	406.56	8,139	11,097
405.10	6,230	617	405.84	7,188	5,581	406.58	8,166	11,260
405.12	6,256	741	405.86	7,214	5,725	406.60	8,193	11,423
405.14	6,282	867	405.88	7,240	5,870	406.62	8,219	11,587
405.16	6,308	993	405.90	7,266	6,015	406.64	8,246	11,752
405.18	6,334	1,119	405.92	7,291	6,161	406.66	8,273	11,917
405.20	6,360	1,246	405.94	7,317	6,307	406.68	8,300	12,083
405.22	6,386	1,374	405.96	7,343	6,453	406.70	8,327	12,249
405.24	6,412	1,502	405.98	7,369	6,600	406.72	8,354	12,416
405.26	6,437	1,630	406.00	7,395	6,748	406.74	**8,381**	**12,583**
405.28	6,463	1,759	406.02	7,421	6,896			
405.30	6,489	1,889	406.04	7,448	7,045			
405.32	6,515	2,019	406.06	7,474	7,194			
405.34	6,541	2,149	406.08	7,501	7,344			
405.36	6,567	2,280	406.10	7,527	7,494			
405.38	6,593	2,412	406.12	7,553	7,645			
405.40	6,619	2,544	406.14	7,580	7,796			
405.42	6,644	2,677	406.16	7,606	7,948			
405.44	6,670	2,810	406.18	7,633	8,100			
405.46	6,696	2,943	406.20	7,659	8,253			
405.48	6,722	3,078	406.22	7,685	8,407			
405.50	6,748	3,212	406.24	7,712	8,561			
405.52	6,774	3,347	406.26	7,738	8,715			
405.54	6,800	3,483	406.28	7,765	8,870			
405.56	6,826	3,619	406.30	7,791	9,026			
405.58	6,852	3,756	406.32	7,817	9,182			
405.60	6,877	3,894	406.34	7,844	9,339			
405.62	6,903	4,031	406.36	7,870	9,496			
405.64	6,929	4,170	406.38	7,897	9,653			
405.66	6,955	4,308	406.40	7,924	9,812			
405.68	6,981	4,448	406.42	7,951	9,970			
405.70	7,007	4,588	406.44	7,978	10,130			
405.72	7,033	4,728	406.46	8,005	10,289			

Summary for Pond Pond 3: Pond 3

Inflow Area = 3.030 ac, 0.00% Impervious, Inflow Depth > 6.14" for 100-yr event
Inflow = 17.83 cfs @ 12.18 hrs, Volume= 1.550 af
Outflow = 12.37 cfs @ 12.36 hrs, Volume= 1.522 af, Atten= 31%, Lag= 10.6 min
Primary = 12.37 cfs @ 12.36 hrs, Volume= 1.522 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 426.13' @ 12.36 hrs Surf.Area= 7,017 sf Storage= 17,338 cf

Plug-Flow detention time= 45.1 min calculated for 1.522 af (98% of inflow)
Center-of-Mass det. time= 34.3 min (845.8 - 811.5)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

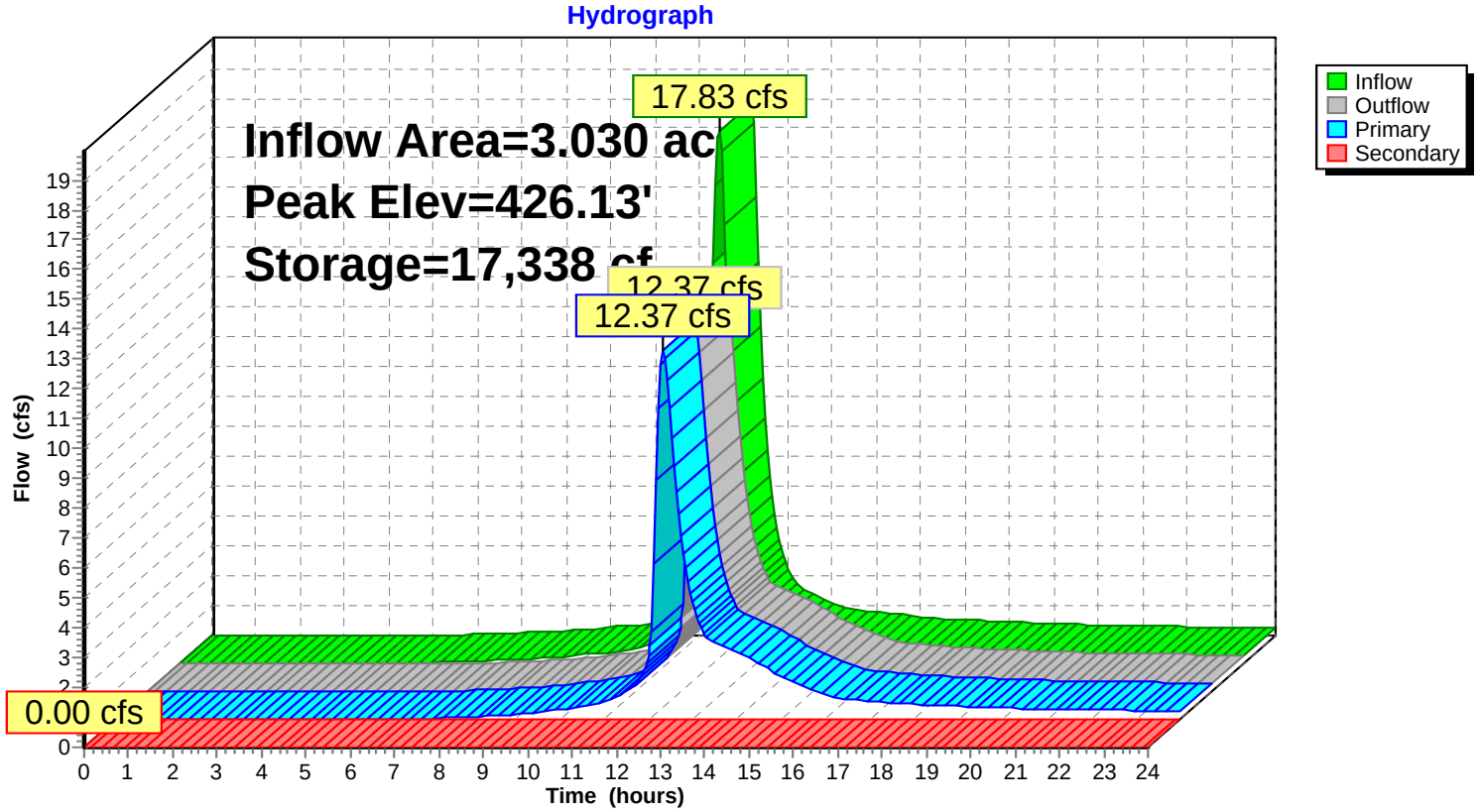
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

Primary OutFlow Max=12.32 cfs @ 12.36 hrs HW=426.12' (Free Discharge)
└─**1=Culvert** (Passes 12.32 cfs of 13.10 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 3.53 cfs @ 7.98 fps)
  └─**3=Sharp-Crested Rectangular Weir** (Weir Controls 8.80 cfs @ 4.41 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Stage-Discharge for Pond Pond 3: Pond 3

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
423.00	0.00	0.00	0.00
423.10	0.04	0.04	0.00
423.20	0.14	0.14	0.00
423.30	0.31	0.31	0.00
423.40	0.52	0.52	0.00
423.50	0.75	0.75	0.00
423.60	1.00	1.00	0.00
423.70	1.22	1.22	0.00
423.80	1.39	1.39	0.00
423.90	1.54	1.54	0.00
424.00	1.68	1.68	0.00
424.10	1.81	1.81	0.00
424.20	1.93	1.93	0.00
424.30	2.05	2.05	0.00
424.40	2.15	2.15	0.00
424.50	2.26	2.26	0.00
424.60	2.35	2.35	0.00
424.70	2.45	2.45	0.00
424.80	2.54	2.54	0.00
424.90	2.63	2.63	0.00
425.00	2.71	2.71	0.00
425.10	3.00	3.00	0.00
425.20	3.47	3.47	0.00
425.30	4.07	4.07	0.00
425.40	4.77	4.77	0.00
425.50	5.57	5.57	0.00
425.60	6.45	6.45	0.00
425.70	7.42	7.42	0.00
425.80	8.46	8.46	0.00
425.90	9.58	9.58	0.00
426.00	10.77	10.77	0.00
426.10	12.03	12.03	0.00
426.20	13.32	13.32	0.00
426.30	13.59	13.59	0.00
426.40	13.85	13.85	0.00
426.50	14.11	14.11	0.00
426.60	14.36	14.36	0.00
426.70	14.61	14.61	0.00
426.80	14.86	14.86	0.00
426.90	15.10	15.10	0.00
427.00	15.34	15.34	0.00
427.10	15.57	15.57	0.00
427.20	15.80	15.80	0.00
427.30	16.03	16.03	0.00
427.40	16.26	16.26	0.00
427.50	16.48	16.48	0.00
427.60	18.73	16.70	2.03
427.70	22.66	16.91	5.75
427.80	27.78	17.12	10.66
427.90	33.90	17.33	16.57
428.00	41.05	17.54	23.51
428.10	49.12	17.75	31.37
428.20	57.26	17.95	39.31
428.30	65.91	18.15	47.76
428.40	75.23	18.35	56.89
428.50	85.04	18.54	66.50
428.60	95.60	18.74	76.86
428.70	106.68	18.93	87.75
428.80	117.87	19.12	98.75
428.90	129.47	19.31	110.16
429.00	141.21	19.50	121.71
429.10	153.26	19.68	133.57
429.20	166.15	19.86	146.29
429.30	179.43	20.05	159.39
429.40	193.08	20.23	172.85
429.50	207.08	20.40	186.68
429.60	221.43	20.58	200.85
429.70	236.12	20.76	215.37
429.80	251.14	20.93	230.22
429.90	266.49	21.10	245.39
430.00	282.16	21.27	260.89
430.10	**298.14**	**21.44**	**276.70**

Stage-Area-Storage for Pond Pond 3: Pond 3

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
423.00	4,085	0	426.70	7,627	21,544
423.10	4,179	413	426.80	7,733	22,312
423.20	4,273	836	426.90	7,839	23,091
423.30	4,367	1,268	427.00	7,946	23,880
423.40	4,461	1,709	427.10	8,052	24,680
423.50	4,556	2,160	427.20	8,158	25,491
423.60	4,650	2,620	427.30	8,264	26,312
423.70	4,744	3,090	427.40	8,370	27,143
423.80	4,838	3,569	427.50	8,476	27,986
423.90	4,932	4,058	427.60	8,582	28,839
424.00	5,026	4,556	427.70	8,689	29,702
424.10	5,119	5,063	427.80	8,795	30,576
424.20	5,212	5,579	427.90	8,901	31,461
424.30	5,305	6,105	428.00	9,007	32,357
424.40	5,398	6,640	428.10	9,121	33,263
424.50	5,491	7,185	428.20	9,234	34,181
424.60	5,583	7,738	428.30	9,348	35,110
424.70	5,676	8,301	428.40	9,461	36,050
424.80	5,769	8,874	428.50	**9,575**	**37,002**
424.90	5,862	9,455	428.60	9,575	37,002
425.00	5,955	10,046	428.70	9,575	37,002
425.10	6,048	10,646	428.80	9,575	37,002
425.20	6,141	11,256	428.90	9,575	37,002
425.30	6,234	11,874	429.00	9,575	37,002
425.40	6,327	12,502	429.10	9,575	37,002
425.50	6,420	13,140	429.20	9,575	37,002
425.60	6,512	13,786	429.30	9,575	37,002
425.70	6,605	14,442	429.40	9,575	37,002
425.80	6,698	15,107	429.50	9,575	37,002
425.90	6,791	15,782	429.60	9,575	37,002
426.00	6,884	16,466	429.70	9,575	37,002
426.10	6,990	17,159	429.80	9,575	37,002
426.20	7,096	17,864	429.90	9,575	37,002
426.30	7,202	18,578	430.00	9,575	37,002
426.40	7,309	19,304	430.10	9,575	37,002
426.50	7,415	20,040			
426.60	7,521	20,787			

Summary for Pond WQB-1: WQB-1

Inflow Area = 0.620 ac, 37.10% Impervious, Inflow Depth > 7.00" for 100-yr event
Inflow = 5.18 cfs @ 12.07 hrs, Volume= 0.361 af
Outflow = 5.16 cfs @ 12.08 hrs, Volume= 0.300 af, Atten= 1%, Lag= 0.9 min
Primary = 5.16 cfs @ 12.08 hrs, Volume= 0.300 af
Routed to Pond Pond 1d : Pond 1d

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 412.24' @ 12.08 hrs Surf.Area= 1,595 sf Storage= 3,009 cf

Plug-Flow detention time= 114.1 min calculated for 0.300 af (83% of inflow)
Center-of-Mass det. time= 42.9 min (829.3 - 786.4)

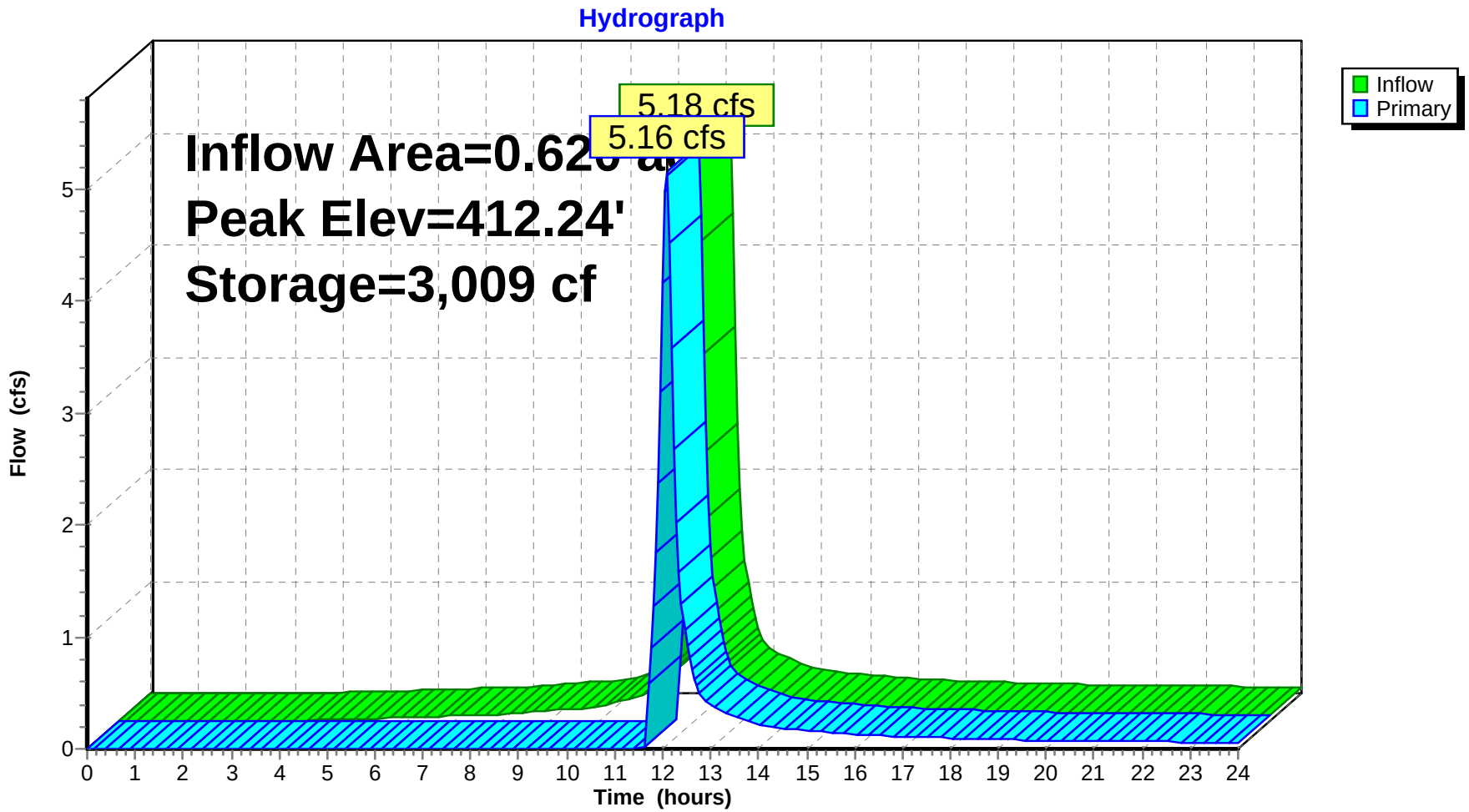
Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	3,453 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	412	0	0
410.00	691	552	552
412.00	1,408	2,099	2,651
412.50	1,800	802	3,453

Device	Routing	Invert	Outlet Devices
#1	Primary	412.00'	**18.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=5.06 cfs @ 12.08 hrs HW=412.24' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.06 cfs @ 1.19 fps)

Pond WQB-1: WQB-1



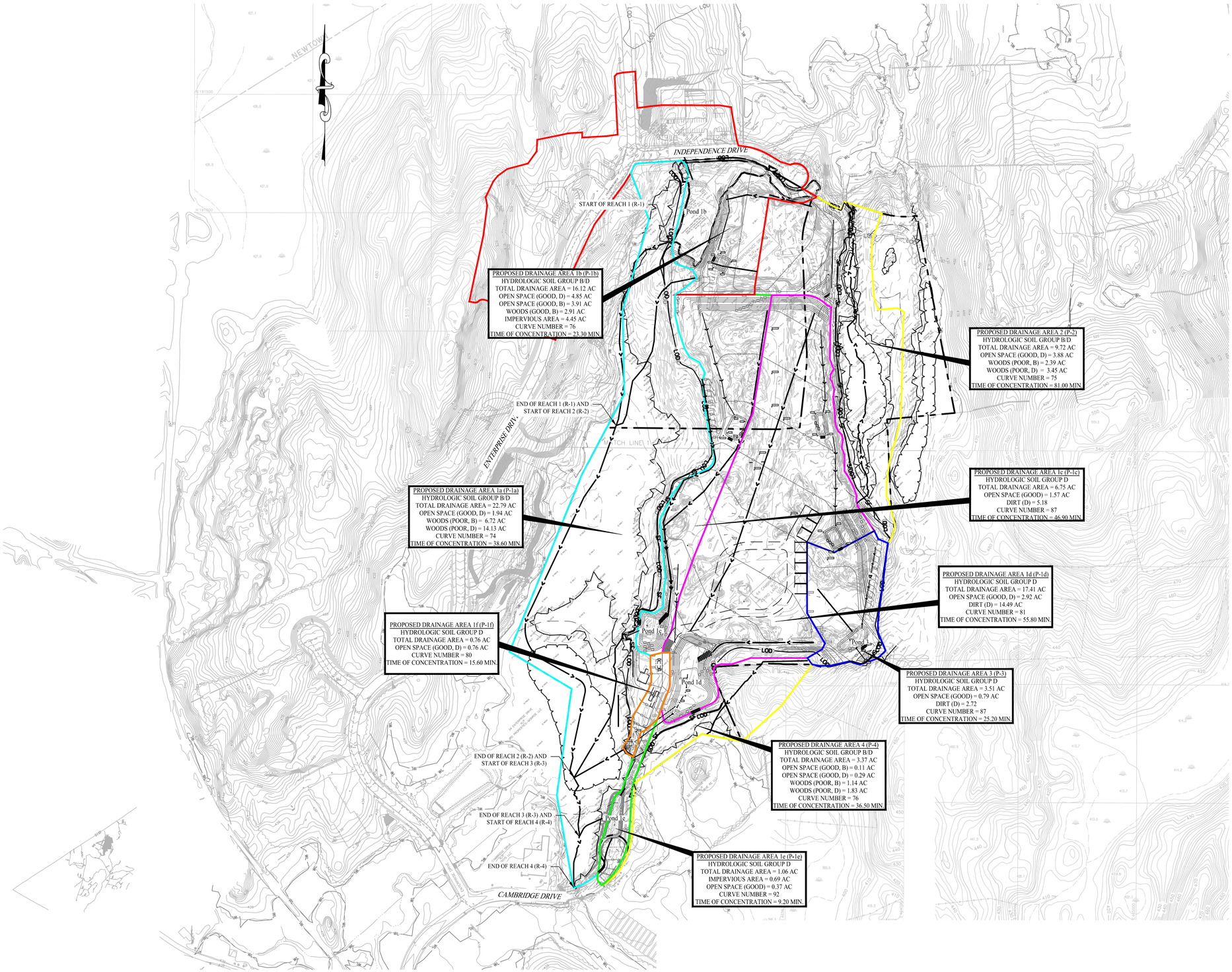
Stage-Discharge for Pond WQB-1: WQB-1

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
409.00	0.00	409.74	0.00	410.48	0.00	411.22	0.00	411.96	0.00
409.02	0.00	409.76	0.00	410.50	0.00	411.24	0.00	411.98	0.00
409.04	0.00	409.78	0.00	410.52	0.00	411.26	0.00	412.00	0.00
409.06	0.00	409.80	0.00	410.54	0.00	411.28	0.00	412.02	0.12
409.08	0.00	409.82	0.00	410.56	0.00	411.30	0.00	412.04	0.35
409.10	0.00	409.84	0.00	410.58	0.00	411.32	0.00	412.06	0.64
409.12	0.00	409.86	0.00	410.60	0.00	411.34	0.00	412.08	0.99
409.14	0.00	409.88	0.00	410.62	0.00	411.36	0.00	412.10	1.38
409.16	0.00	409.90	0.00	410.64	0.00	411.38	0.00	412.12	1.82
409.18	0.00	409.92	0.00	410.66	0.00	411.40	0.00	412.14	2.29
409.20	0.00	409.94	0.00	410.68	0.00	411.42	0.00	412.16	2.80
409.22	0.00	409.96	0.00	410.70	0.00	411.44	0.00	412.18	3.34
409.24	0.00	409.98	0.00	410.72	0.00	411.46	0.00	412.20	3.91
409.26	0.00	410.00	0.00	410.74	0.00	411.48	0.00	412.22	4.53
409.28	0.00	410.02	0.00	410.76	0.00	411.50	0.00	412.24	5.19
409.30	0.00	410.04	0.00	410.78	0.00	411.52	0.00	412.26	5.88
409.32	0.00	410.06	0.00	410.80	0.00	411.54	0.00	412.28	6.60
409.34	0.00	410.08	0.00	410.82	0.00	411.56	0.00	412.30	7.35
409.36	0.00	410.10	0.00	410.84	0.00	411.58	0.00	412.32	8.13
409.38	0.00	410.12	0.00	410.86	0.00	411.60	0.00	412.34	8.95
409.40	0.00	410.14	0.00	410.88	0.00	411.62	0.00	412.36	9.79
409.42	0.00	410.16	0.00	410.90	0.00	411.64	0.00	412.38	10.66
409.44	0.00	410.18	0.00	410.92	0.00	411.66	0.00	412.40	11.57
409.46	0.00	410.20	0.00	410.94	0.00	411.68	0.00	412.42	12.52
409.48	0.00	410.22	0.00	410.96	0.00	411.70	0.00	412.44	13.51
409.50	0.00	410.24	0.00	410.98	0.00	411.72	0.00	412.46	14.53
409.52	0.00	410.26	0.00	411.00	0.00	411.74	0.00	412.48	15.59
409.54	0.00	410.28	0.00	411.02	0.00	411.76	0.00	412.50	**16.67**
409.56	0.00	410.30	0.00	411.04	0.00	411.78	0.00		
409.58	0.00	410.32	0.00	411.06	0.00	411.80	0.00		
409.60	0.00	410.34	0.00	411.08	0.00	411.82	0.00		
409.62	0.00	410.36	0.00	411.10	0.00	411.84	0.00		
409.64	0.00	410.38	0.00	411.12	0.00	411.86	0.00		
409.66	0.00	410.40	0.00	411.14	0.00	411.88	0.00		
409.68	0.00	410.42	0.00	411.16	0.00	411.90	0.00		
409.70	0.00	410.44	0.00	411.18	0.00	411.92	0.00		
409.72	0.00	410.46	0.00	411.20	0.00	411.94	0.00		

Stage-Area-Storage for Pond WQB-1: WQB-1

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
409.00	412	0	410.85	996	1,268
409.05	426	21	410.90	1,014	1,319
409.10	440	43	410.95	1,032	1,370
409.15	454	65	411.00	1,050	1,422
409.20	468	88	411.05	1,067	1,475
409.25	482	112	411.10	1,085	1,528
409.30	496	136	411.15	1,103	1,583
409.35	510	161	411.20	1,121	1,639
409.40	524	187	411.25	1,139	1,695
409.45	538	214	411.30	1,157	1,753
409.50	552	241	411.35	1,175	1,811
409.55	565	269	411.40	1,193	1,870
409.60	579	297	411.45	1,211	1,930
409.65	593	327	411.50	1,229	1,991
409.70	607	357	411.55	1,247	2,053
409.75	621	387	411.60	1,265	2,116
409.80	635	419	411.65	1,283	2,180
409.85	649	451	411.70	1,300	2,244
409.90	663	484	411.75	1,318	2,310
409.95	677	517	411.80	1,336	2,376
410.00	691	552	411.85	1,354	2,443
410.05	709	586	411.90	1,372	2,511
410.10	727	622	411.95	1,390	2,581
410.15	745	659	412.00	1,408	2,651
410.20	763	697	412.05	1,447	2,722
410.25	781	735	412.10	1,486	2,795
410.30	799	775	412.15	1,526	2,871
410.35	816	815	412.20	1,565	2,948
410.40	834	857	412.25	1,604	3,027
410.45	852	899	412.30	1,643	3,108
410.50	870	942	412.35	1,682	3,191
410.55	888	986	412.40	1,722	3,276
410.60	906	1,031	412.45	1,761	3,363
410.65	924	1,076	412.50	**1,800**	**3,453**
410.70	942	1,123			
410.75	960	1,171			
410.80	978	1,219			

Construction HydroCAD Report



GENERAL NOTES

1. THE STORMWATER MANAGEMENT PLAN AND DESIGN IS INTENDED TO BE IN COMPLIANCE WITH THE 2000 CONNECTICUT DEPARTMENT OF TRANSPORTATION (CTDOT) DRAINAGE MANUAL AND THE 2004 CONNECTICUT STORMWATER QUALITY MANUAL.
2. STORMWATER RUNOFF ANALYSIS WAS CALCULATED USING THE SCS TR-55 METHODOLOGY.

LEGEND

- PROPERTY LINE
- LIMITS OF EXISTING DRAINAGE AREA
- FLOW PATH

Rev. #:	Date	Description
1	06/02/21	Inland Wetlands RTC

Graphic Scale: 200 0 200 400

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	ABS
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	06/17/21
Scale:	1" = 200'

Kevin Solli, P.E.
CT 25759

Project:

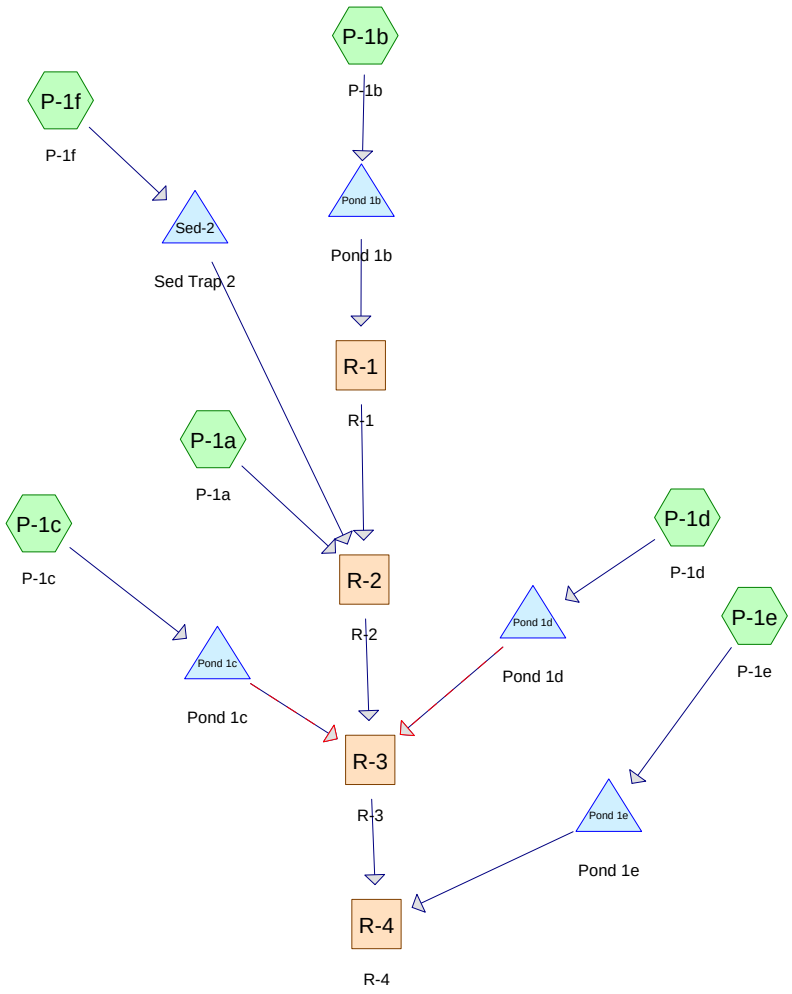
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: CONSTRUCTION DRAINAGE AREA MAP

Sheet #: DA-C

Jun 17, 2021 - 1:13pm chris
X:\SE Files\Project Data\2019\1903601 - 64 Cambridge Drive - Monroe\Cadd Data\Wtr. Remediation\1903601-DA Map-Construction.dwg



Subcat Reach Pond Link

Routing Diagram for 1903601 - Proposed Hydrology - Construction Mod

Prepared by {enter your company name here}, Printed 6/17/2021

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>1.27"
Flow Length=777' Tc=38.6 min CN=74 Runoff=20.18 cfs 2.404 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>1.40"
Flow Length=209' Tc=23.3 min CN=76 Runoff=22.43 cfs 1.880 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>2.21"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=9.66 cfs 1.244 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>2.21"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=21.93 cfs 3.201 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>2.69"
Tc=9.2 min CN=92 Runoff=4.25 cfs 0.238 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>1.68"
Tc=15.6 min CN=80 Runoff=1.61 cfs 0.106 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>1.31"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=5.27 cfs 1.060 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>2.22"
Flow Length=234' Tc=25.2 min CN=87 Runoff=7.57 cfs 0.650 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>1.39"
Flow Length=590' Tc=36.5 min CN=76 Runoff=3.48 cfs 0.391 af

Reach R-1: R-1 Avg. Flow Depth=0.43' Max Vel=3.70 fps Inflow=9.46 cfs 1.790 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=9.40 cfs 1.780 af

Reach R-2: R-2 Avg. Flow Depth=1.12' Max Vel=1.68 fps Inflow=28.13 cfs 4.183 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=23.03 cfs 4.077 af

Reach R-3: R-3 Avg. Flow Depth=1.45' Max Vel=1.25 fps Inflow=23.03 cfs 4.585 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=22.80 cfs 4.559 af

Reach R-4: R-4 Avg. Flow Depth=1.52' Max Vel=1.17 fps Inflow=22.80 cfs 4.579 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=22.66 cfs 4.557 af

Pond Pond 1b: Pond 1b Peak Elev=443.20' Storage=24,569 cf Inflow=22.43 cfs 1.880 af
Outflow=9.46 cfs 1.790 af

Pond Pond 1c: Pond 1c Peak Elev=413.40' Storage=34,831 cf Inflow=9.66 cfs 1.244 af
Discarded=0.00 cfs 0.000 af Primary=1.37 cfs 0.507 af Outflow=1.37 cfs 0.507 af

Pond Pond 1d: Pond 1d Peak Elev=414.89' Storage=139,366 cf Inflow=21.93 cfs 3.201 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond Pond 1e: Pond 1e Peak Elev=406.36' Storage=9,484 cf Inflow=4.25 cfs 0.238 af
Outflow=0.05 cfs 0.020 af

Pond Pond 3: Pond 3 Peak Elev=424.91' Storage=9,543 cf Inflow=7.57 cfs 0.650 af
Primary=2.64 cfs 0.632 af Secondary=0.00 cfs 0.000 af Outflow=2.64 cfs 0.632 af

Pond Sed-2: Sed Trap 2 Peak Elev=407.71' Storage=2,537 cf Inflow=1.61 cfs 0.106 af
Outflow=0.20 cfs 0.050 af

Summary for Subcatchment P-1a: P-1a

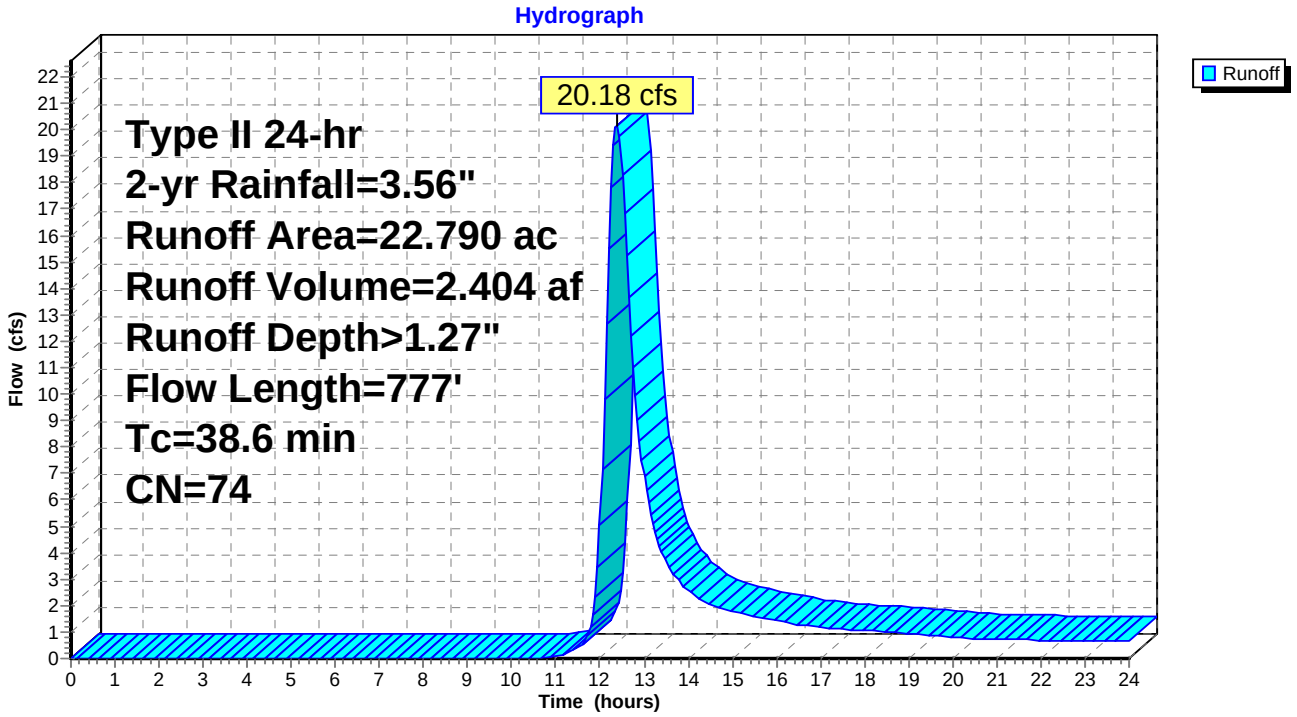
Runoff = 20.18 cfs @ 12.37 hrs, Volume= 2.404 af, Depth> 1.27"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

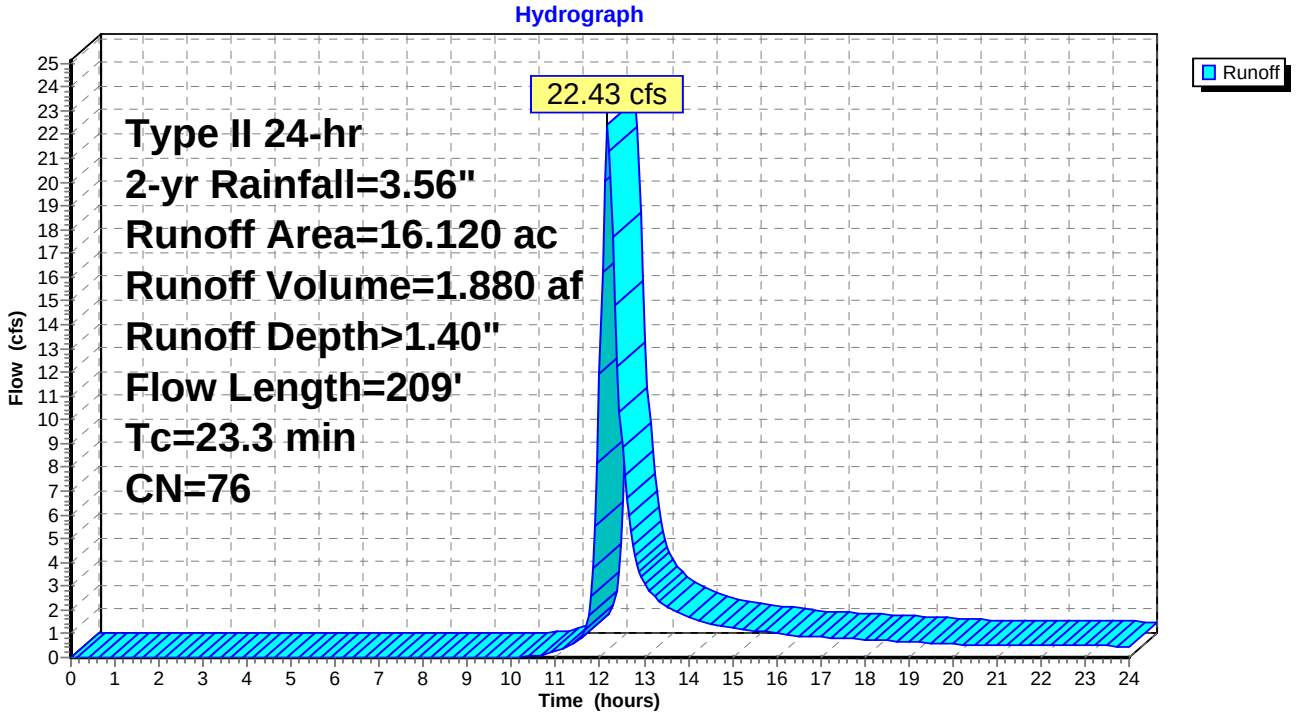
Runoff = 22.43 cfs @ 12.17 hrs, Volume= 1.880 af, Depth> 1.40"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

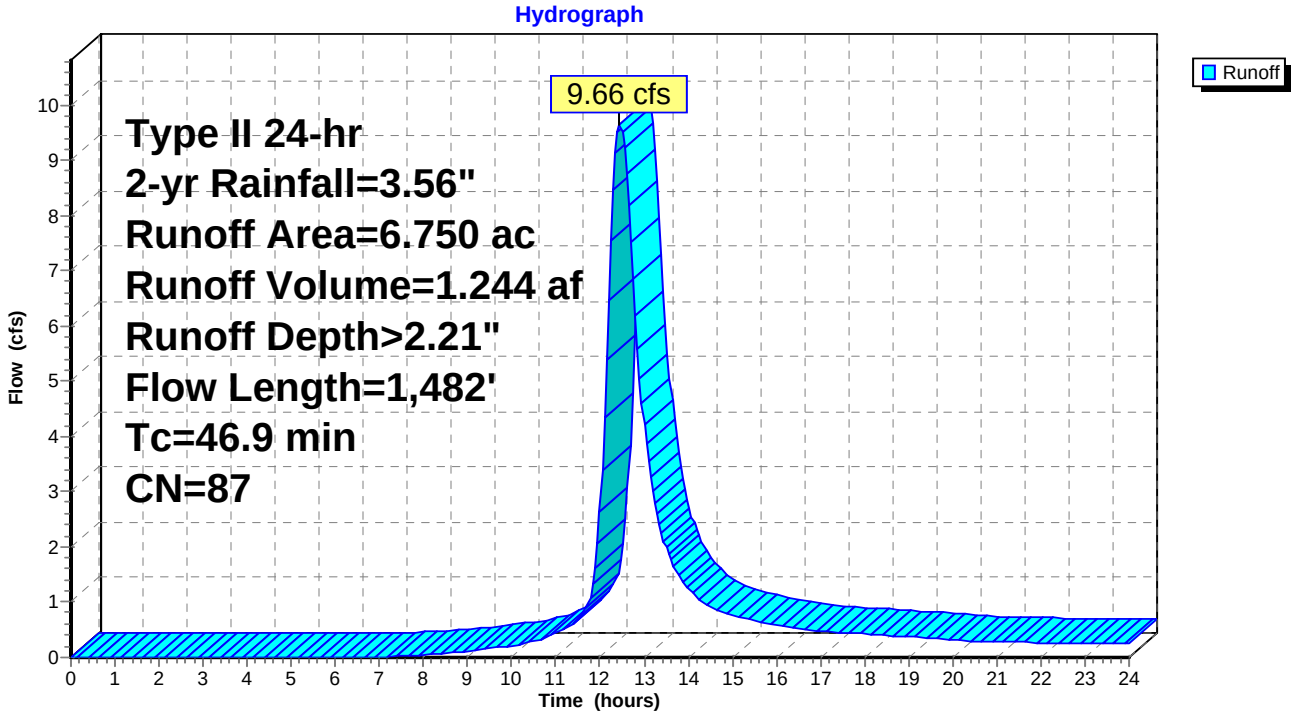
Runoff = 9.66 cfs @ 12.45 hrs, Volume= 1.244 af, Depth> 2.21"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

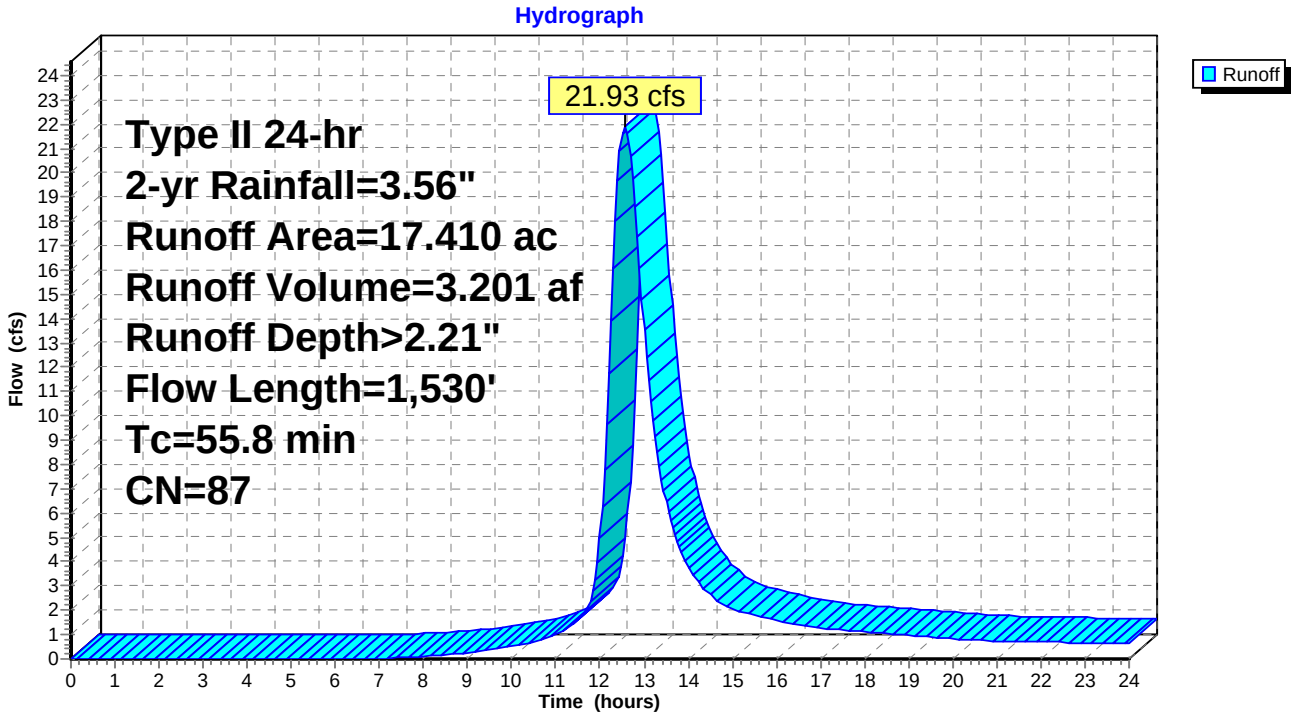
Runoff = 21.93 cfs @ 12.57 hrs, Volume= 3.201 af, Depth> 2.21"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

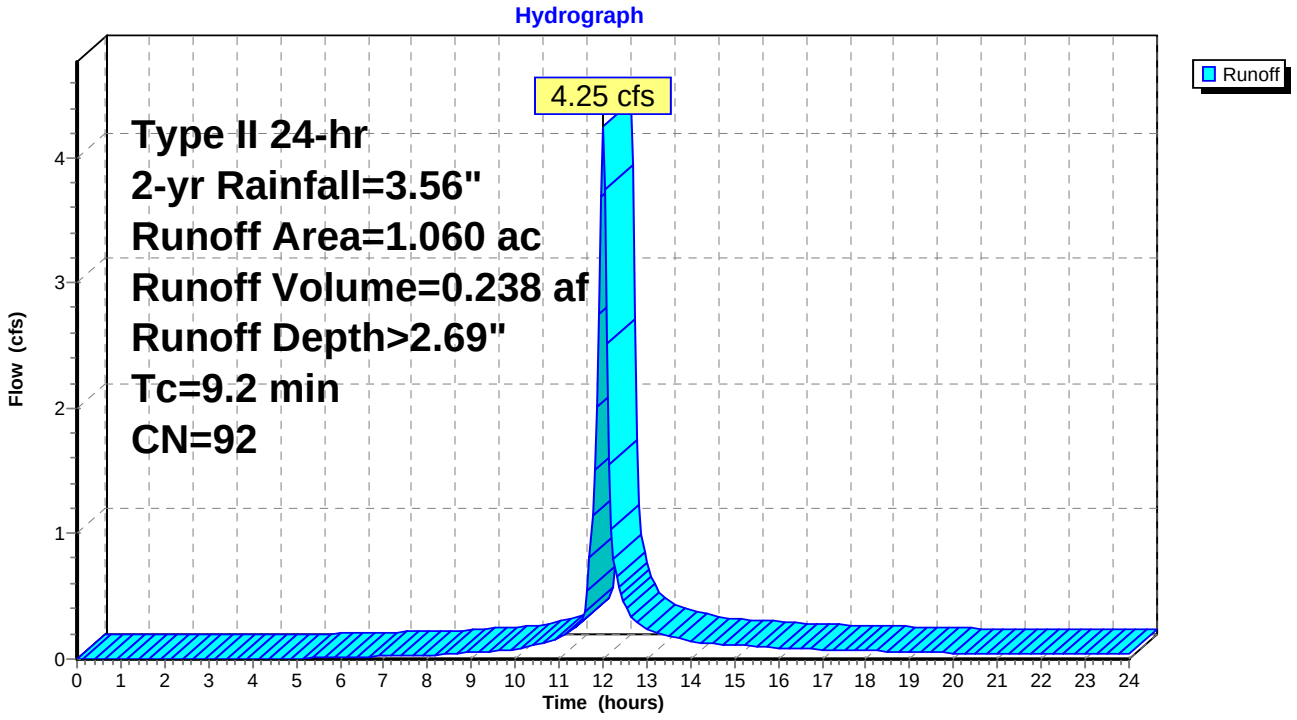
Runoff = 4.25 cfs @ 12.00 hrs, Volume= 0.238 af, Depth> 2.69"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

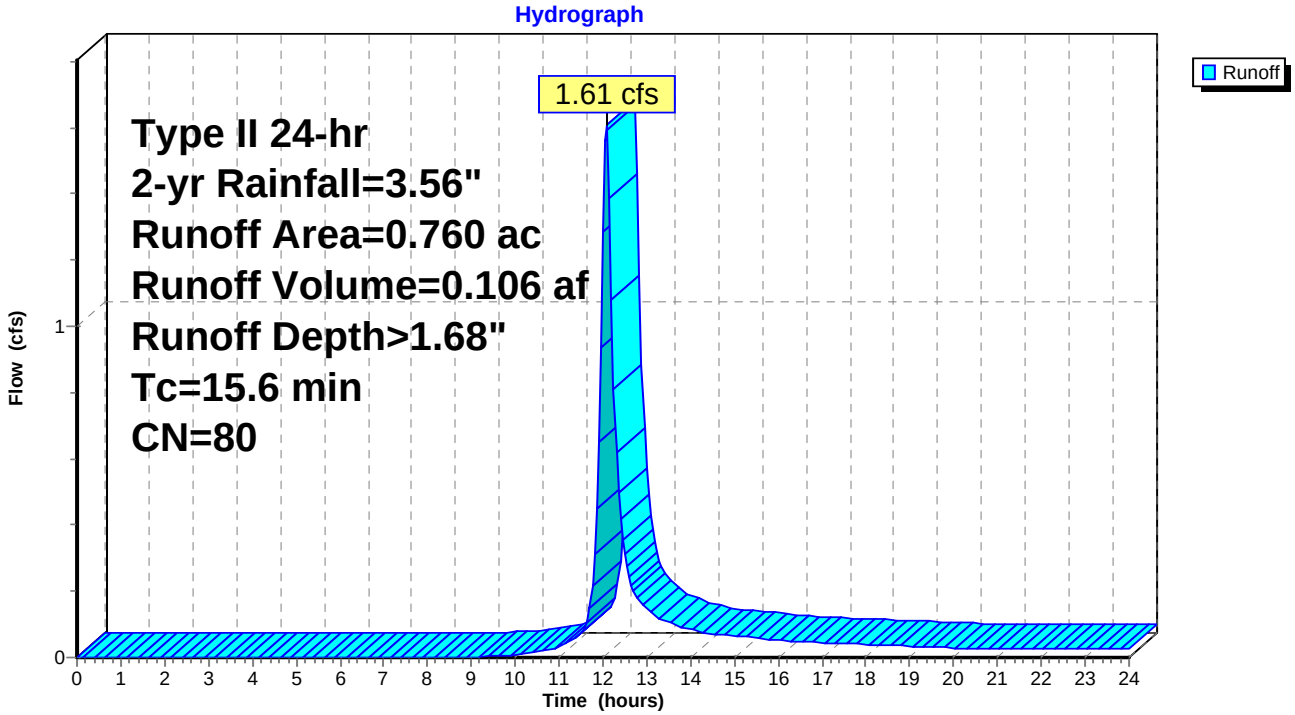
Runoff = 1.61 cfs @ 12.08 hrs, Volume= 0.106 af, Depth> 1.68"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

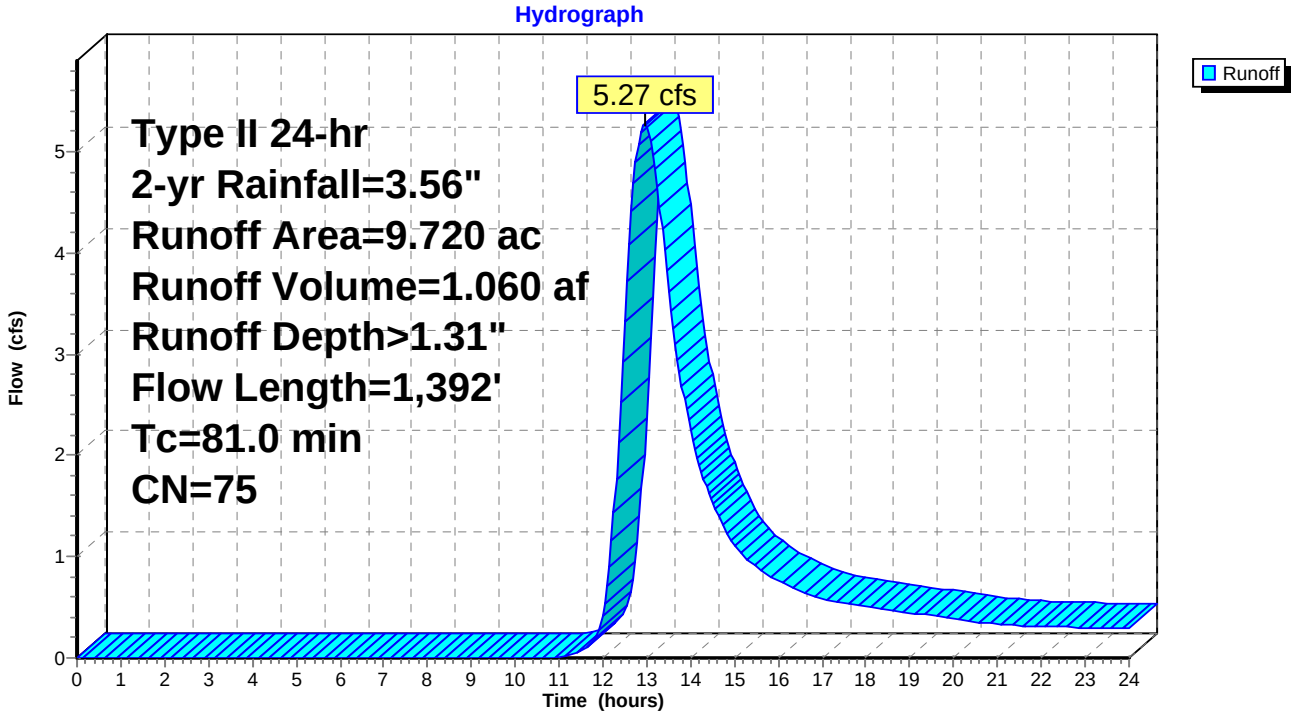
Runoff = 5.27 cfs @ 12.94 hrs, Volume= 1.060 af, Depth> 1.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

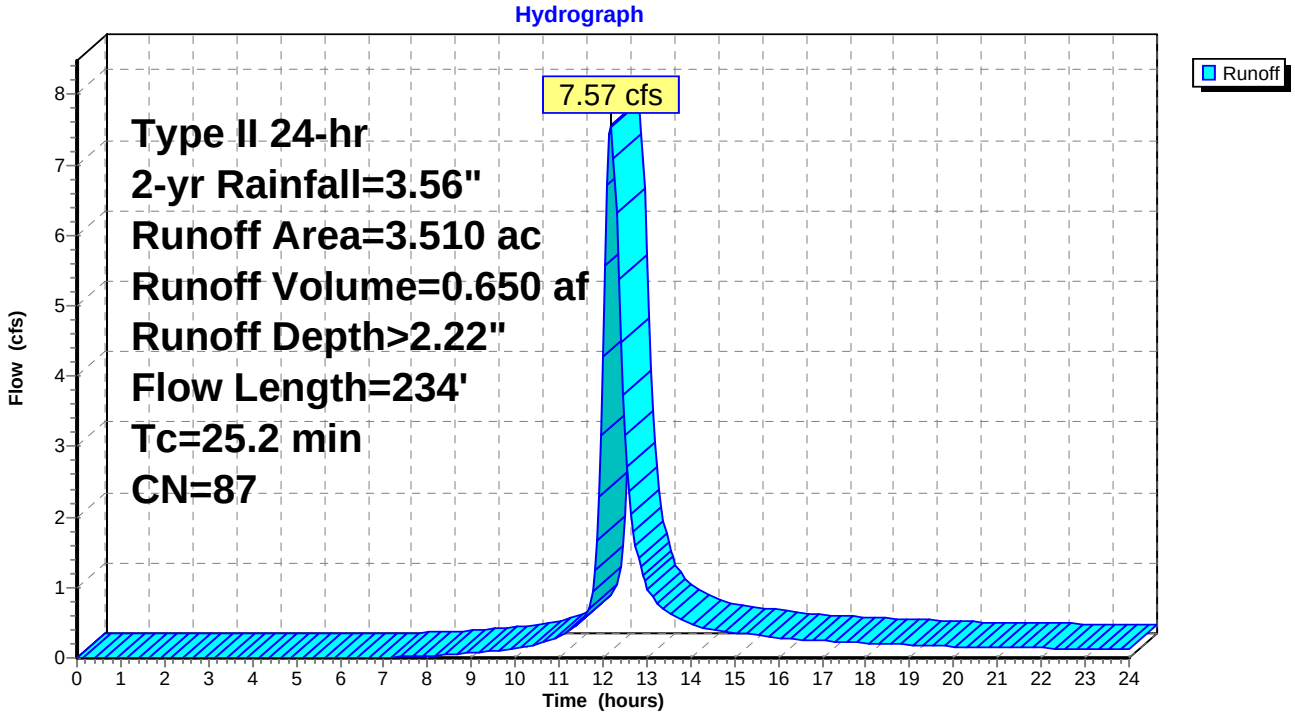
Runoff = 7.57 cfs @ 12.18 hrs, Volume= 0.650 af, Depth> 2.22"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

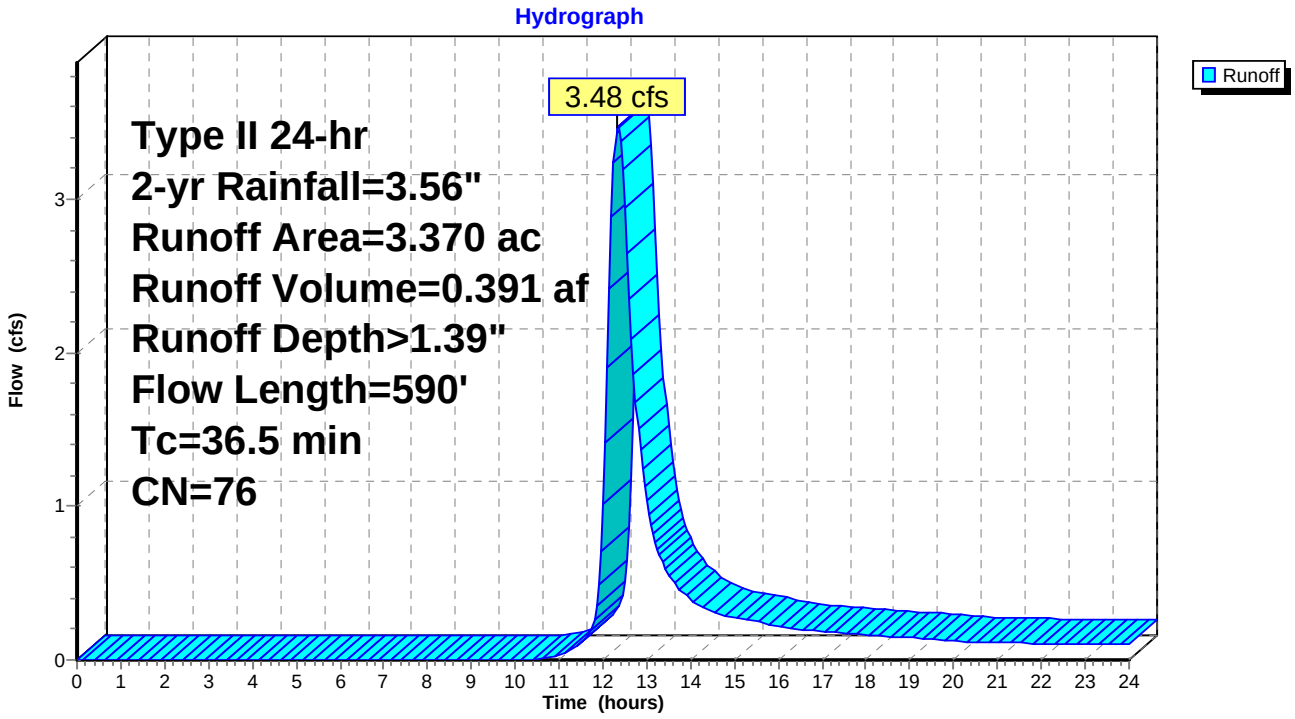
Runoff = 3.48 cfs @ 12.34 hrs, Volume= 0.391 af, Depth> 1.39"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 1.33" for 2-yr event
Inflow = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af
Outflow = 9.40 cfs @ 12.60 hrs, Volume= 1.780 af, Atten= 1%, Lag= 7.3 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.70 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 8.2 min

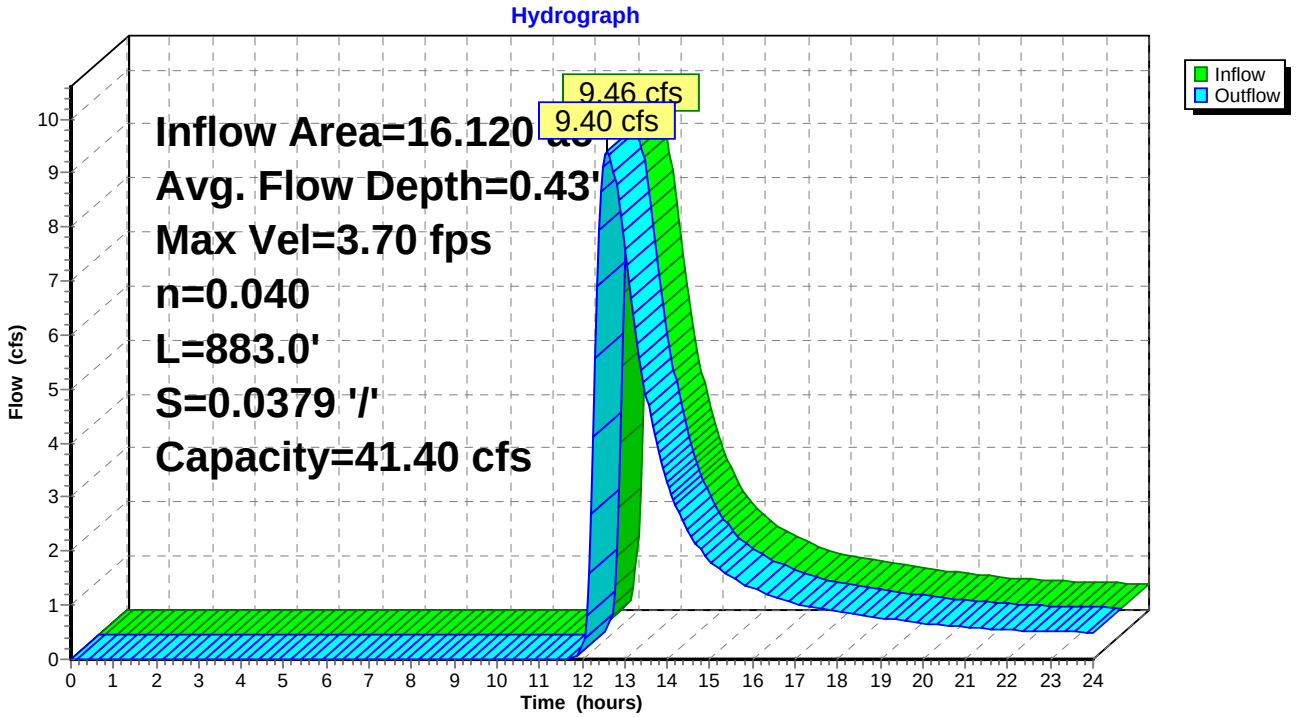
Peak Storage= 2,244 cf @ 12.53 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 6.73'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

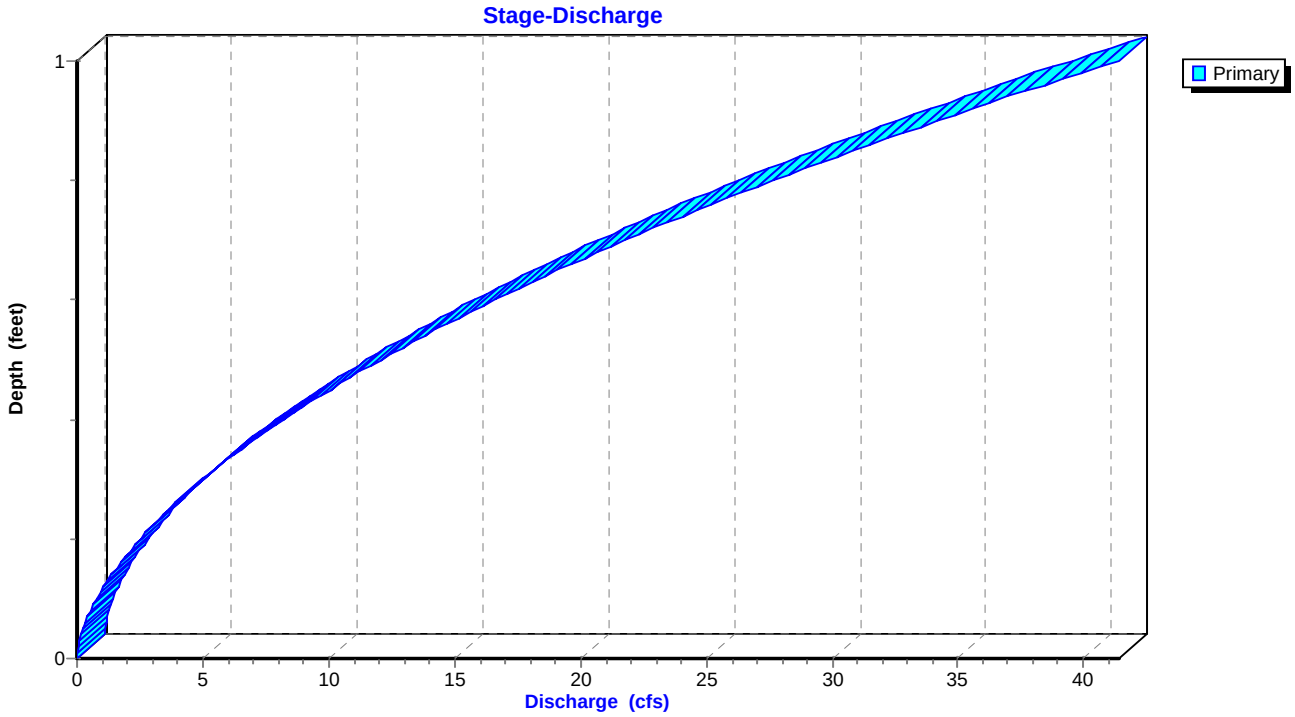


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Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Depth (feet)
Discharge (cfs)
Primary
0
1
0
5
10
15
20
25
30
35
40

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 1.27" for 2-yr event
Inflow = 28.13 cfs @ 12.43 hrs, Volume= 4.183 af
Outflow = 23.03 cfs @ 12.94 hrs, Volume= 4.077 af, Atten= 18%, Lag= 30.5 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.68 fps, Min. Travel Time= 17.0 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 37.8 min

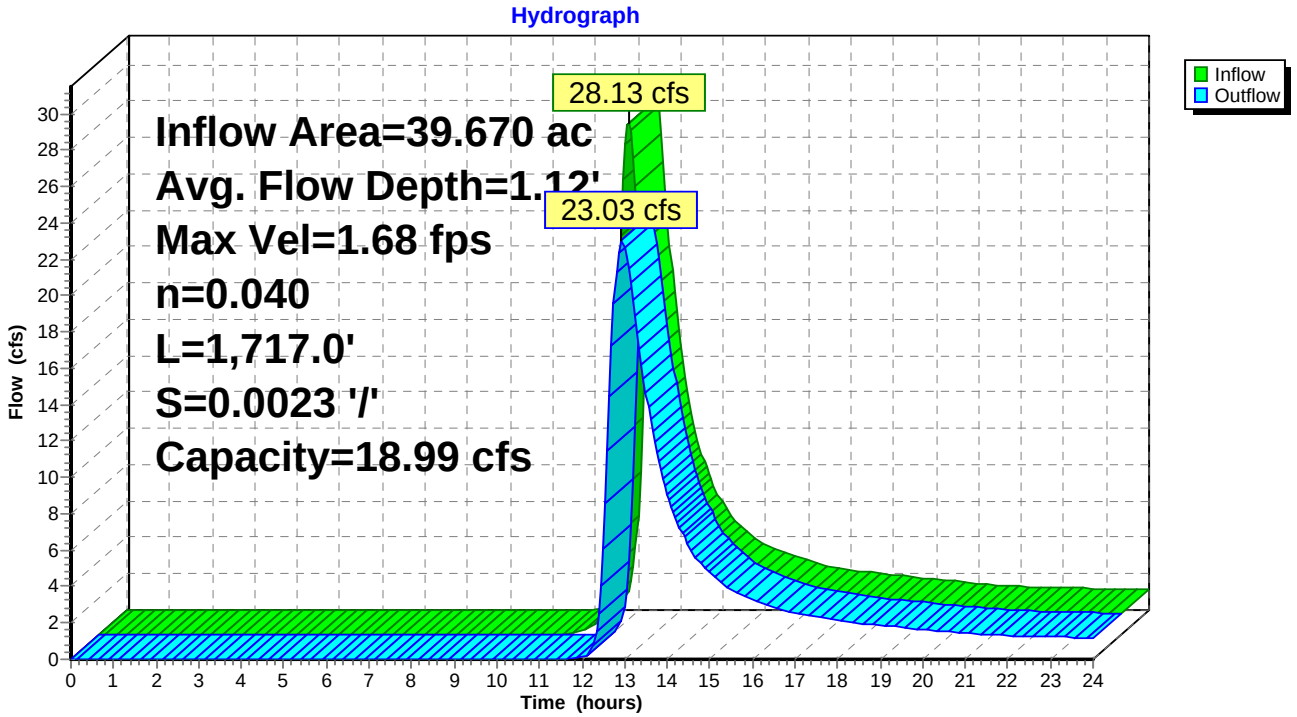
Peak Storage= 23,590 cf @ 12.65 hrs
Average Depth at Peak Storage= 1.12' , Surface Width= 14.50'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

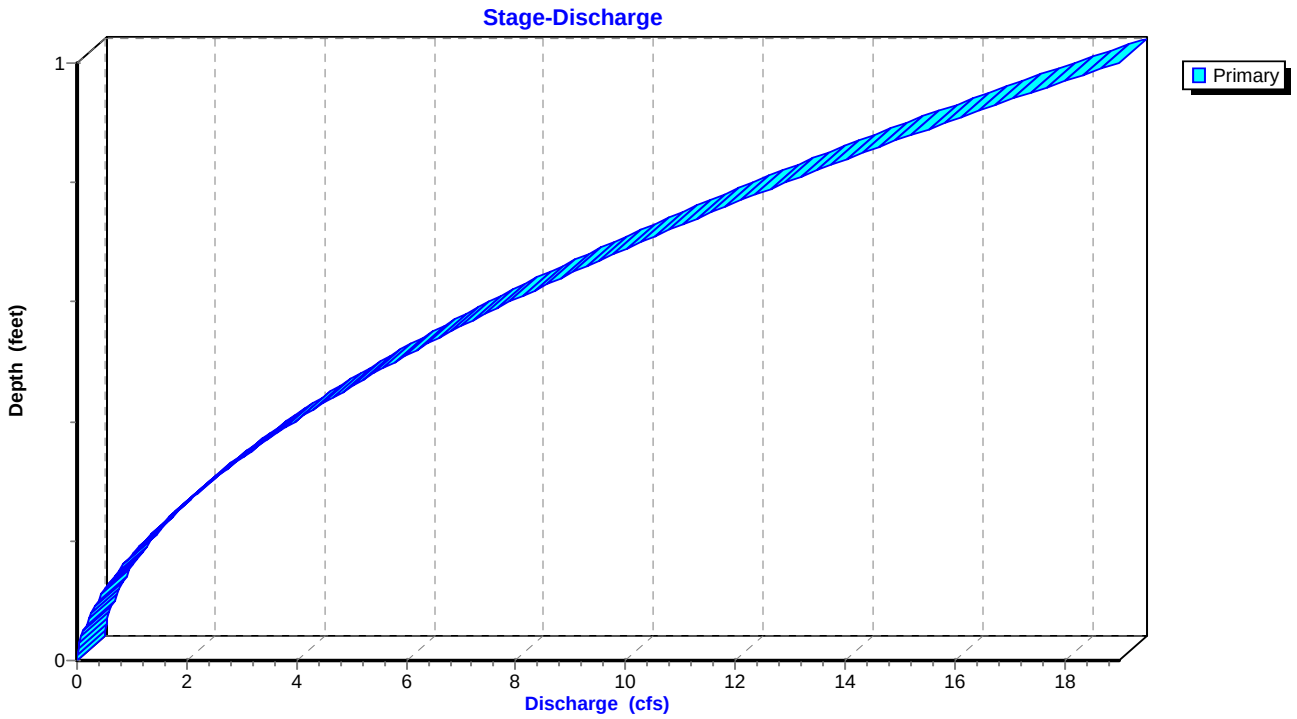


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Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 0.86" for 2-yr event
Inflow = 23.03 cfs @ 12.94 hrs, Volume= 4.585 af
Outflow = 22.80 cfs @ 13.05 hrs, Volume= 4.559 af, Atten= 1%, Lag= 7.1 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.25 fps, Min. Travel Time= 3.7 min
Avg. Velocity = 0.63 fps, Avg. Travel Time= 7.4 min

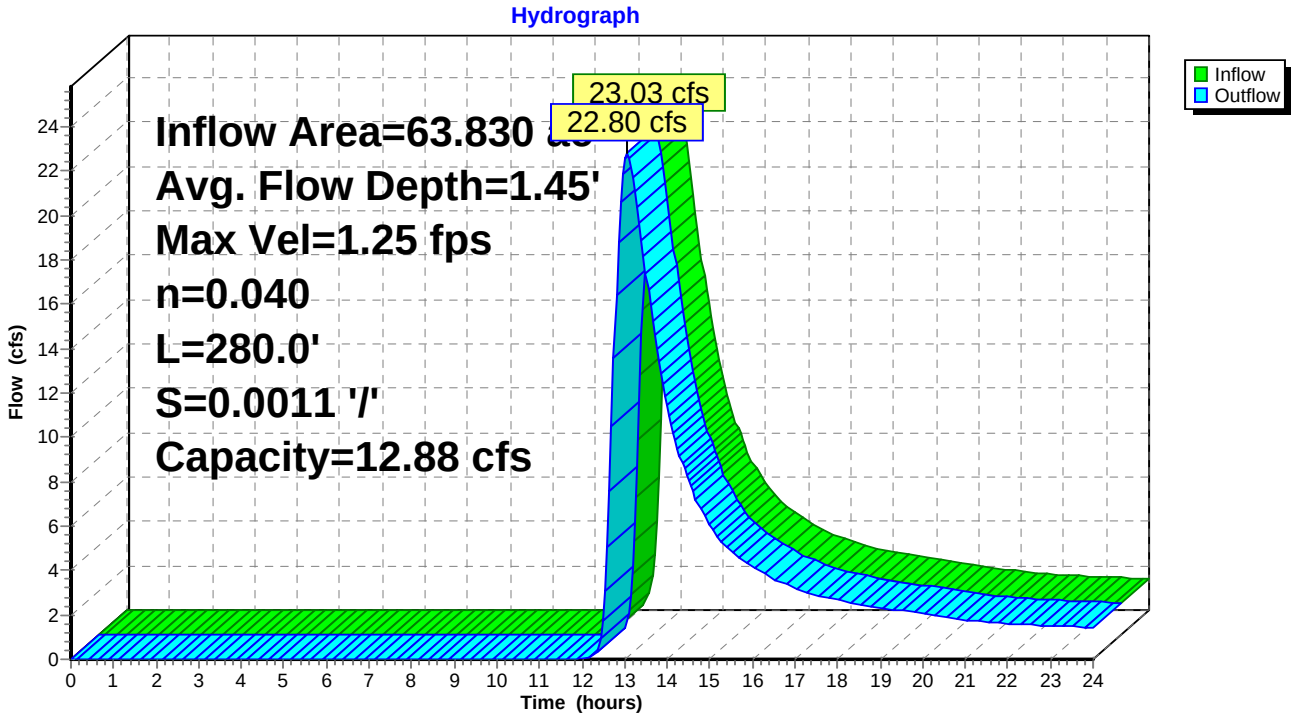
Peak Storage= 5,107 cf @ 12.99 hrs
Average Depth at Peak Storage= 1.45' , Surface Width= 15.78'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

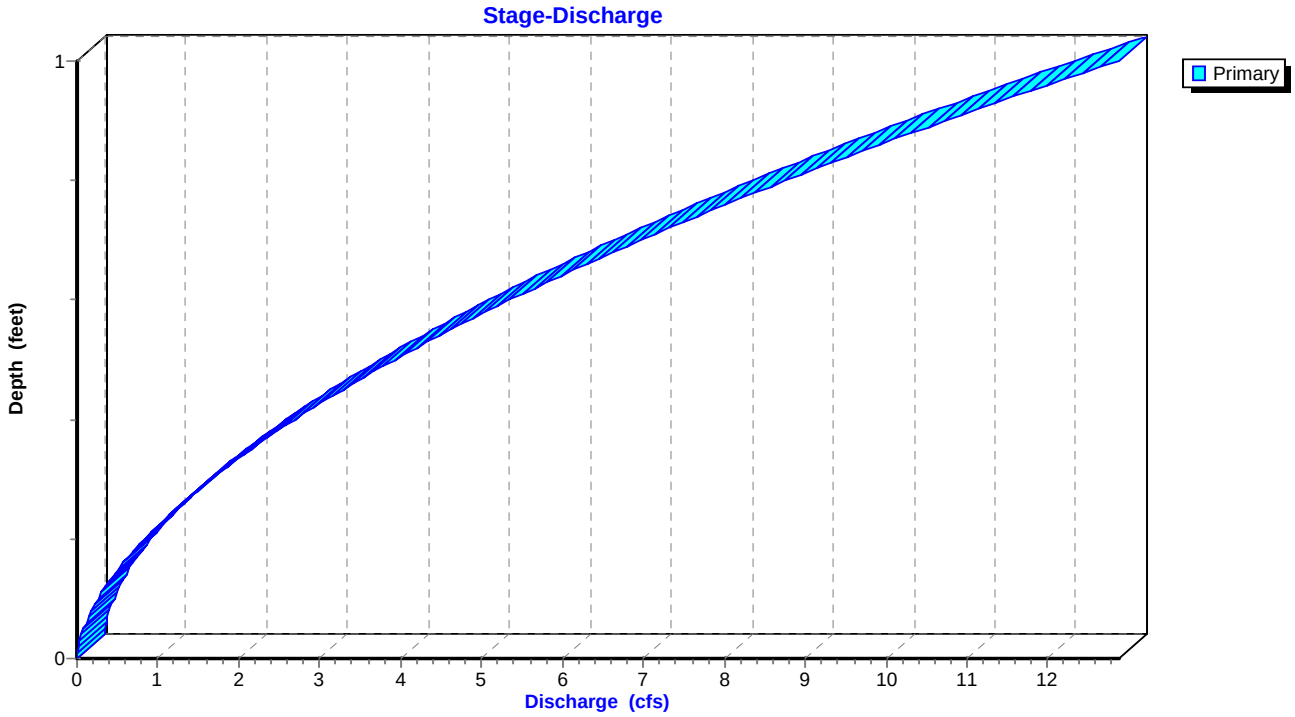


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Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 0.85" for 2-yr event
Inflow = 22.80 cfs @ 13.05 hrs, Volume= 4.579 af
Outflow = 22.66 cfs @ 13.15 hrs, Volume= 4.557 af, Atten= 1%, Lag= 5.9 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.17 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.60 fps, Avg. Travel Time= 6.0 min

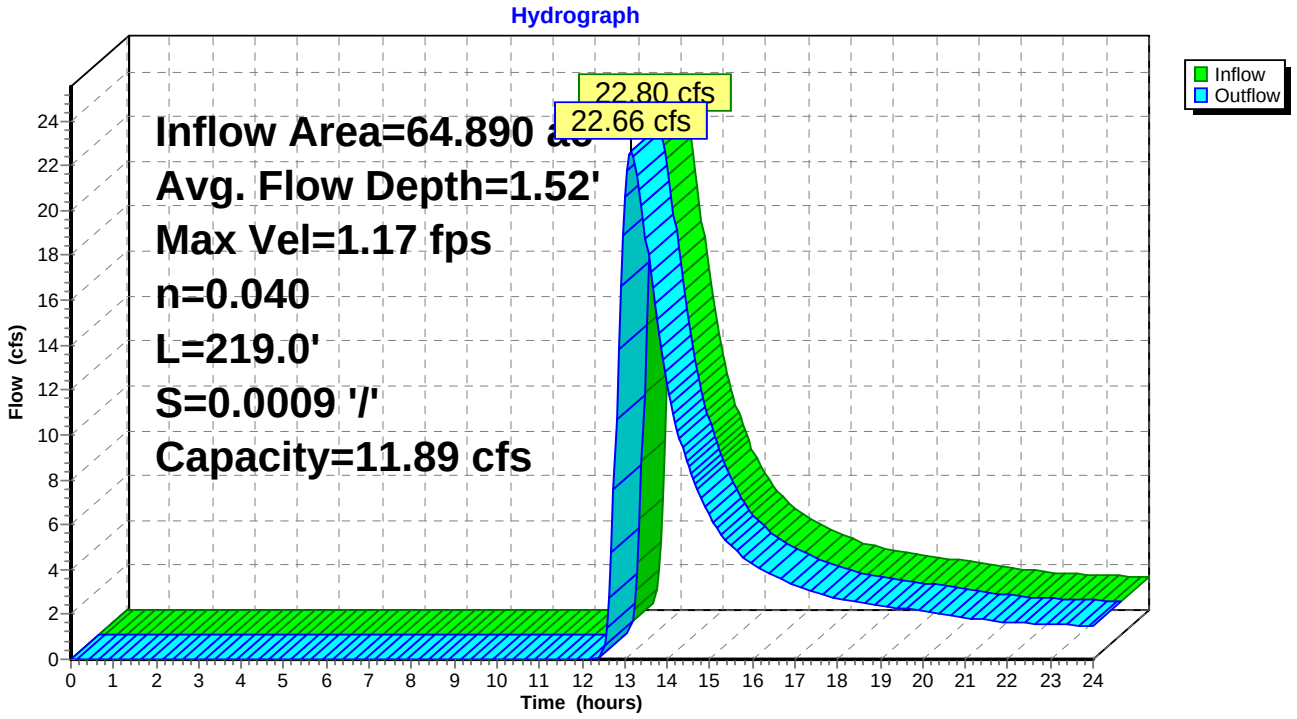
Peak Storage= 4,230 cf @ 13.10 hrs
Average Depth at Peak Storage= 1.52' , Surface Width= 16.09'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

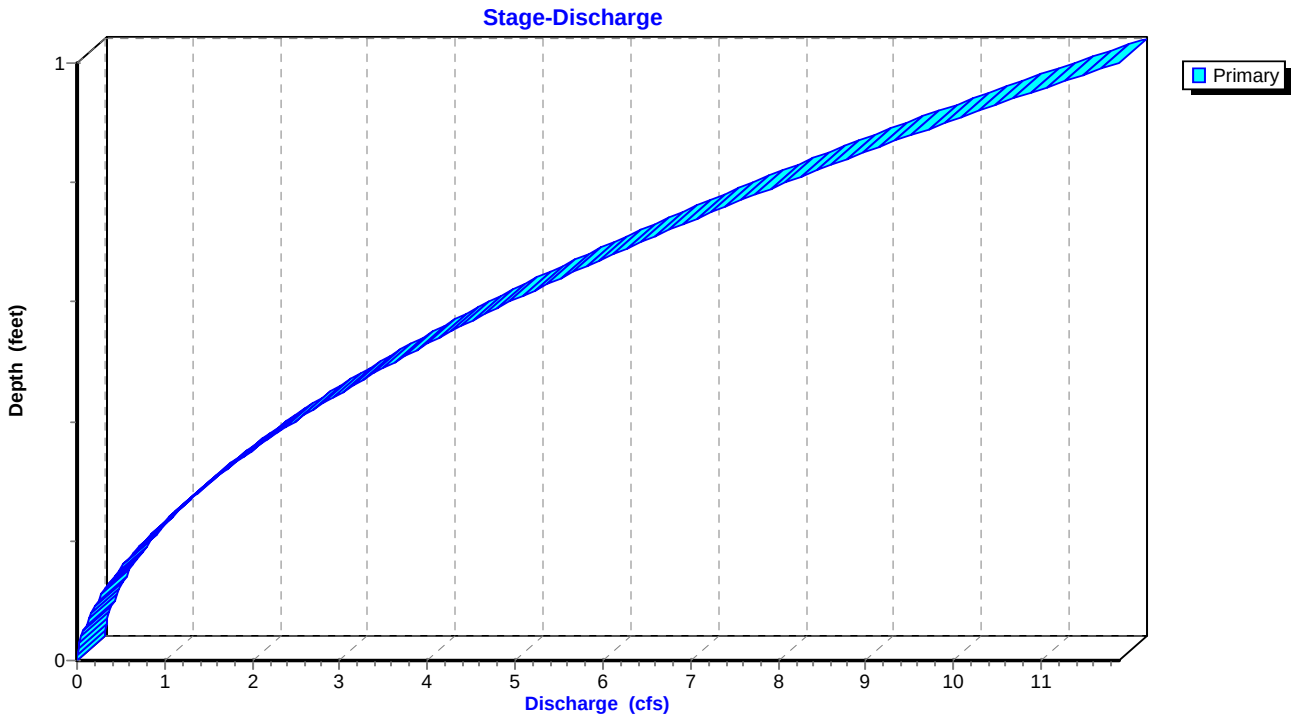


‡

Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 1.40" for 2-yr event
Inflow = 22.43 cfs @ 12.17 hrs, Volume= 1.880 af
Outflow = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af, Atten= 58%, Lag= 18.4 min
Primary = 9.46 cfs @ 12.48 hrs, Volume= 1.790 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.20' @ 12.48 hrs Surf.Area= 25,187 sf Storage= 24,569 cf

Plug-Flow detention time= 64.3 min calculated for 1.790 af (95% of inflow)
Center-of-Mass det. time= 38.6 min (896.7 - 858.1)

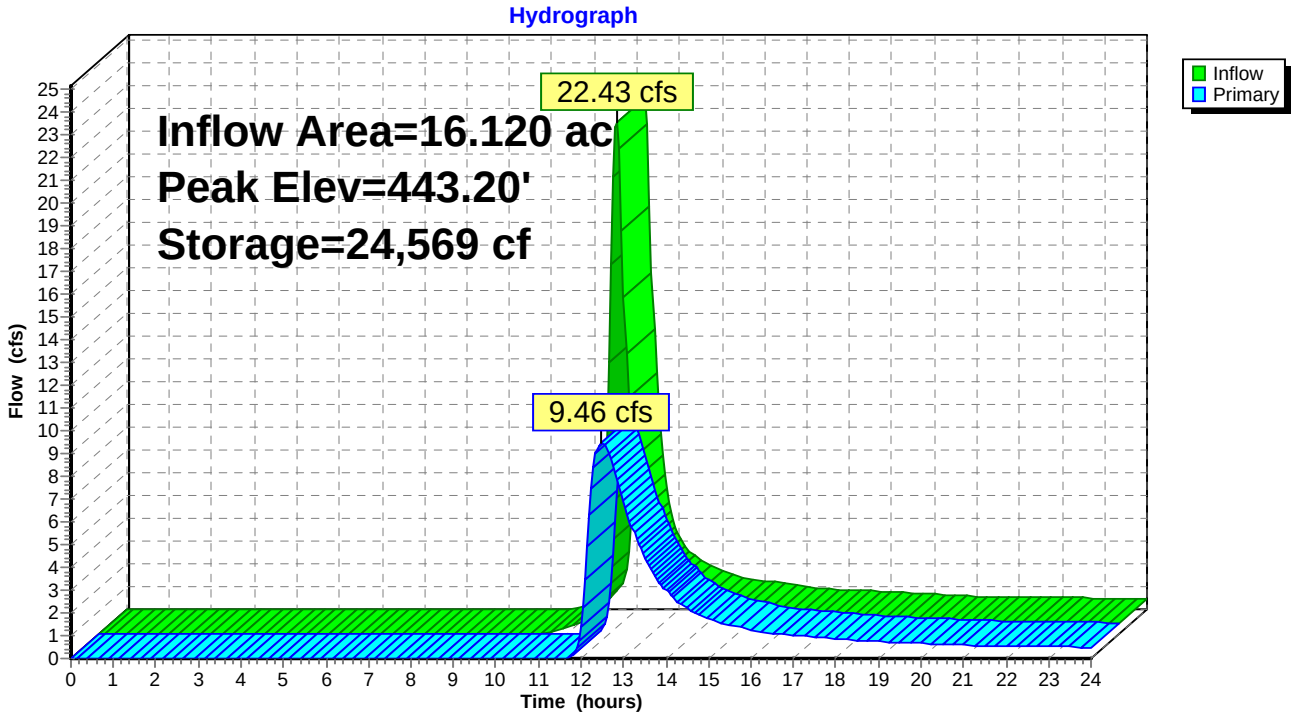
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

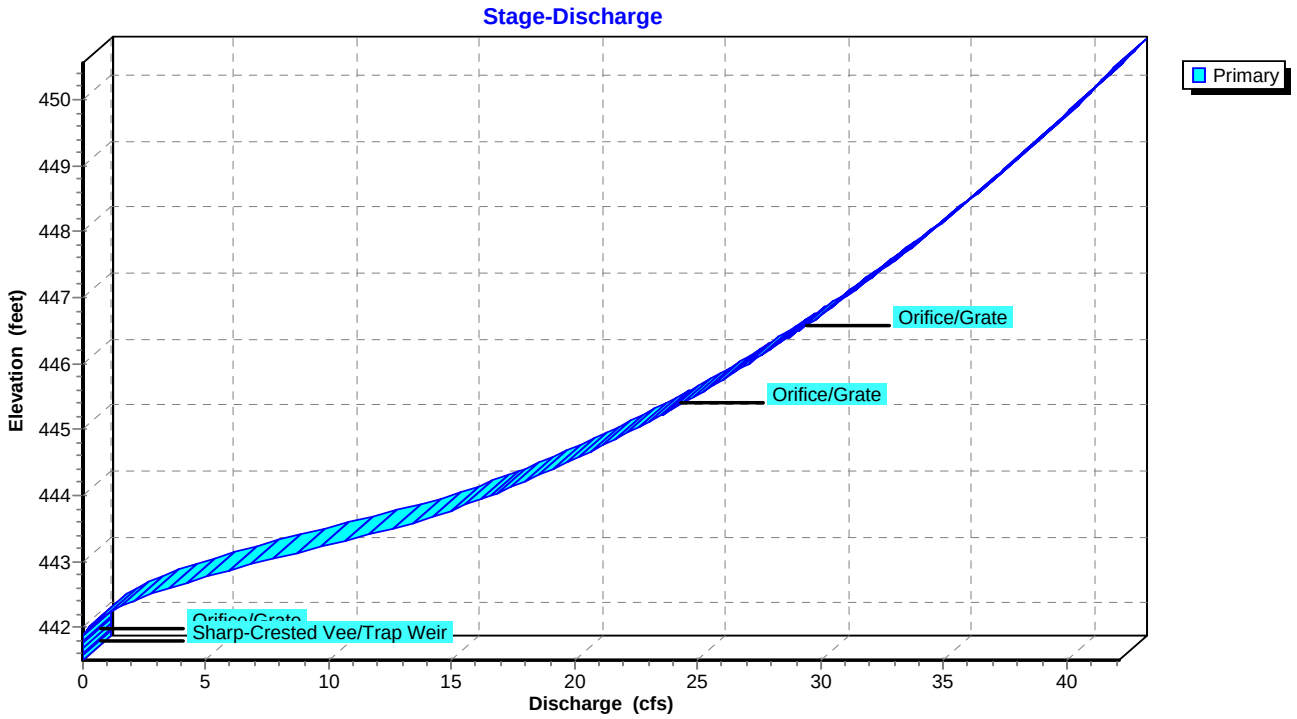
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.45 cfs @ 12.48 hrs HW=443.20' (Free Discharge)
- **1=Orifice/Grate** (Orifice Controls 9.45 cfs @ 4.03 fps)
  - **2=Sharp-Crested Vee/Trap Weir** (Passes 9.45 cfs of 15.20 cfs potential flow)
  - **3=Orifice/Grate** (Controls 0.00 cfs)
  - **4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 2.21" for 2-yr event
Inflow = 9.66 cfs @ 12.45 hrs, Volume= 1.244 af
Outflow = 1.37 cfs @ 13.87 hrs, Volume= 0.507 af, Atten= 86%, Lag= 85.5 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 1.37 cfs @ 13.87 hrs, Volume= 0.507 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.40' @ 13.87 hrs Surf.Area= 10,398 sf Storage= 34,831 cf

Plug-Flow detention time= 297.4 min calculated for 0.507 af (41% of inflow)
Center-of-Mass det. time= 177.4 min (1,019.7 - 842.3)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

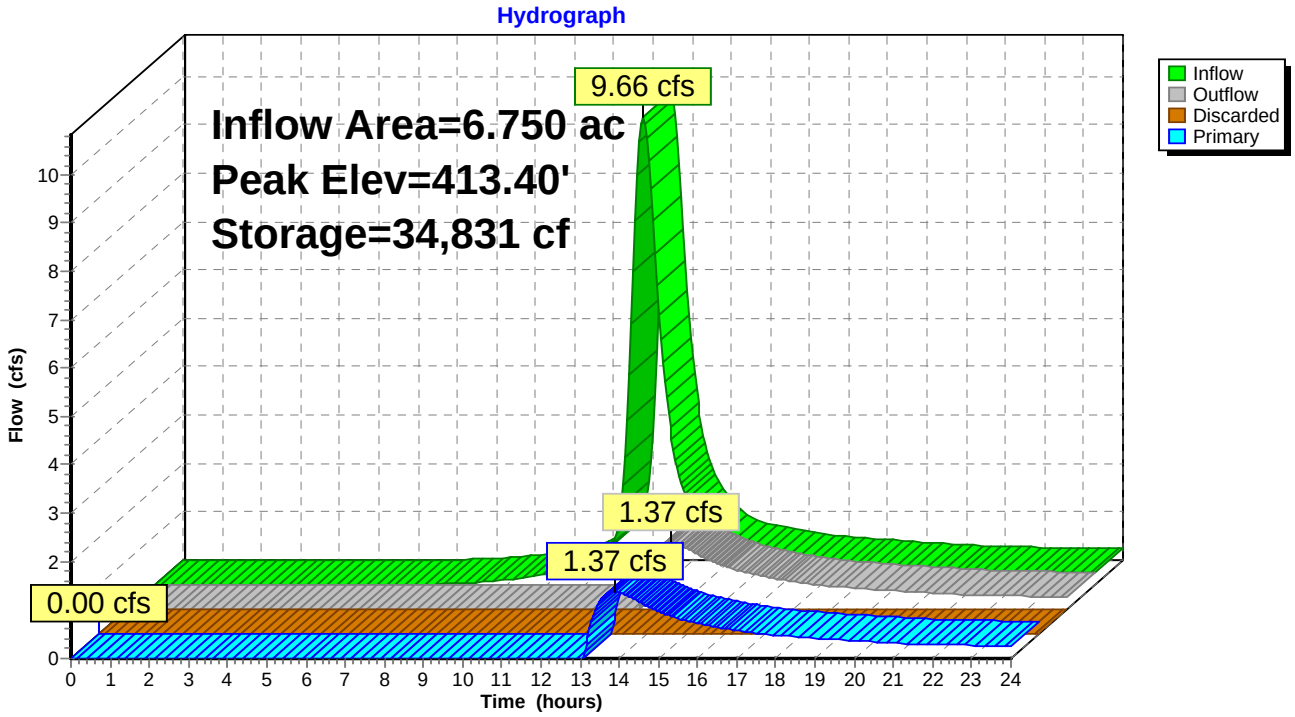
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

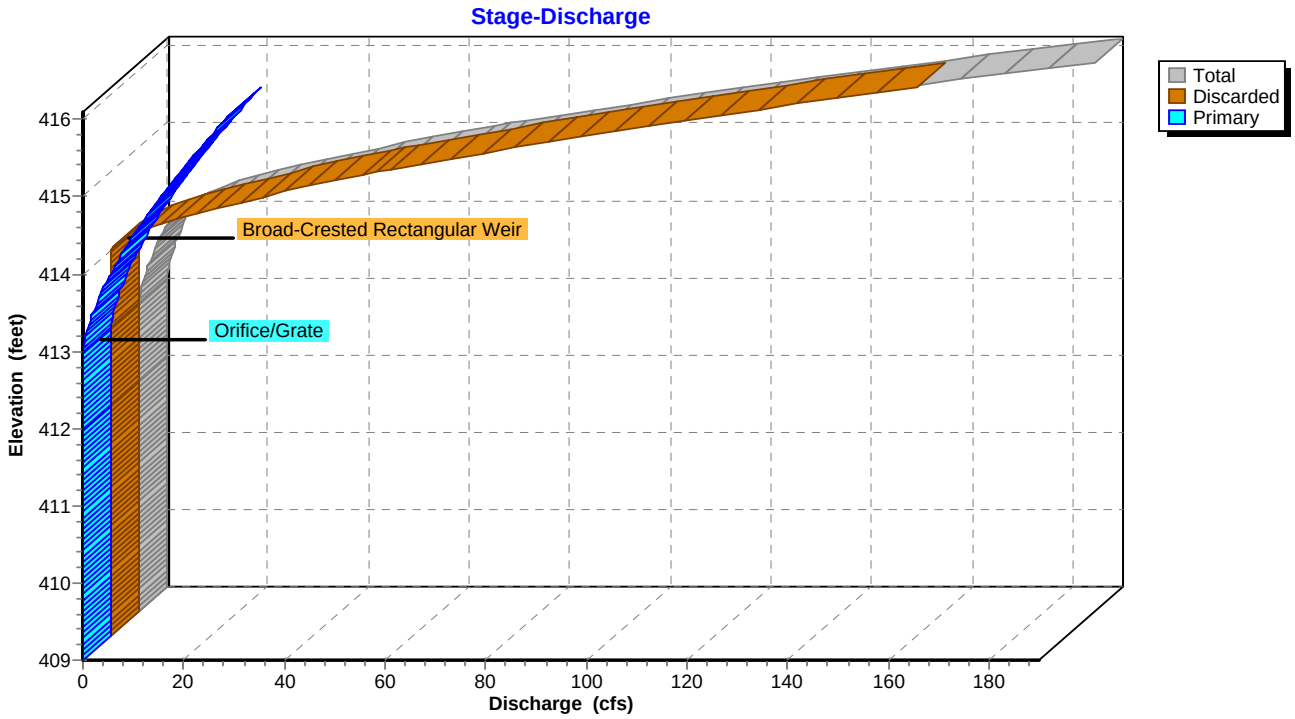
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=1.37 cfs @ 13.87 hrs HW=413.40' (Free Discharge)
└**1=Culvert** (Passes 1.37 cfs of 31.72 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 1.37 cfs @ 2.03 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 2.21" for 2-yr event
Inflow = 21.93 cfs @ 12.57 hrs, Volume= 3.201 af
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.89' @ 24.00 hrs Surf.Area= 33,712 sf Storage= 139,366 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	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

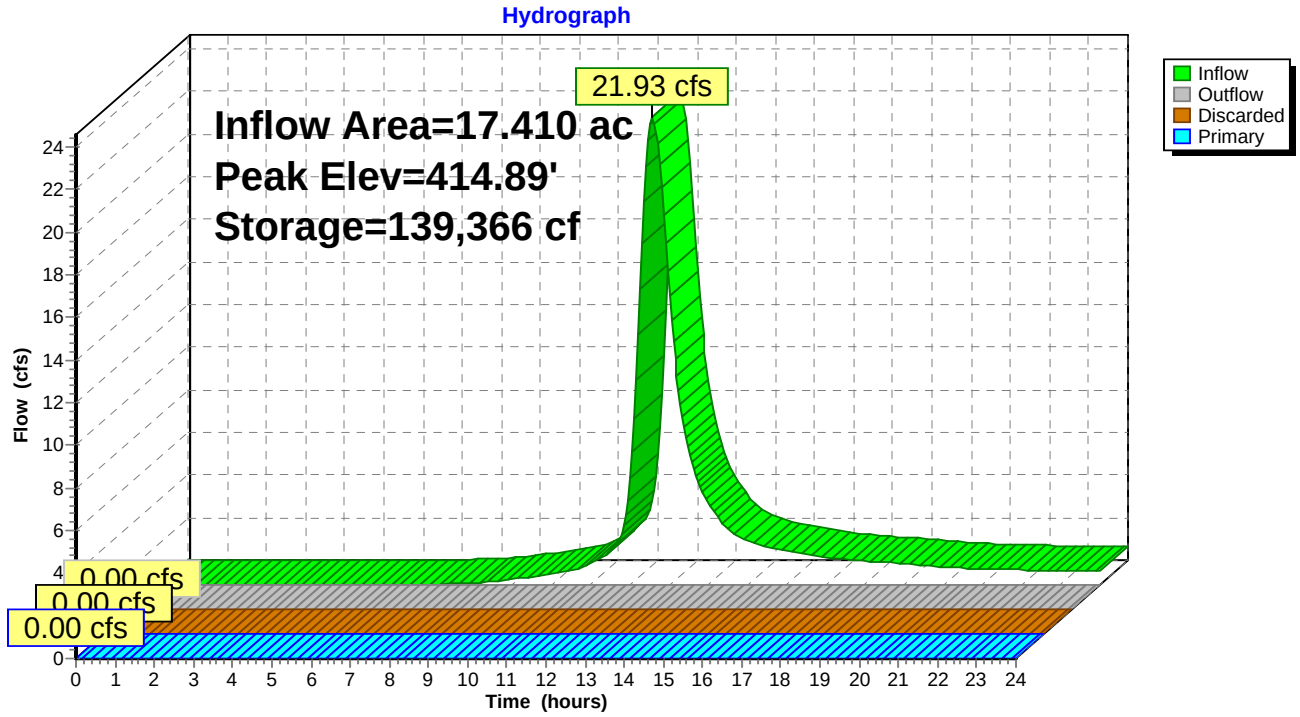
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

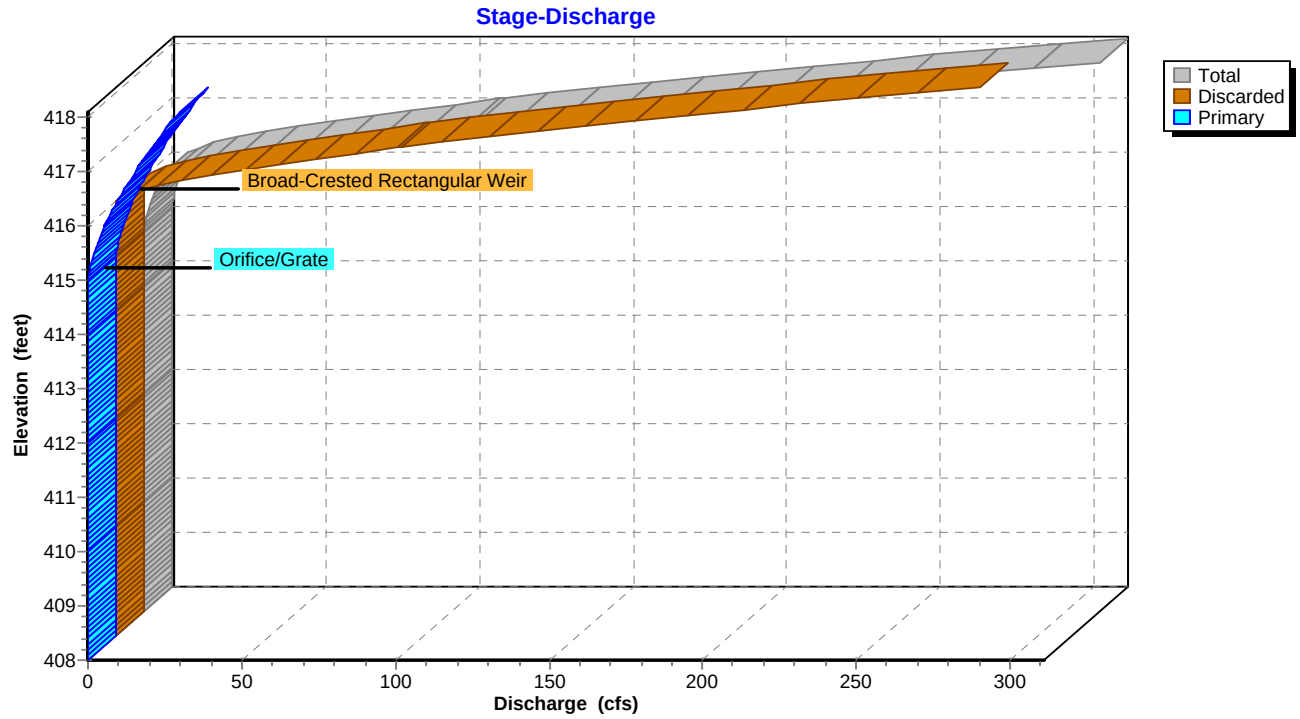
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
↑—**1=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 2.69" for 2-yr event
Inflow = 4.25 cfs @ 12.00 hrs, Volume= 0.238 af
Outflow = 0.05 cfs @ 19.59 hrs, Volume= 0.020 af, Atten= 99%, Lag= 455.2 min
Primary = 0.05 cfs @ 19.59 hrs, Volume= 0.020 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.36' @ 19.59 hrs Surf.Area= 7,868 sf Storage= 9,484 cf

Plug-Flow detention time= 734.5 min calculated for 0.020 af (8% of inflow)
Center-of-Mass det. time= 483.6 min (1,276.3 - 792.7)

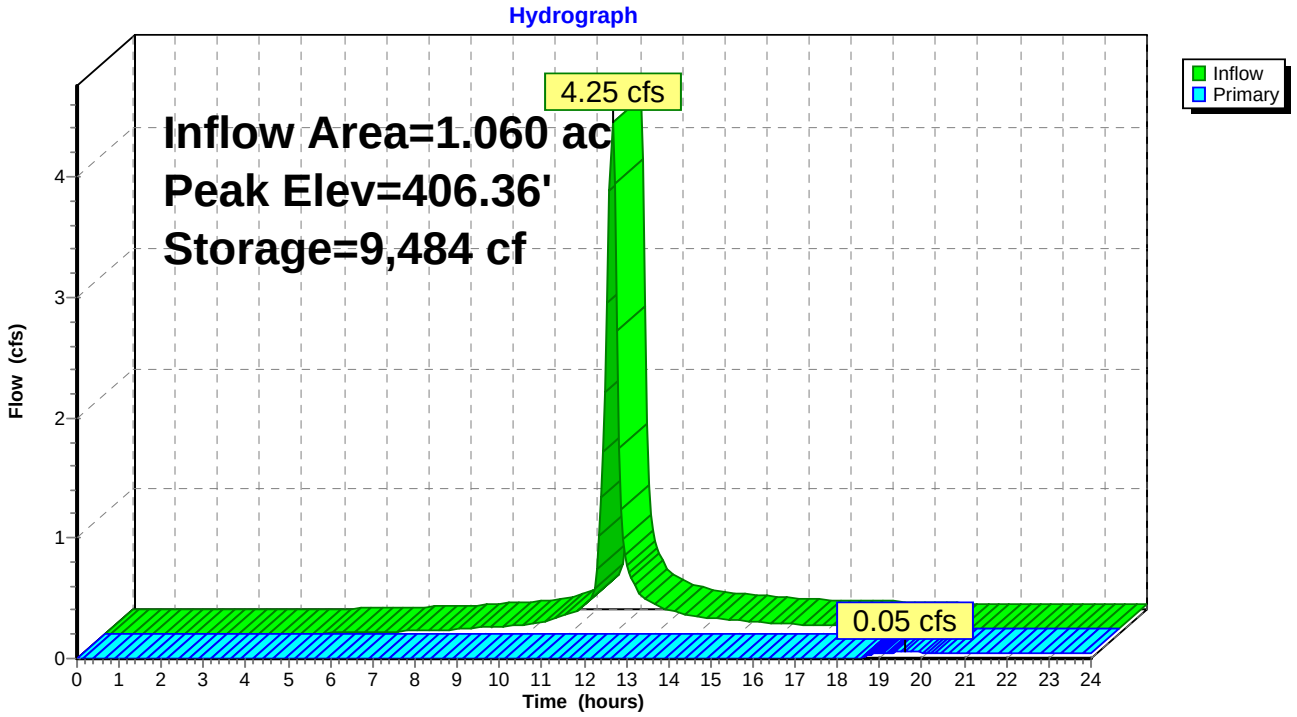
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

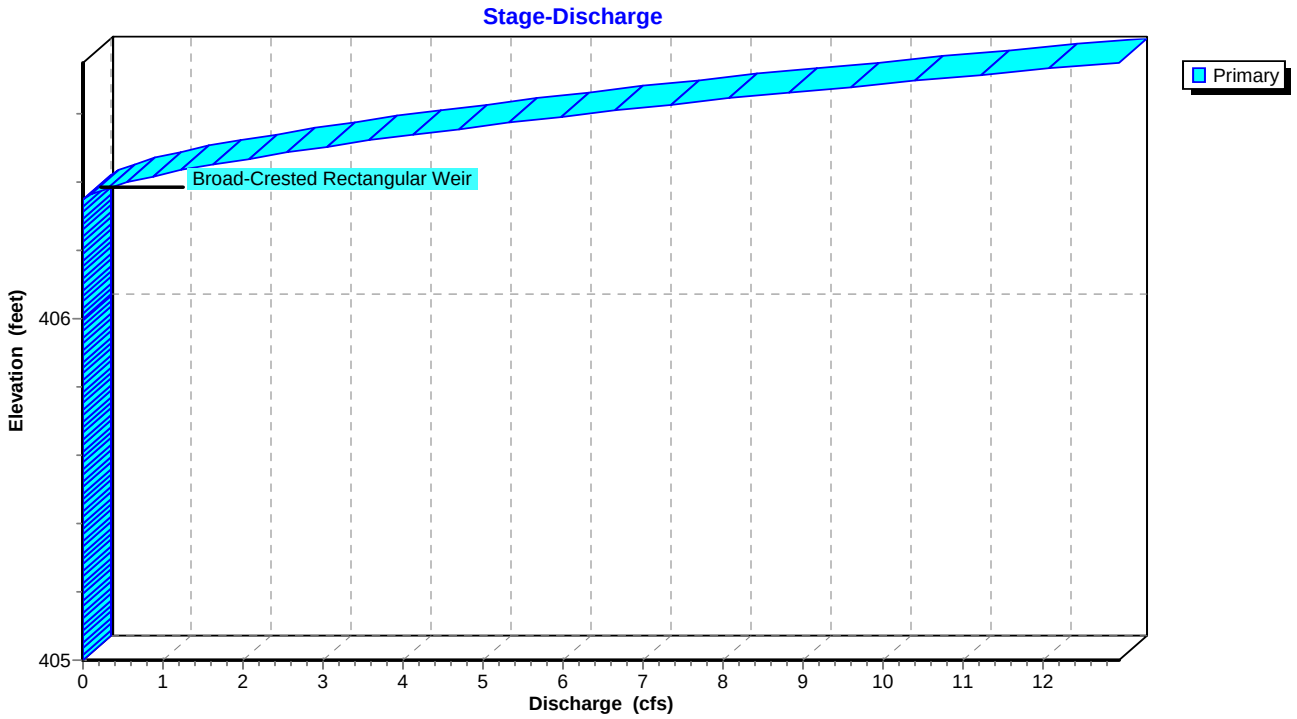
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.04 cfs @ 19.59 hrs HW=406.36' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.04 cfs @ 0.23 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 2.22" for 2-yr event
Inflow = 7.57 cfs @ 12.18 hrs, Volume= 0.650 af
Outflow = 2.64 cfs @ 12.56 hrs, Volume= 0.632 af, Atten= 65%, Lag= 22.7 min
Primary = 2.64 cfs @ 12.56 hrs, Volume= 0.632 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 424.91' @ 12.56 hrs Surf.Area= 5,876 sf Storage= 9,543 cf

Plug-Flow detention time= 59.1 min calculated for 0.631 af (97% of inflow)
Center-of-Mass det. time= 43.0 min (868.5 - 825.5)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

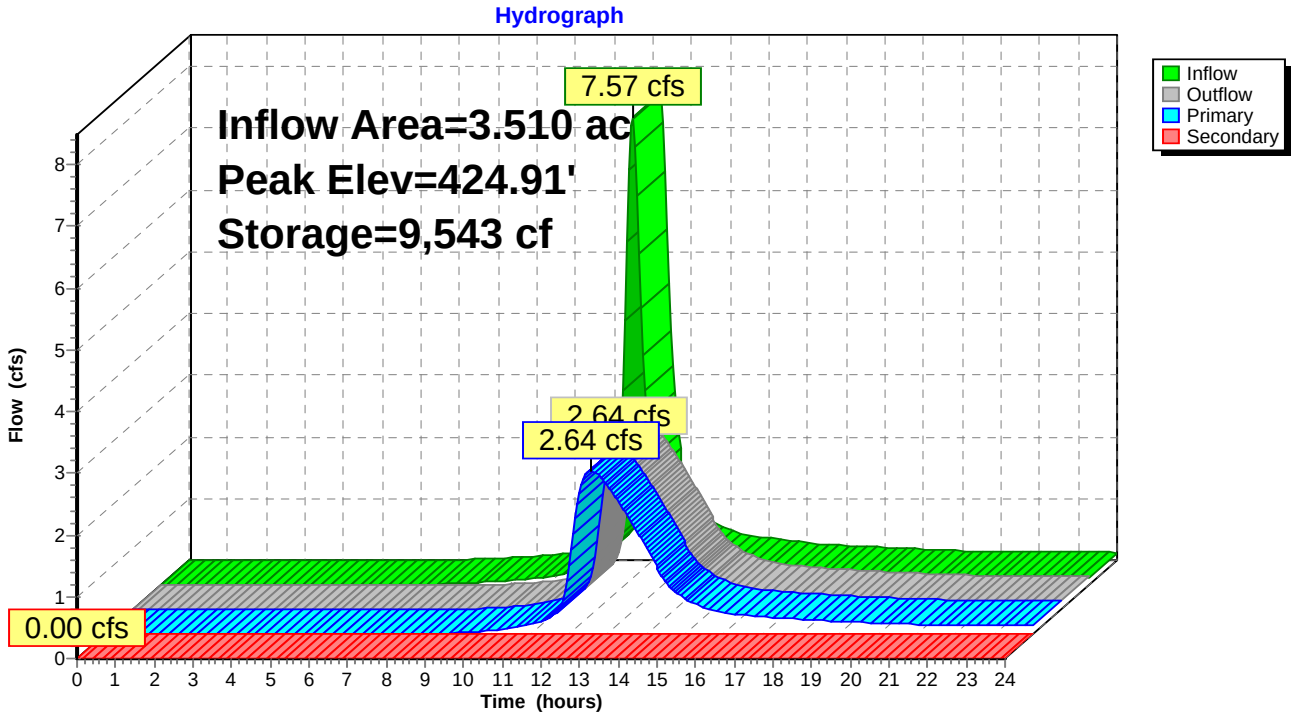
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

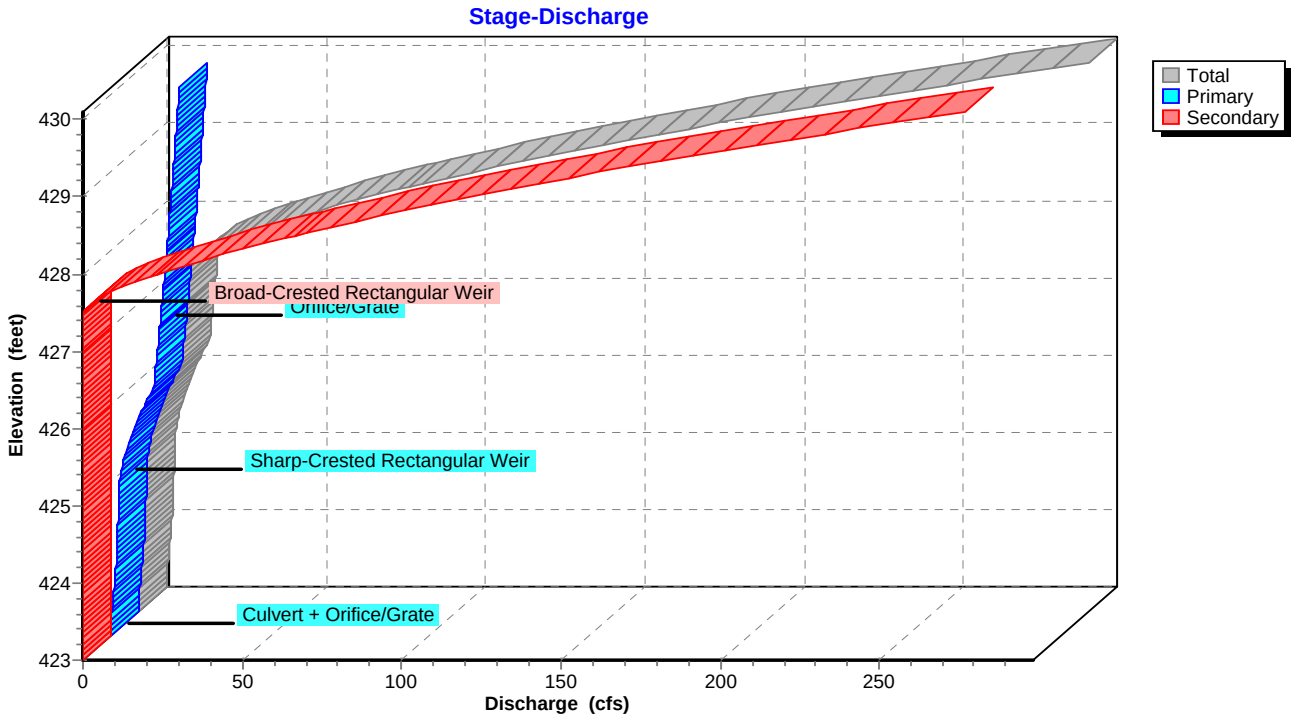
Primary OutFlow Max=2.64 cfs @ 12.56 hrs HW=424.91' (Free Discharge)
└**1=Culvert** (Passes 2.64 cfs of 9.18 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 2.64 cfs @ 5.97 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 1.68" for 2-yr event
Inflow = 1.61 cfs @ 12.08 hrs, Volume= 0.106 af
Outflow = 0.20 cfs @ 12.71 hrs, Volume= 0.050 af, Atten= 88%, Lag= 37.7 min
Discarded = 0.20 cfs @ 12.71 hrs, Volume= 0.050 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 407.71' @ 12.71 hrs Surf.Area= 2,287 sf Storage= 2,537 cf

Plug-Flow detention time= 263.3 min calculated for 0.050 af (47% of inflow)
Center-of-Mass det. time= 141.2 min (981.9 - 840.6)

Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

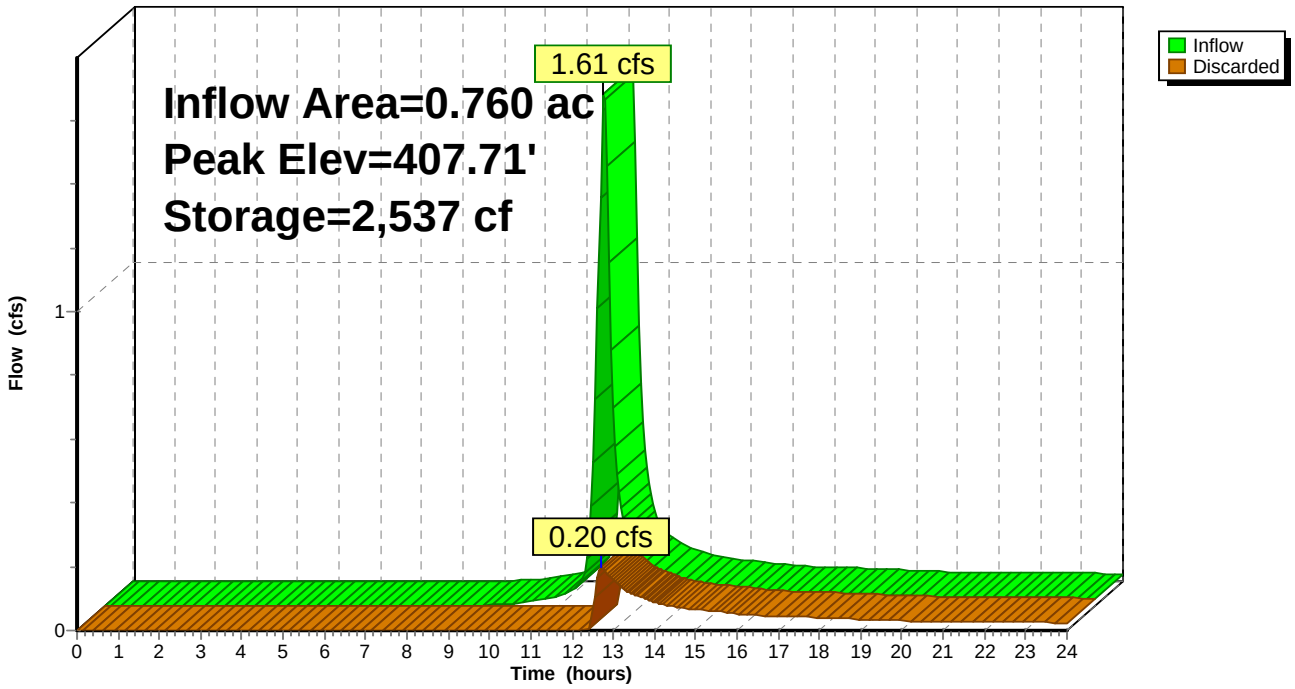
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=0.20 cfs @ 12.71 hrs HW=407.71' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 0.20 cfs @ 0.49 fps)

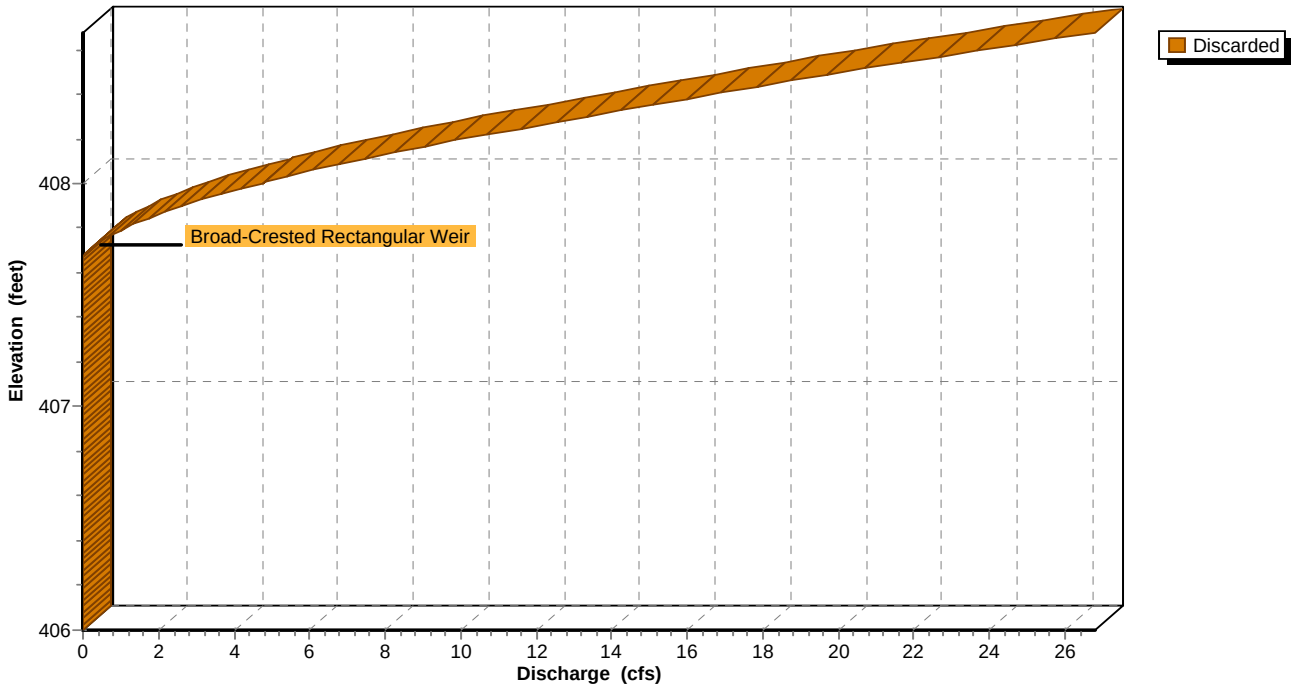
Pond Sed-2: Sed Trap 2

Hydrograph



Pond Sed-2: Sed Trap 2

Stage-Discharge



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>2.04"
Flow Length=777' Tc=38.6 min CN=74 Runoff=33.68 cfs 3.878 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>2.21"
Flow Length=209' Tc=23.3 min CN=76 Runoff=36.16 cfs 2.972 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>3.18"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=13.82 cfs 1.787 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>3.17"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=31.39 cfs 4.599 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>3.71"
Tc=9.2 min CN=92 Runoff=5.76 cfs 0.328 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>2.55"
Tc=15.6 min CN=80 Runoff=2.45 cfs 0.162 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>2.09"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=8.70 cfs 1.696 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>3.19"
Flow Length=234' Tc=25.2 min CN=87 Runoff=10.79 cfs 0.934 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>2.20"
Flow Length=590' Tc=36.5 min CN=76 Runoff=5.64 cfs 0.619 af

Reach R-1: R-1 Avg. Flow Depth=0.56' Max Vel=4.29 fps Inflow=14.79 cfs 2.866 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=14.75 cfs 2.853 af

Reach R-2: R-2 Avg. Flow Depth=1.62' Max Vel=1.91 fps Inflow=47.03 cfs 6.731 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=39.47 cfs 6.599 af

Reach R-3: R-3 Avg. Flow Depth=2.36' Max Vel=1.39 fps Inflow=43.65 cfs 8.696 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=43.25 cfs 8.652 af

Reach R-4: R-4 Avg. Flow Depth=2.53' Max Vel=1.30 fps Inflow=43.60 cfs 8.762 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=43.33 cfs 8.725 af

Pond Pond 1b: Pond 1b Peak Elev=443.75' Storage=40,079 cf Inflow=36.16 cfs 2.972 af
Outflow=14.79 cfs 2.866 af

Pond Pond 1c: Pond 1c Peak Elev=413.95' Storage=40,697 cf Inflow=13.82 cfs 1.787 af
Discarded=0.00 cfs 0.000 af Primary=5.02 cfs 1.044 af Outflow=5.02 cfs 1.044 af

Pond Pond 1d: Pond 1d Peak Elev=415.45' Storage=159,339 cf Inflow=31.39 cfs 4.599 af
Discarded=0.00 cfs 0.000 af Primary=1.67 cfs 1.053 af Outflow=1.67 cfs 1.053 af

Pond Pond 1e: Pond 1e Peak Elev=406.39' Storage=9,707 cf Inflow=5.76 cfs 0.328 af
Outflow=0.36 cfs 0.110 af

Pond Pond 3: Pond 3 Peak Elev=425.46' Storage=12,884 cf Inflow=10.79 cfs 0.934 af
Primary=5.24 cfs 0.913 af Secondary=0.00 cfs 0.000 af Outflow=5.24 cfs 0.913 af

Pond Sed-2: Sed Trap 2 Peak Elev=407.83' Storage=2,818 cf Inflow=2.45 cfs 0.162 af
Outflow=1.55 cfs 0.105 af

Summary for Subcatchment P-1a: P-1a

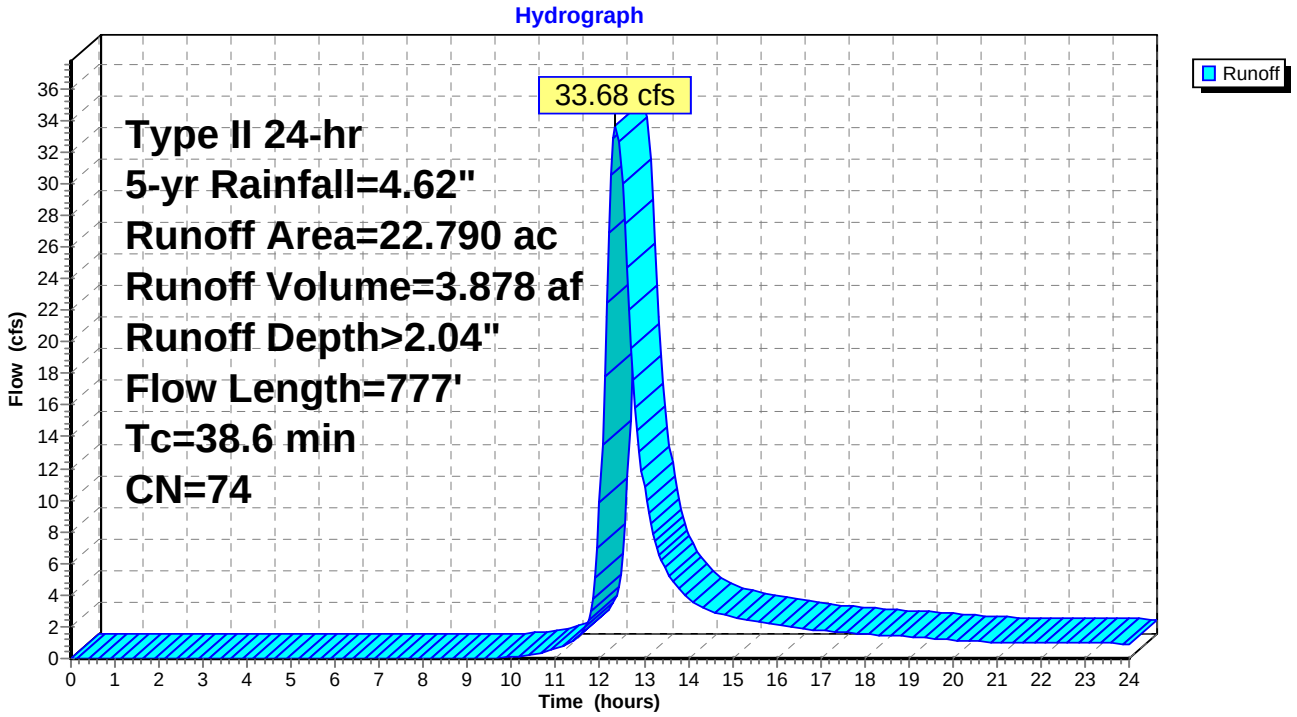
Runoff = 33.68 cfs @ 12.36 hrs, Volume= 3.878 af, Depth> 2.04"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

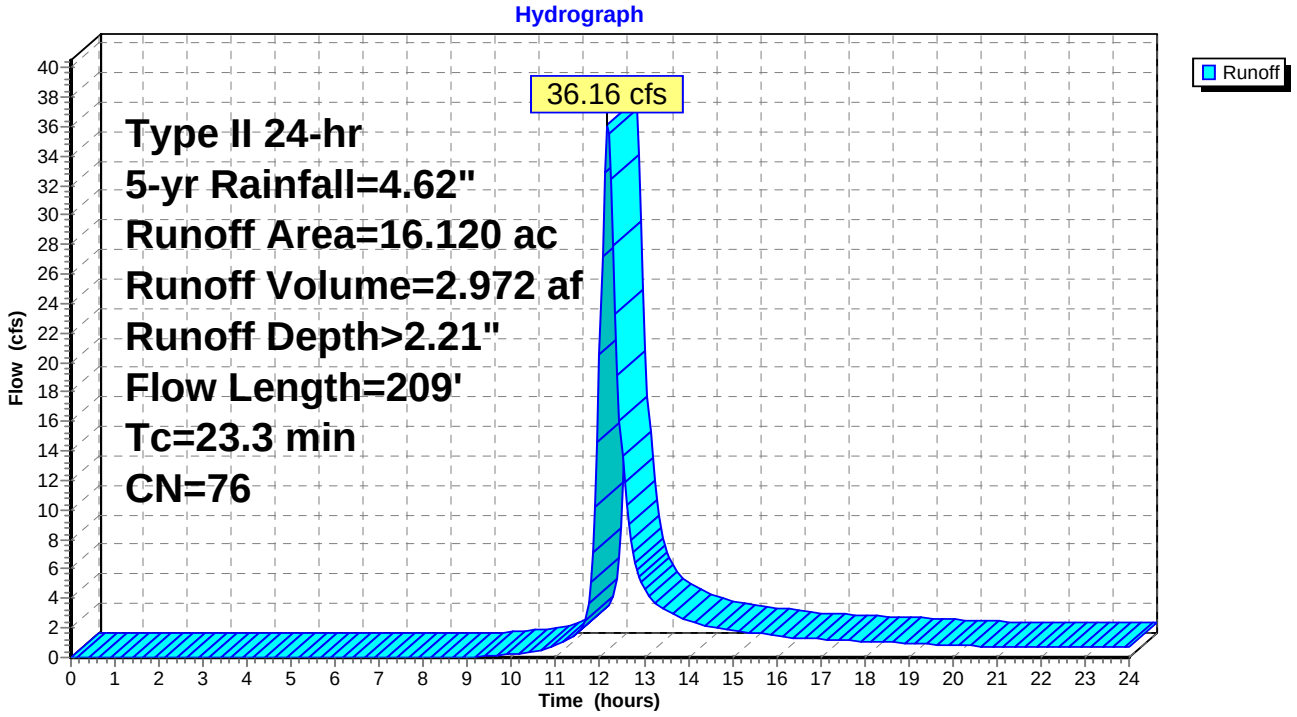
Runoff = 36.16 cfs @ 12.17 hrs, Volume= 2.972 af, Depth> 2.21"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

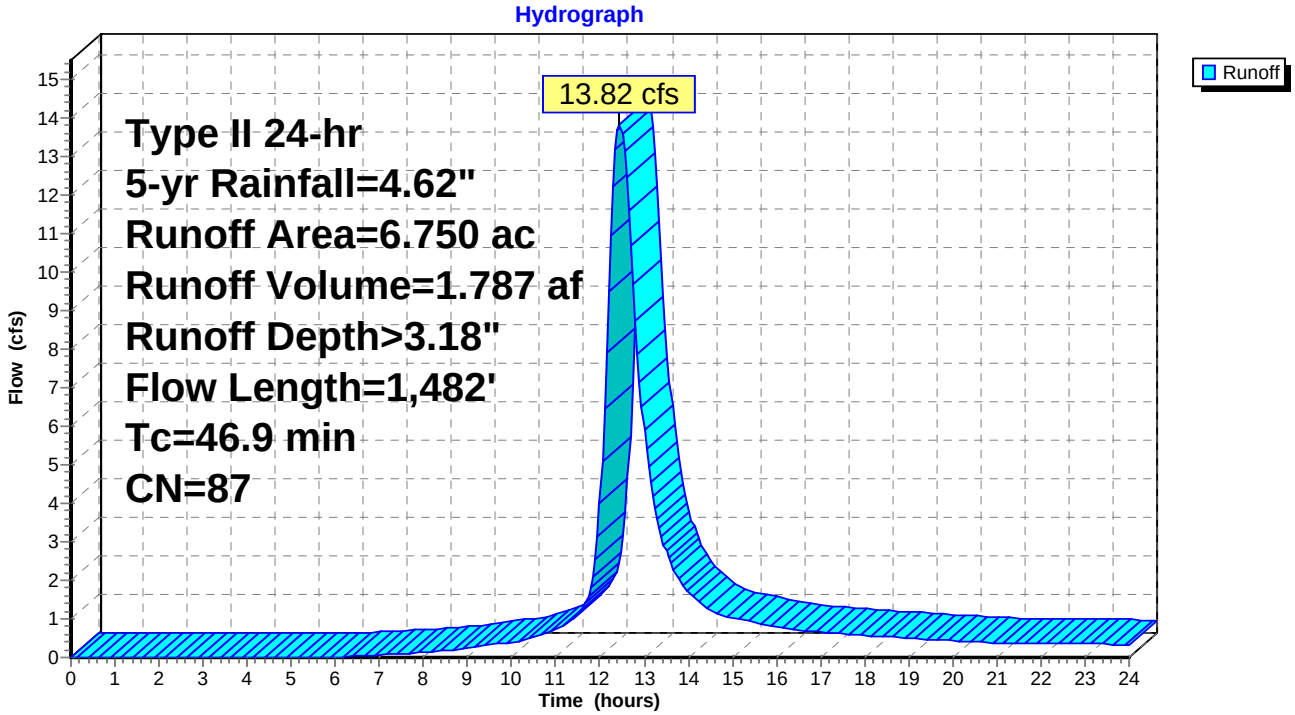
Runoff = 13.82 cfs @ 12.44 hrs, Volume= 1.787 af, Depth> 3.18"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

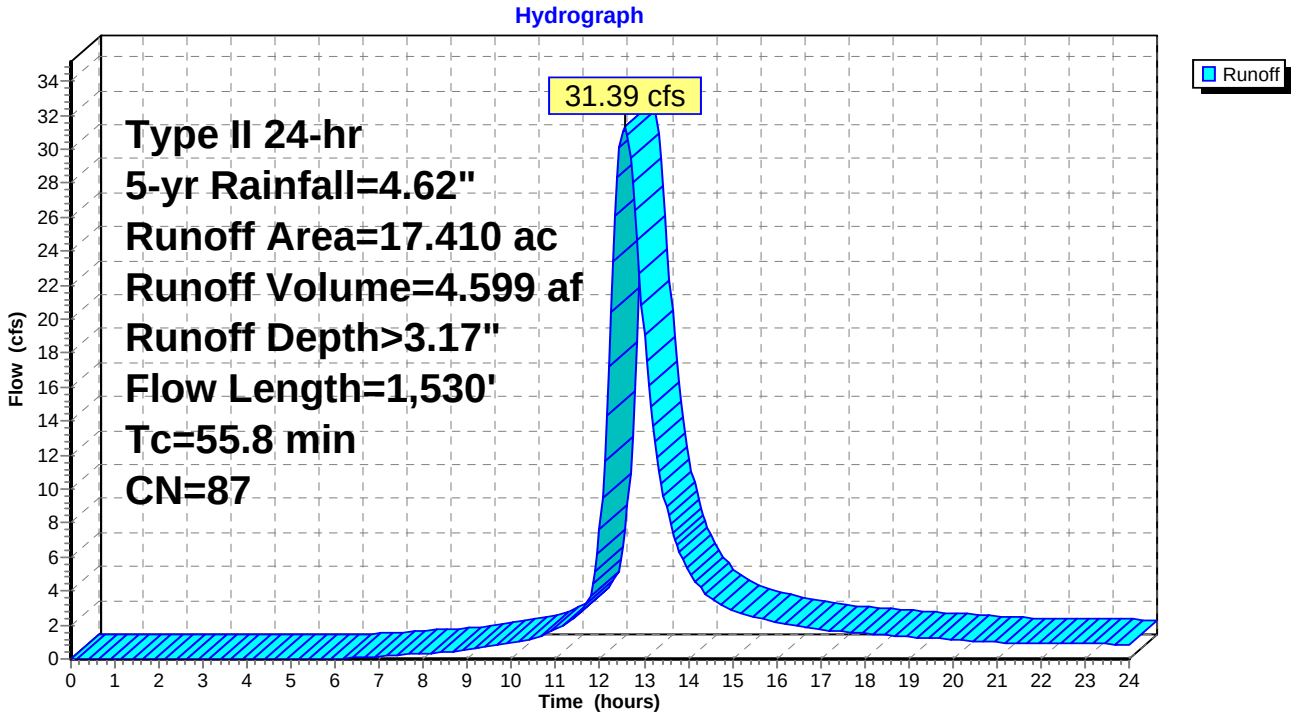
Runoff = 31.39 cfs @ 12.56 hrs, Volume= 4.599 af, Depth> 3.17"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

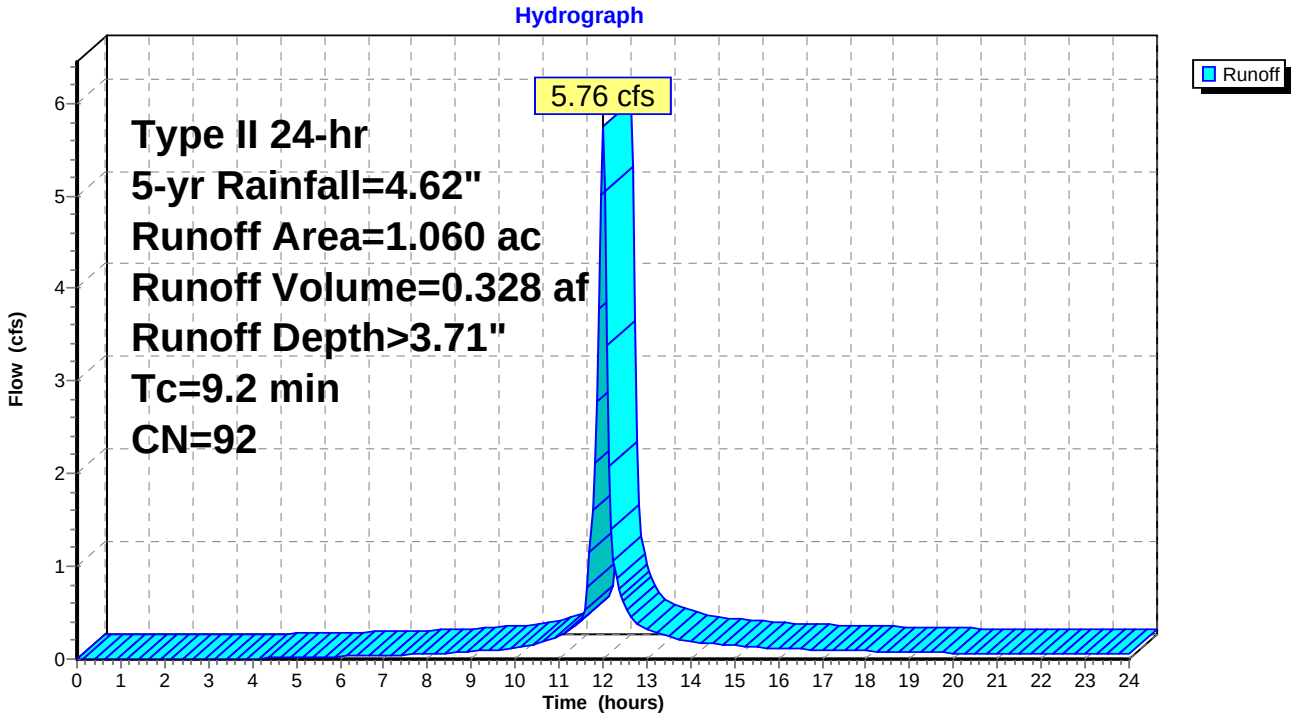
Runoff = 5.76 cfs @ 12.00 hrs, Volume= 0.328 af, Depth> 3.71"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

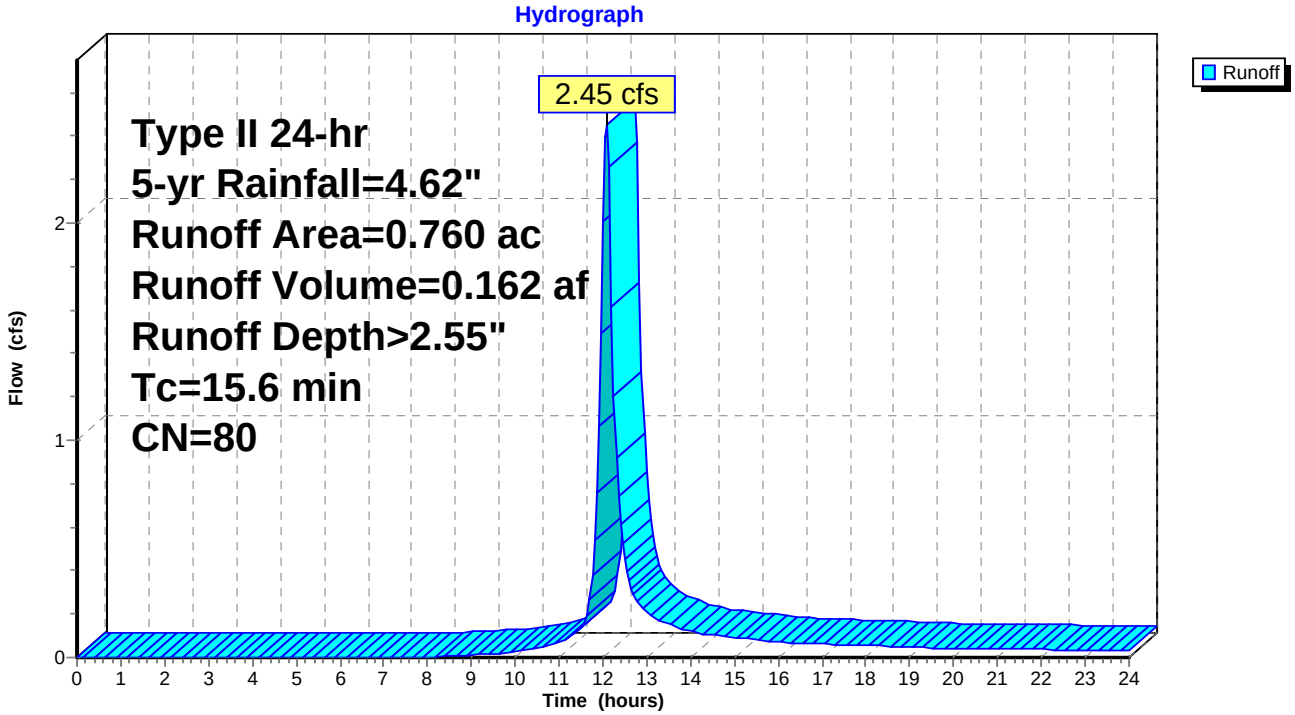
Runoff = 2.45 cfs @ 12.08 hrs, Volume= 0.162 af, Depth> 2.55"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

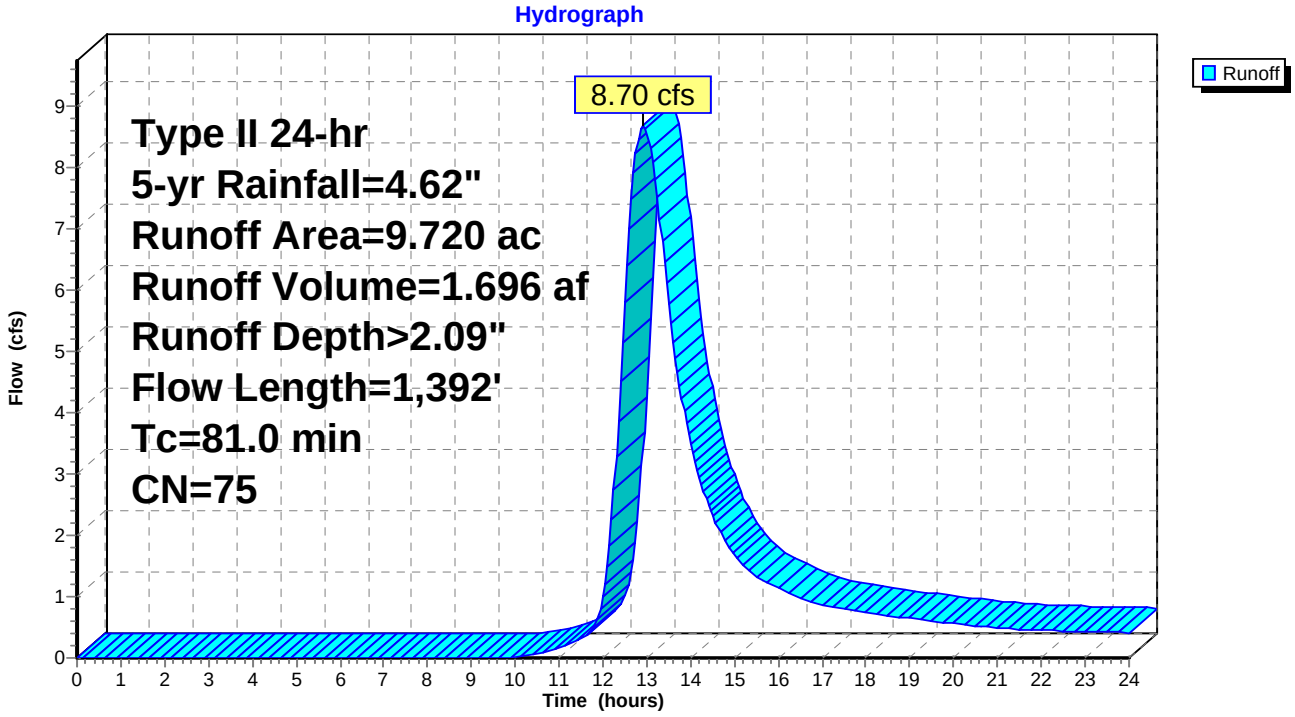
Runoff = 8.70 cfs @ 12.91 hrs, Volume= 1.696 af, Depth> 2.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

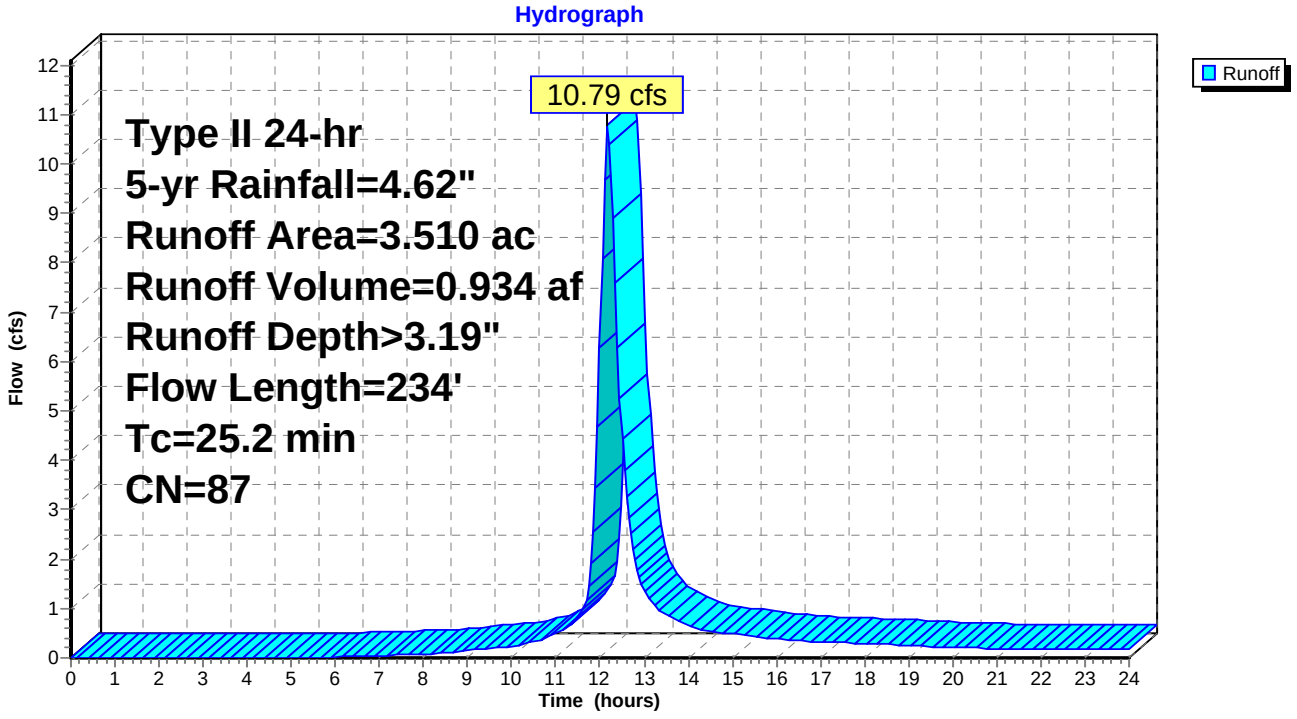
Runoff = 10.79 cfs @ 12.18 hrs, Volume= 0.934 af, Depth> 3.19"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

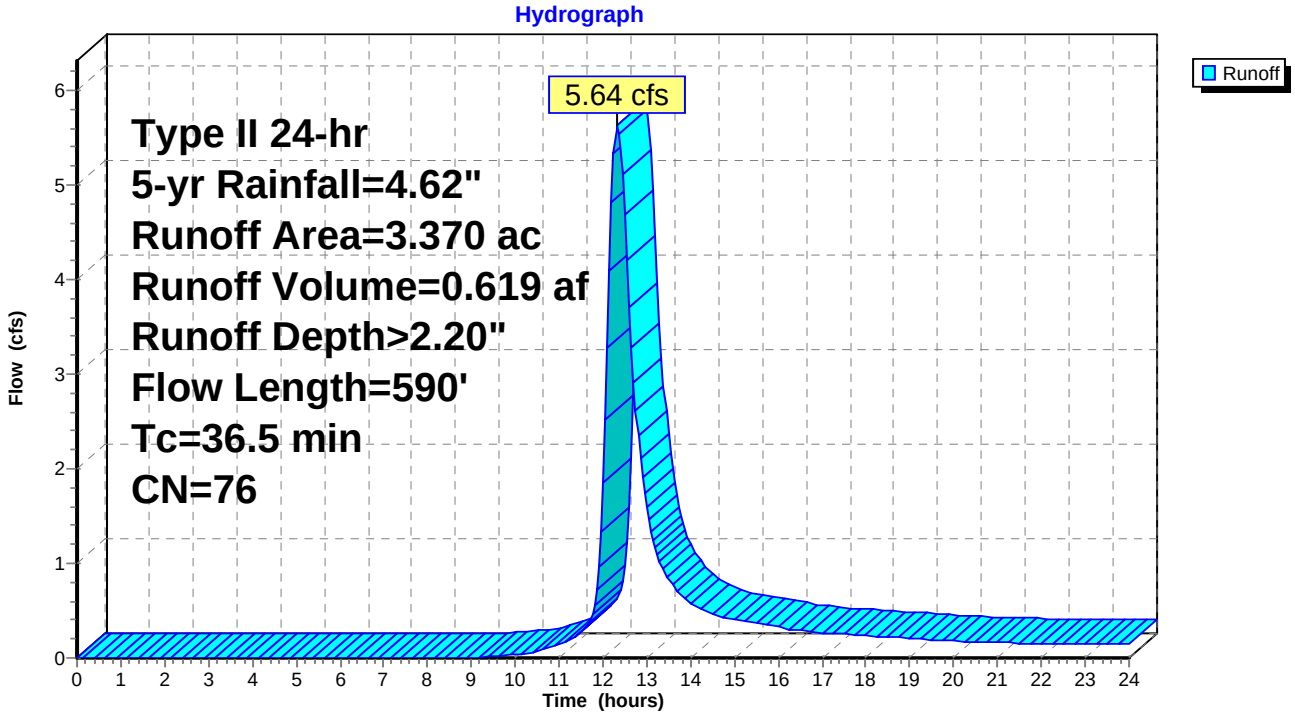
Runoff = 5.64 cfs @ 12.33 hrs, Volume= 0.619 af, Depth> 2.20"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.13" for 5-yr event
Inflow = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af
Outflow = 14.75 cfs @ 12.58 hrs, Volume= 2.853 af, Atten= 0%, Lag= 6.2 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.29 fps, Min. Travel Time= 3.4 min
Avg. Velocity = 2.01 fps, Avg. Travel Time= 7.3 min

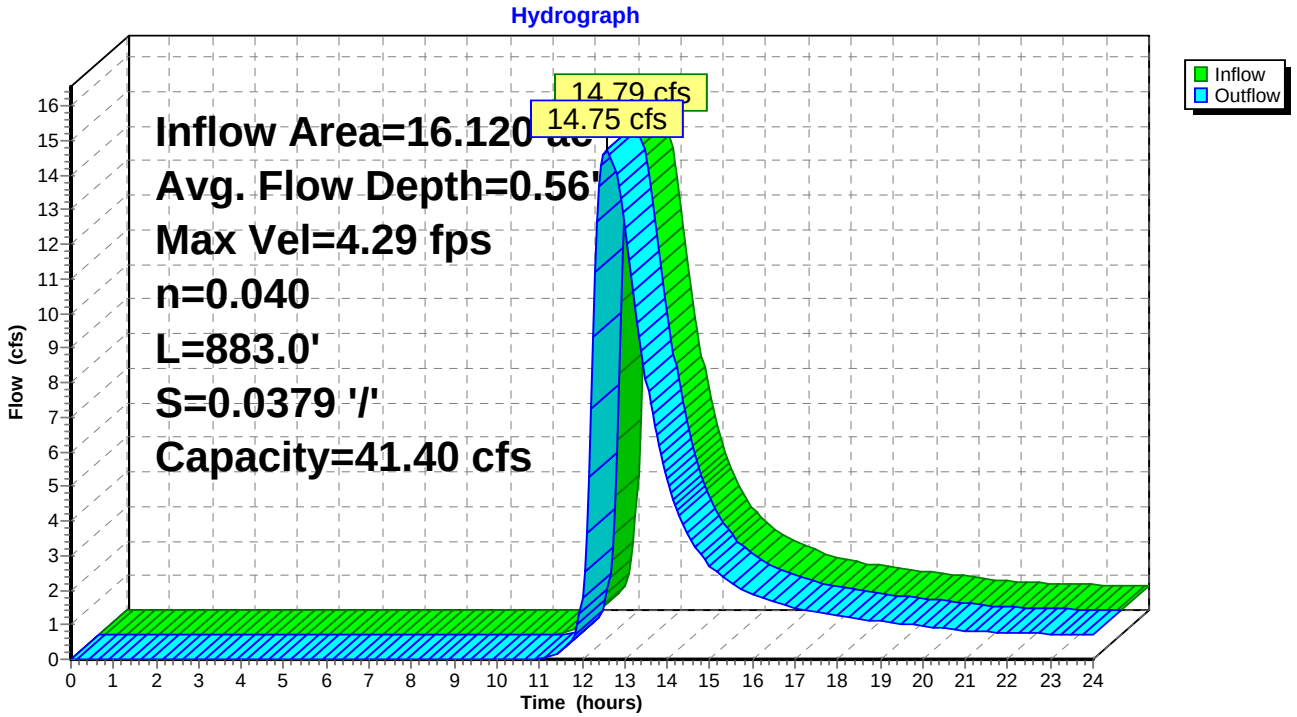
Peak Storage= 3,033 cf @ 12.52 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 7.24'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

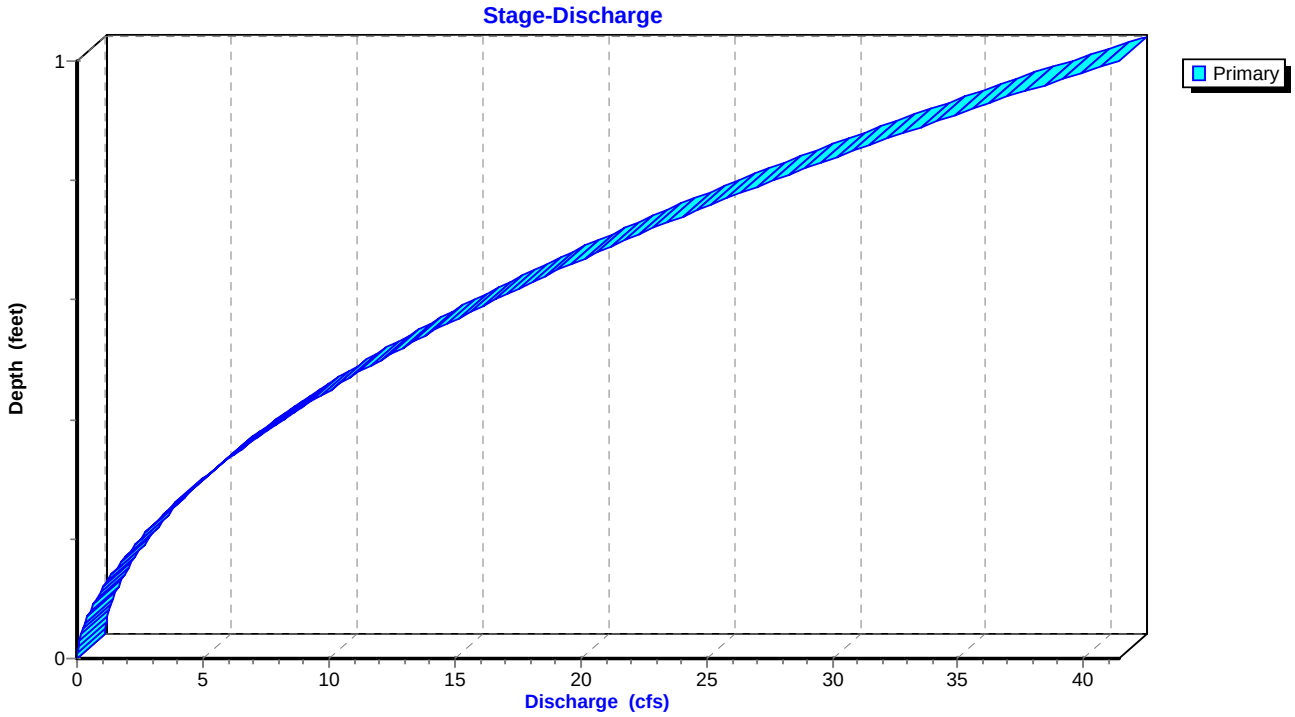


‡

Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Depth (feet)
Discharge (cfs)
Primary
0
1
0
5
10
15
20
25
30
35
40

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 2.04" for 5-yr event
Inflow = 47.03 cfs @ 12.40 hrs, Volume= 6.731 af
Outflow = 39.47 cfs @ 12.85 hrs, Volume= 6.599 af, Atten= 16%, Lag= 27.2 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.91 fps, Min. Travel Time= 15.0 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 34.2 min

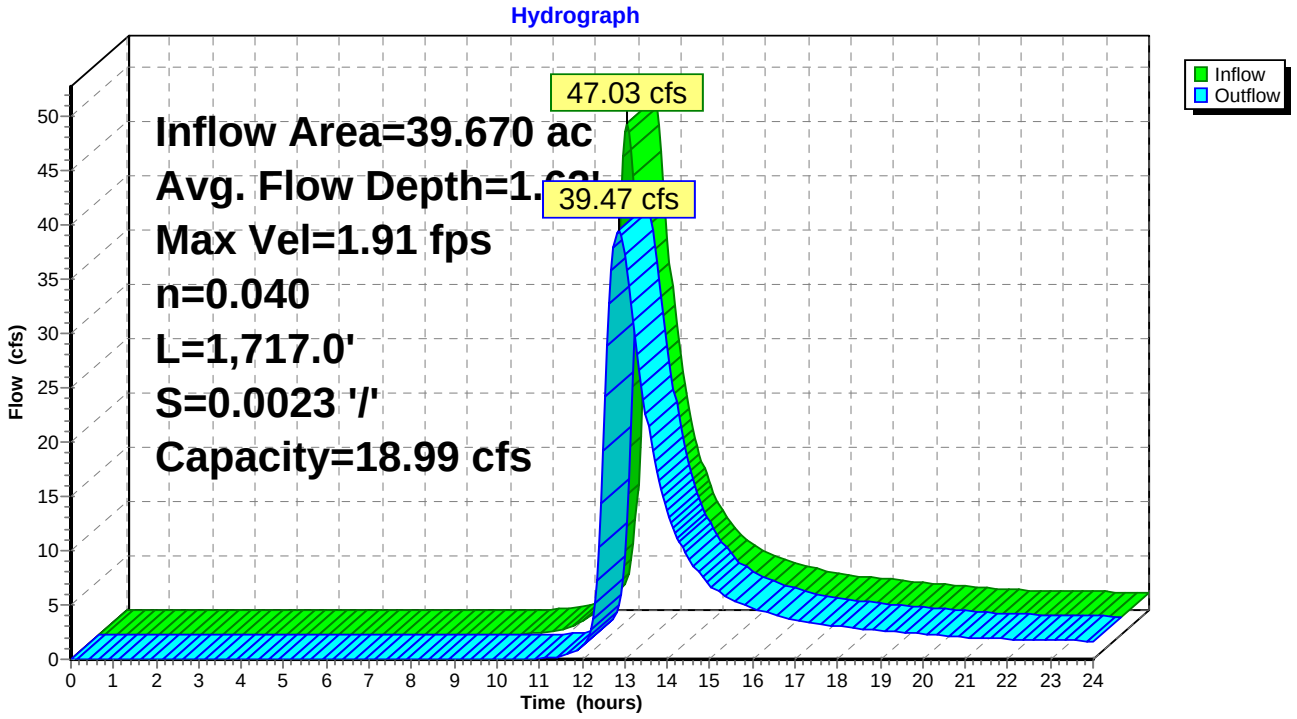
Peak Storage= 35,554 cf @ 12.60 hrs
Average Depth at Peak Storage= 1.62' , Surface Width= 16.49'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

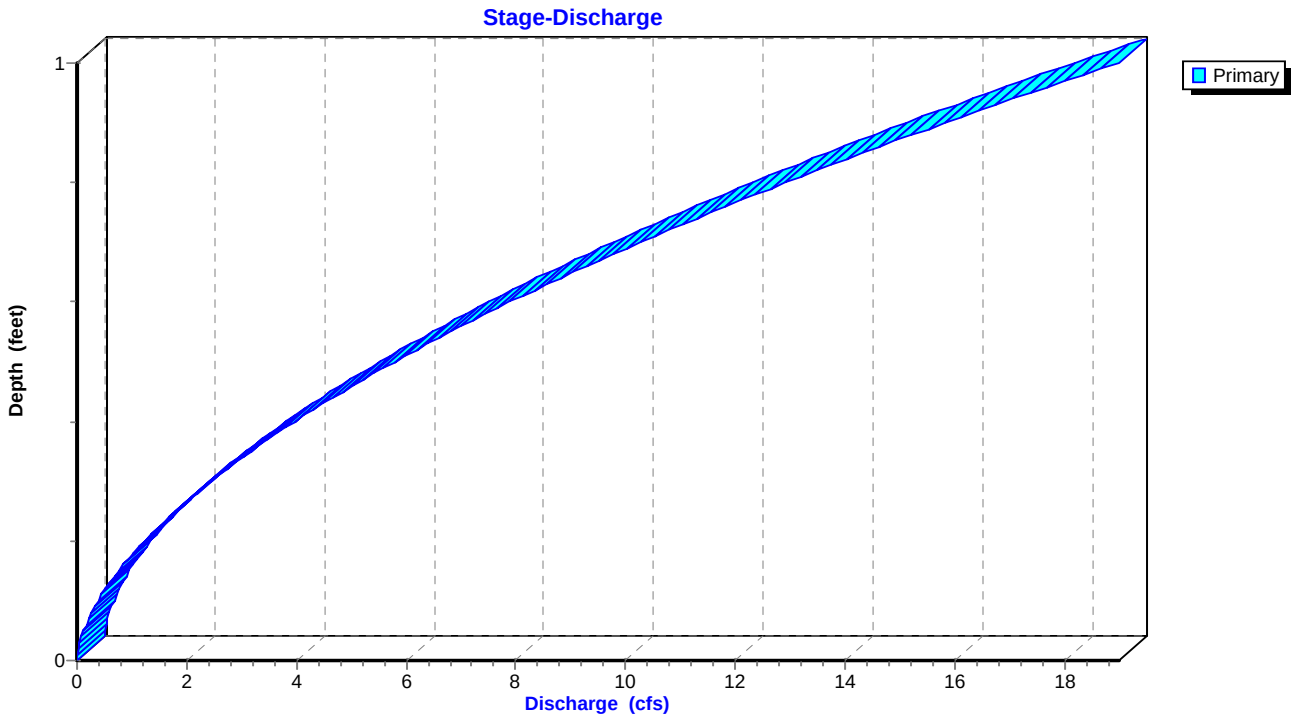


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Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 1.63" for 5-yr event
Inflow = 43.65 cfs @ 12.88 hrs, Volume= 8.696 af
Outflow = 43.25 cfs @ 12.99 hrs, Volume= 8.652 af, Atten= 1%, Lag= 6.7 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.39 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 6.3 min

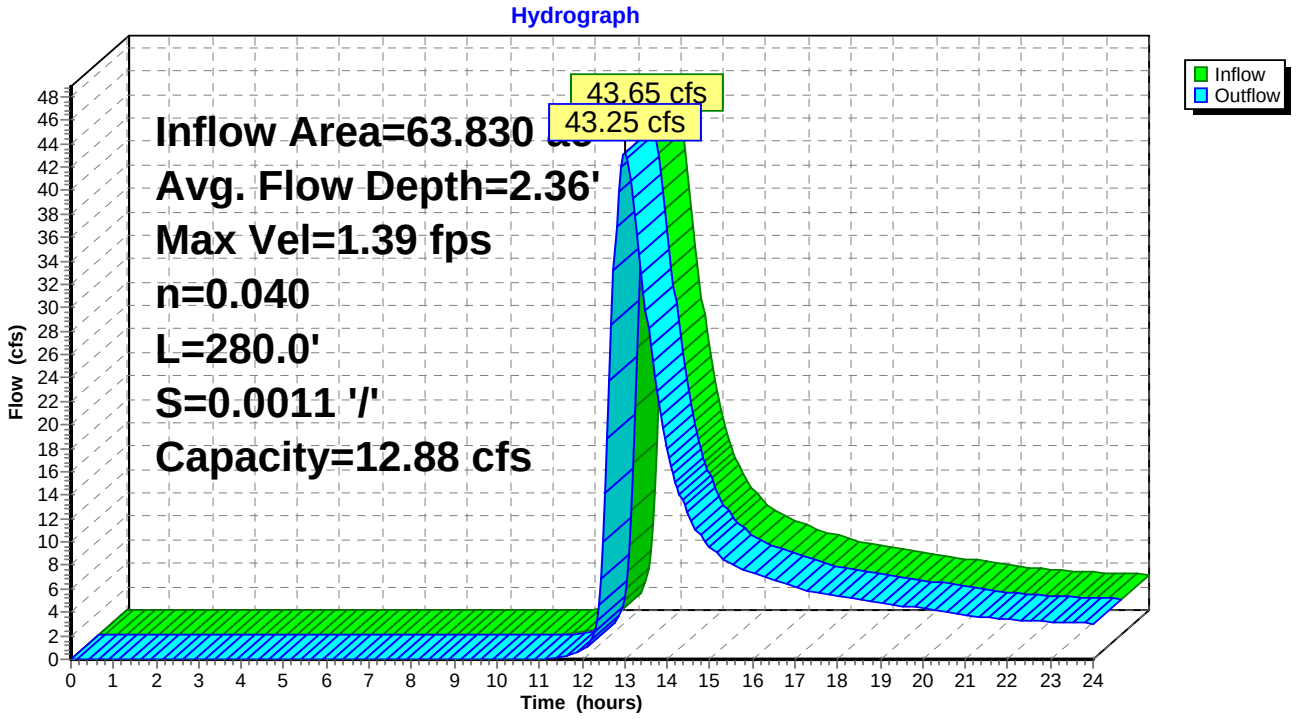
Peak Storage= 8,697 cf @ 12.94 hrs
Average Depth at Peak Storage= 2.36' , Surface Width= 19.45'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

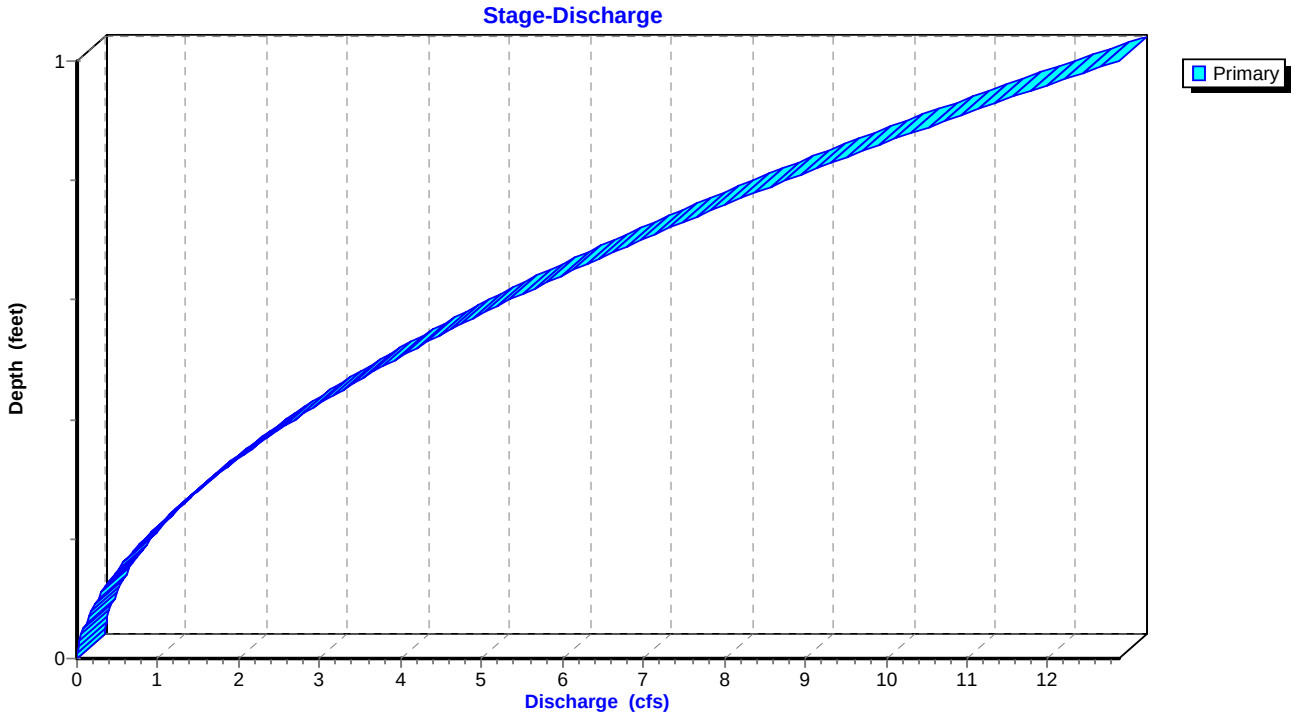


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Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 1.62" for 5-yr event
Inflow = 43.60 cfs @ 12.99 hrs, Volume= 8.762 af
Outflow = 43.33 cfs @ 13.09 hrs, Volume= 8.725 af, Atten= 1%, Lag= 5.5 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.30 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 0.71 fps, Avg. Travel Time= 5.2 min

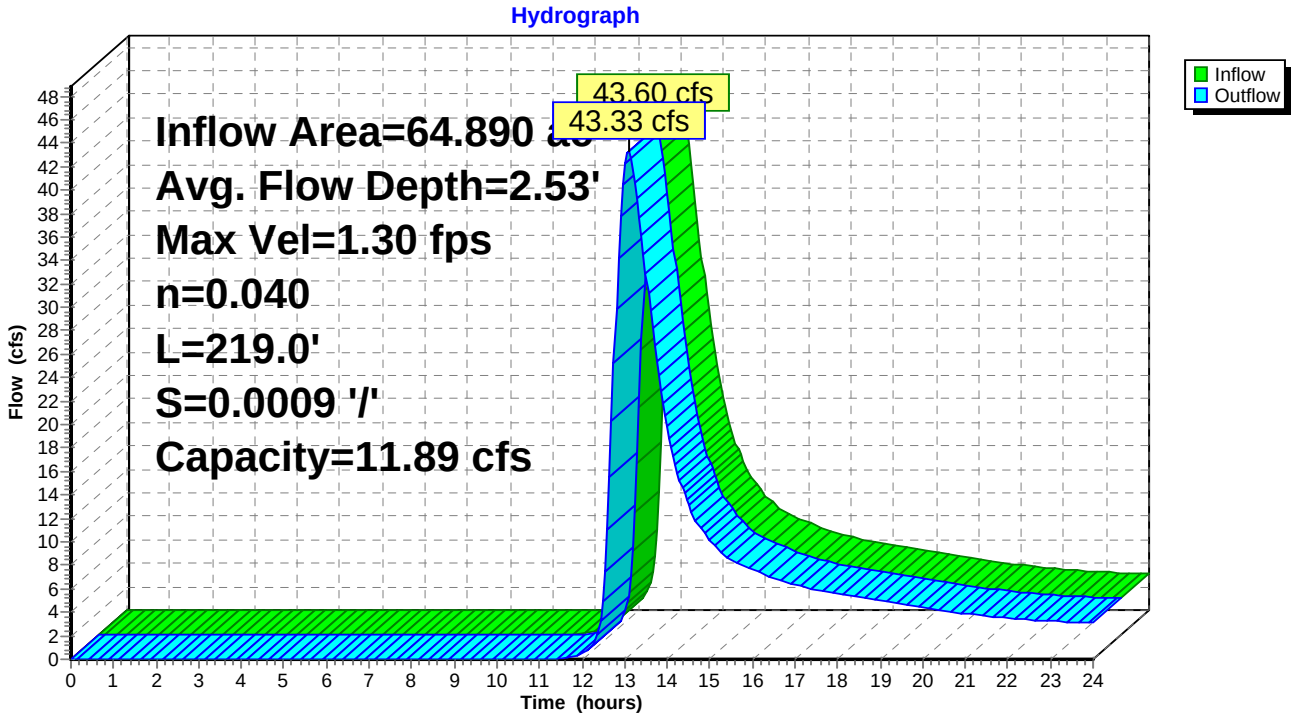
Peak Storage= 7,306 cf @ 13.04 hrs
Average Depth at Peak Storage= 2.53' , Surface Width= 20.11'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

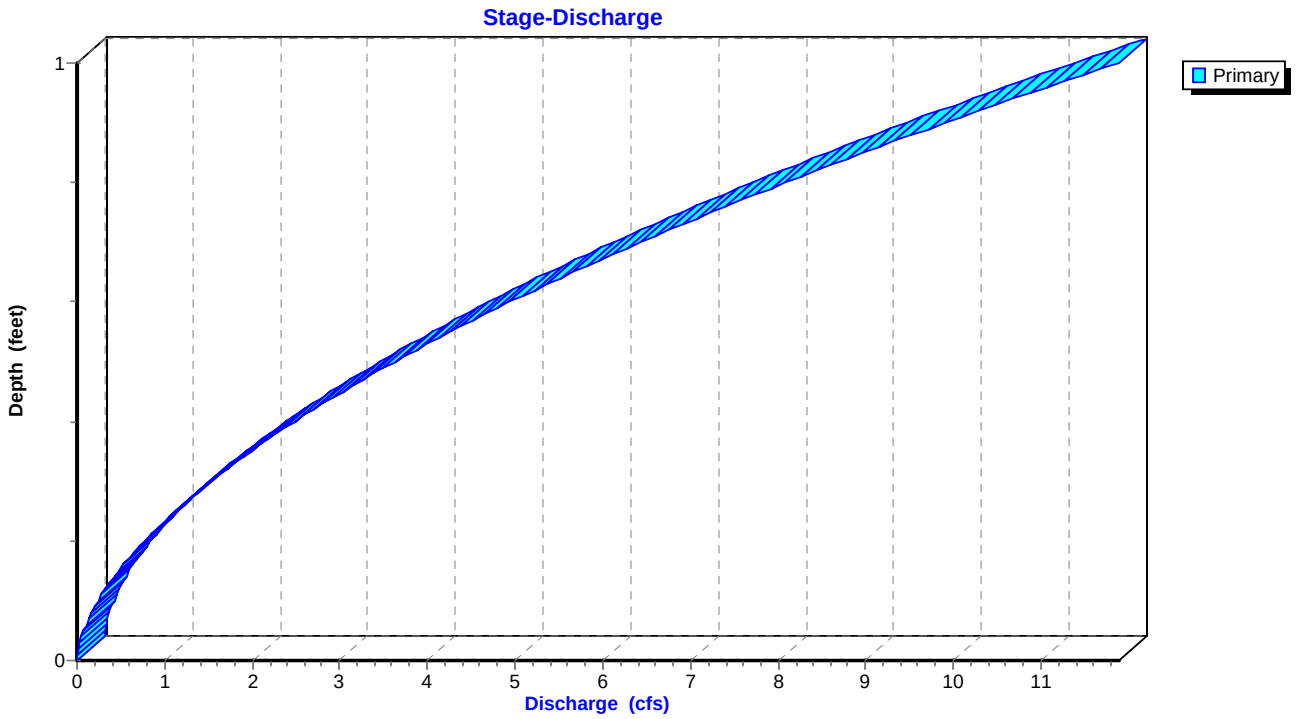


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Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.21" for 5-yr event
Inflow = 36.16 cfs @ 12.17 hrs, Volume= 2.972 af
Outflow = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af, Atten= 59%, Lag= 18.5 min
Primary = 14.79 cfs @ 12.48 hrs, Volume= 2.866 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 443.75' @ 12.48 hrs Surf.Area= 31,733 sf Storage= 40,079 cf

Plug-Flow detention time= 57.1 min calculated for 2.866 af (96% of inflow)
Center-of-Mass det. time= 37.2 min (882.4 - 845.1)

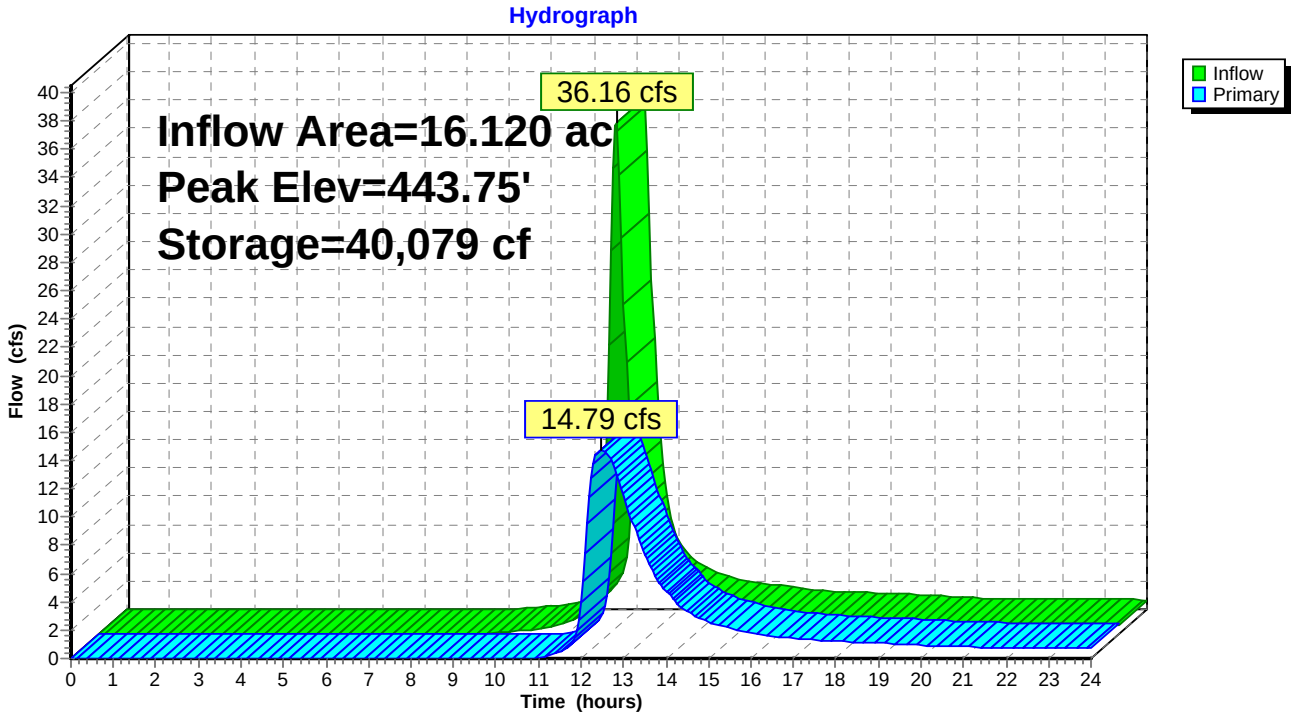
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

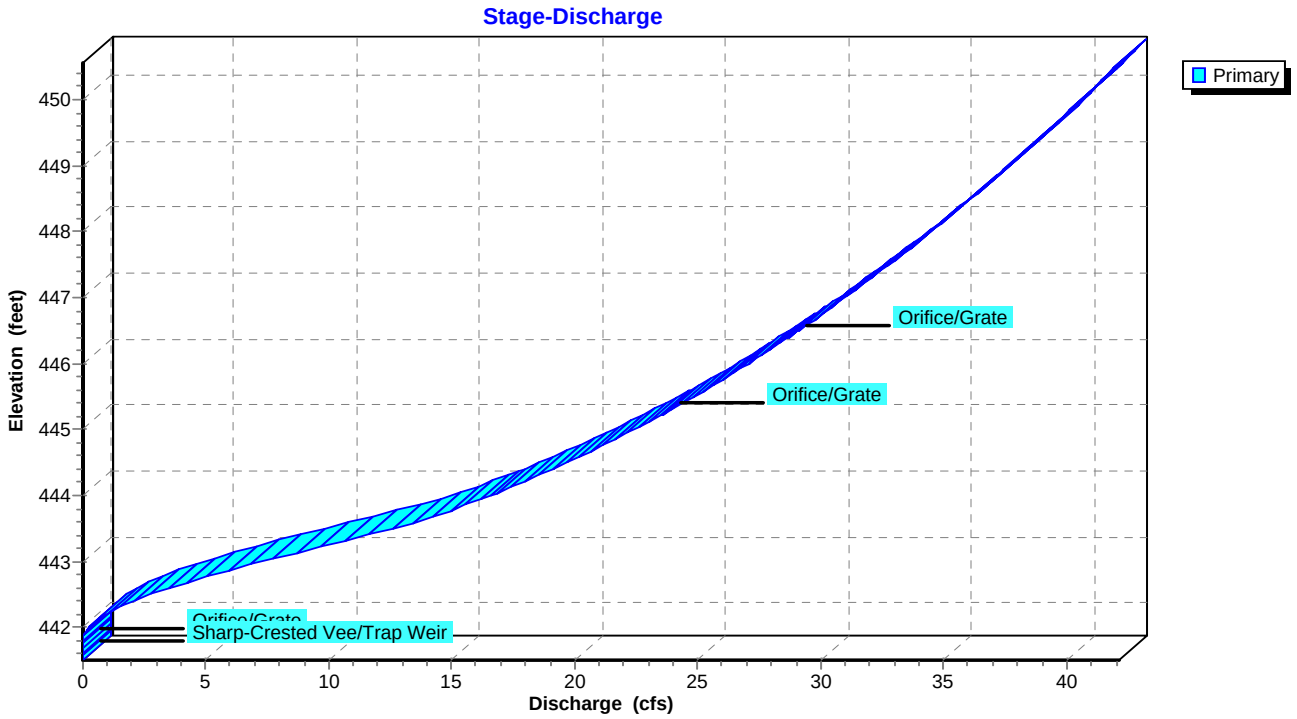
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=14.79 cfs @ 12.48 hrs HW=443.74' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 14.79 cfs @ 4.75 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 14.79 cfs of 24.68 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 3.18" for 5-yr event
Inflow = 13.82 cfs @ 12.44 hrs, Volume= 1.787 af
Outflow = 5.02 cfs @ 13.10 hrs, Volume= 1.044 af, Atten= 64%, Lag= 39.1 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 5.02 cfs @ 13.10 hrs, Volume= 1.044 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 413.95' @ 13.10 hrs Surf.Area= 11,050 sf Storage= 40,697 cf

Plug-Flow detention time= 212.9 min calculated for 1.042 af (58% of inflow)
Center-of-Mass det. time= 110.1 min (942.4 - 832.3)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

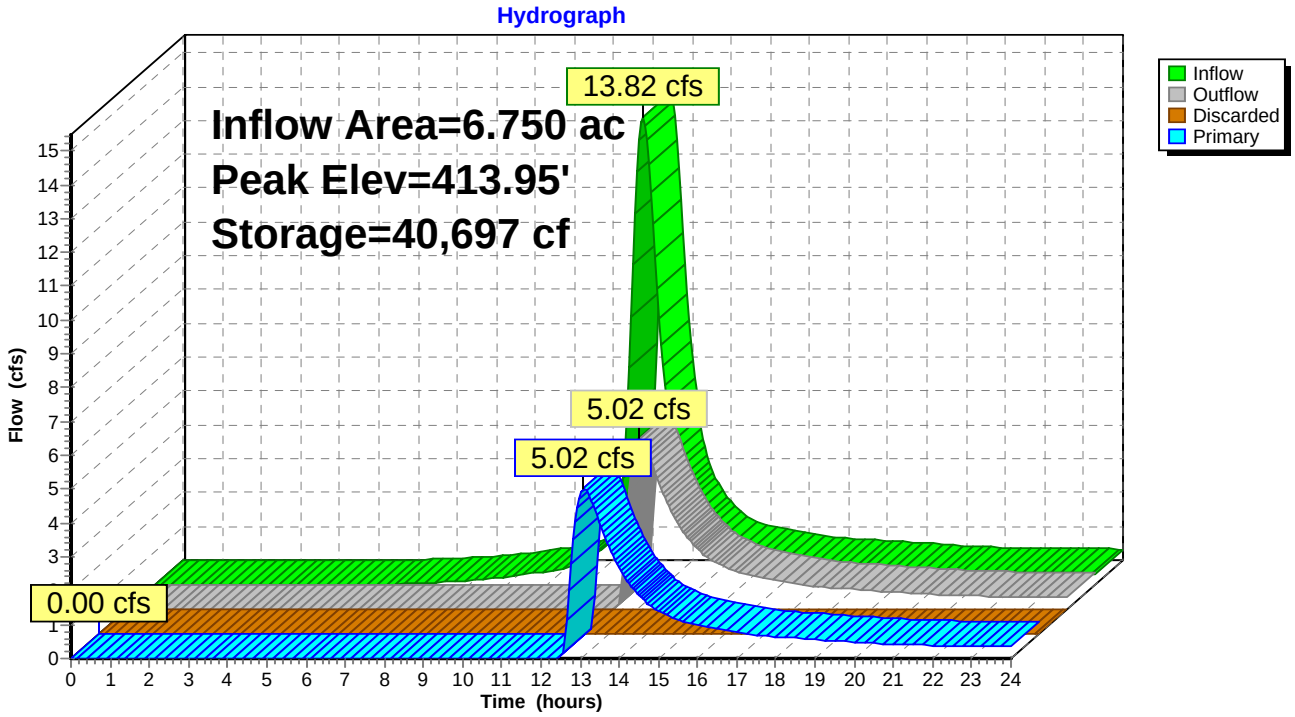
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

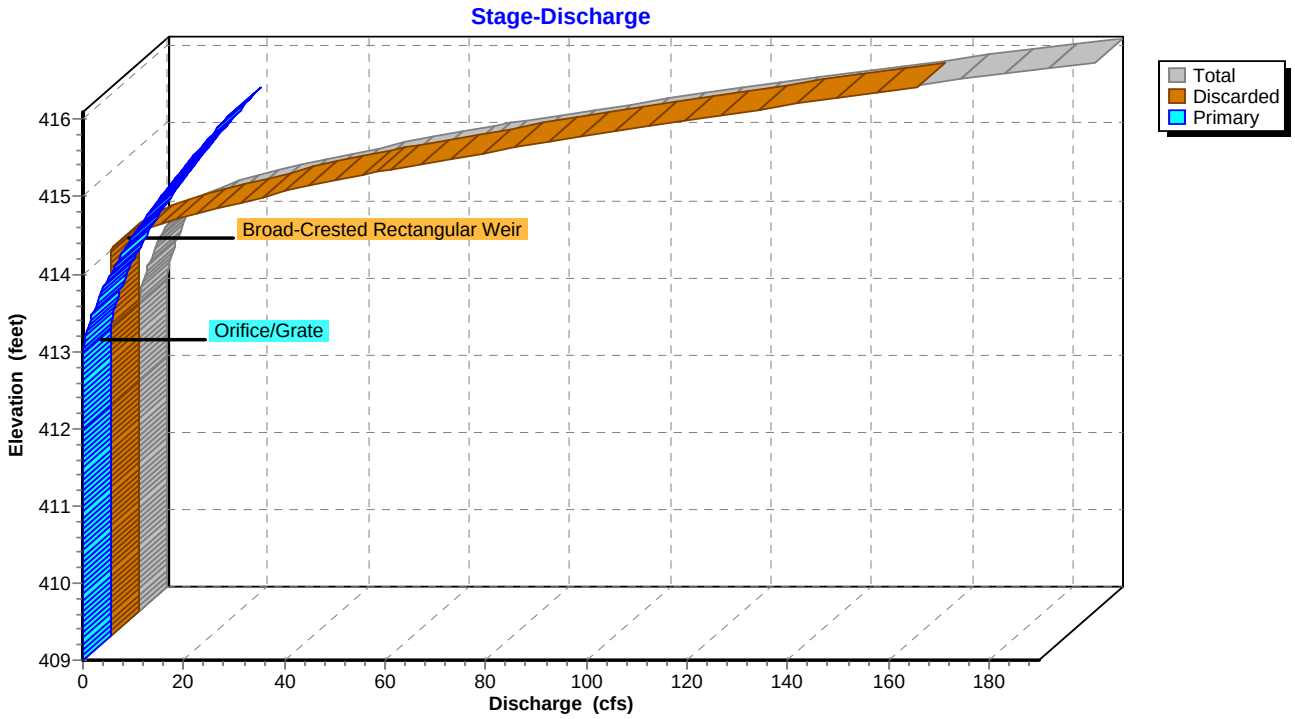
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=409.00' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=5.01 cfs @ 13.10 hrs HW=413.94' (Free Discharge)
└**1=Culvert** (Passes 5.01 cfs of 33.64 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 5.01 cfs @ 3.12 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 3.17" for 5-yr event
Inflow = 31.39 cfs @ 12.56 hrs, Volume= 4.599 af
Outflow = 1.67 cfs @ 17.21 hrs, Volume= 1.053 af, Atten= 95%, Lag= 278.9 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 1.67 cfs @ 17.21 hrs, Volume= 1.053 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 415.45' @ 17.21 hrs Surf.Area= 36,777 sf Storage= 159,339 cf

Plug-Flow detention time= 453.3 min calculated for 1.053 af (23% of inflow)
Center-of-Mass det. time= 304.8 min (1,144.0 - 839.3)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

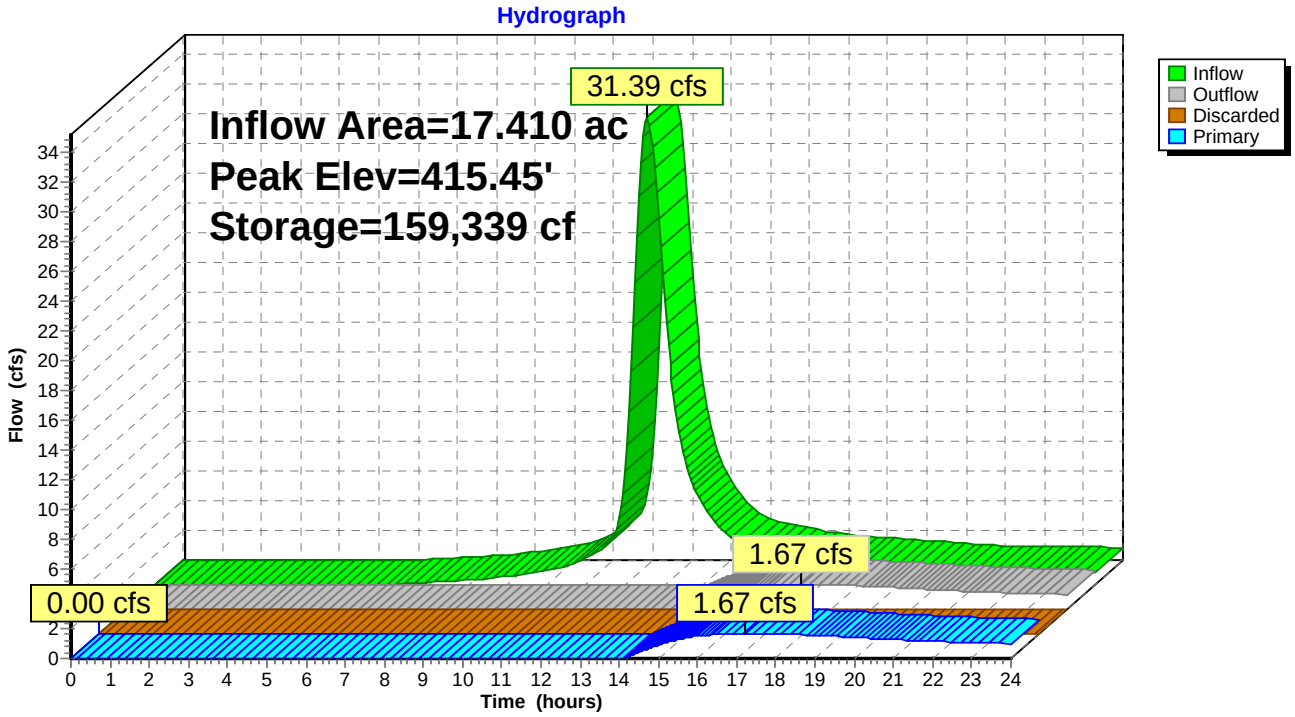
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

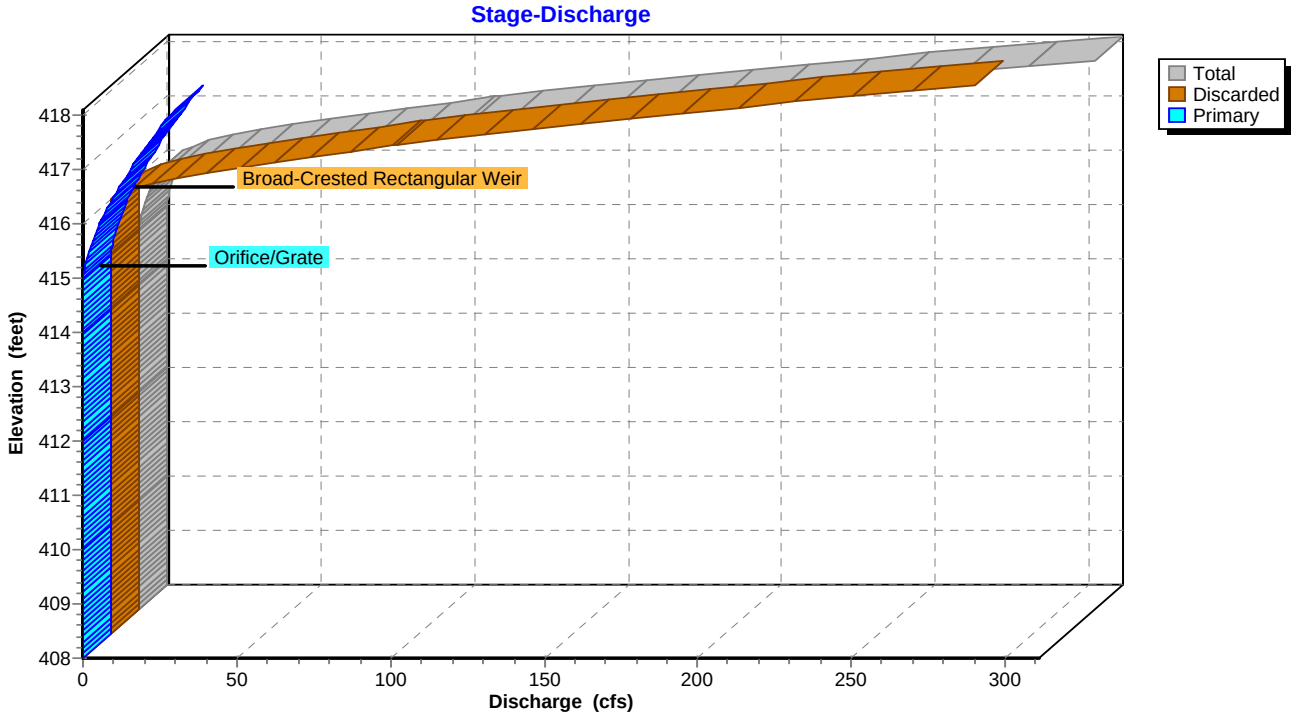
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=1.67 cfs @ 17.21 hrs HW=415.45' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 1.67 cfs @ 2.16 fps)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 3.71" for 5-yr event
Inflow = 5.76 cfs @ 12.00 hrs, Volume= 0.328 af
Outflow = 0.36 cfs @ 12.87 hrs, Volume= 0.110 af, Atten= 94%, Lag= 52.3 min
Primary = 0.36 cfs @ 12.87 hrs, Volume= 0.110 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.39' @ 12.87 hrs Surf.Area= 7,906 sf Storage= 9,707 cf

Plug-Flow detention time= 338.8 min calculated for 0.110 af (34% of inflow)
Center-of-Mass det. time= 202.6 min (986.4 - 783.9)

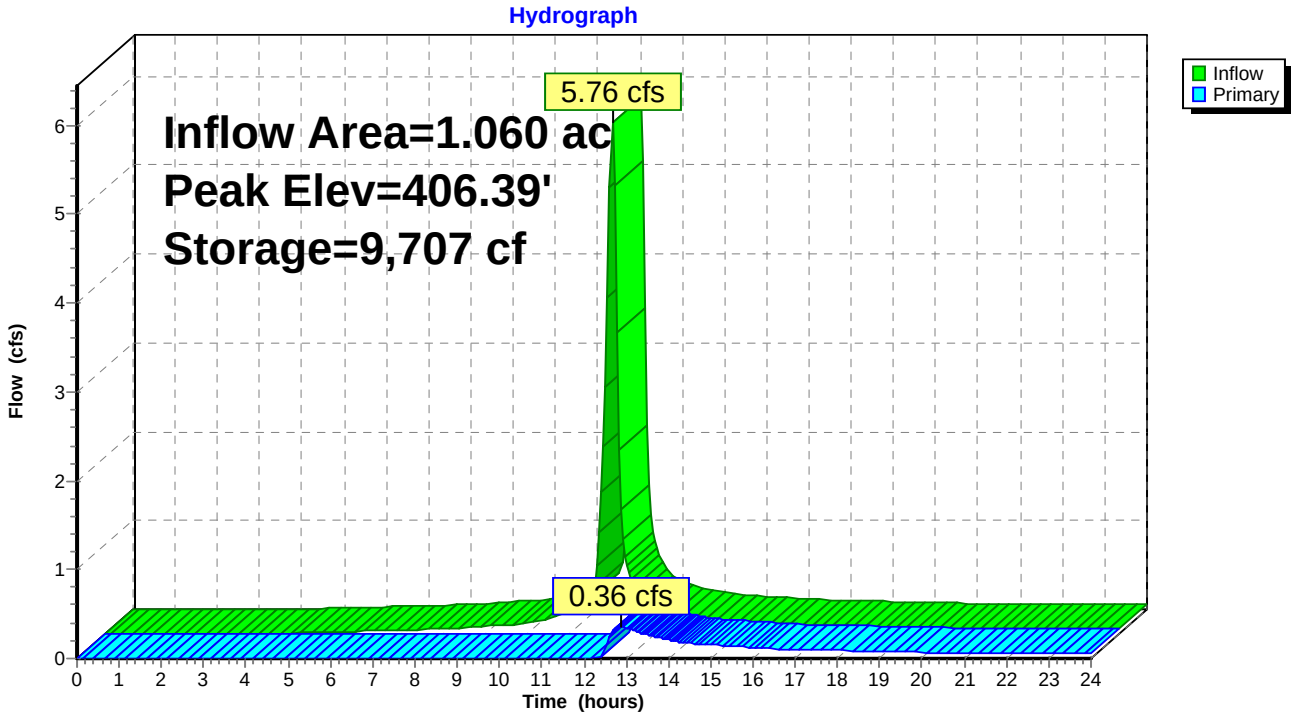
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

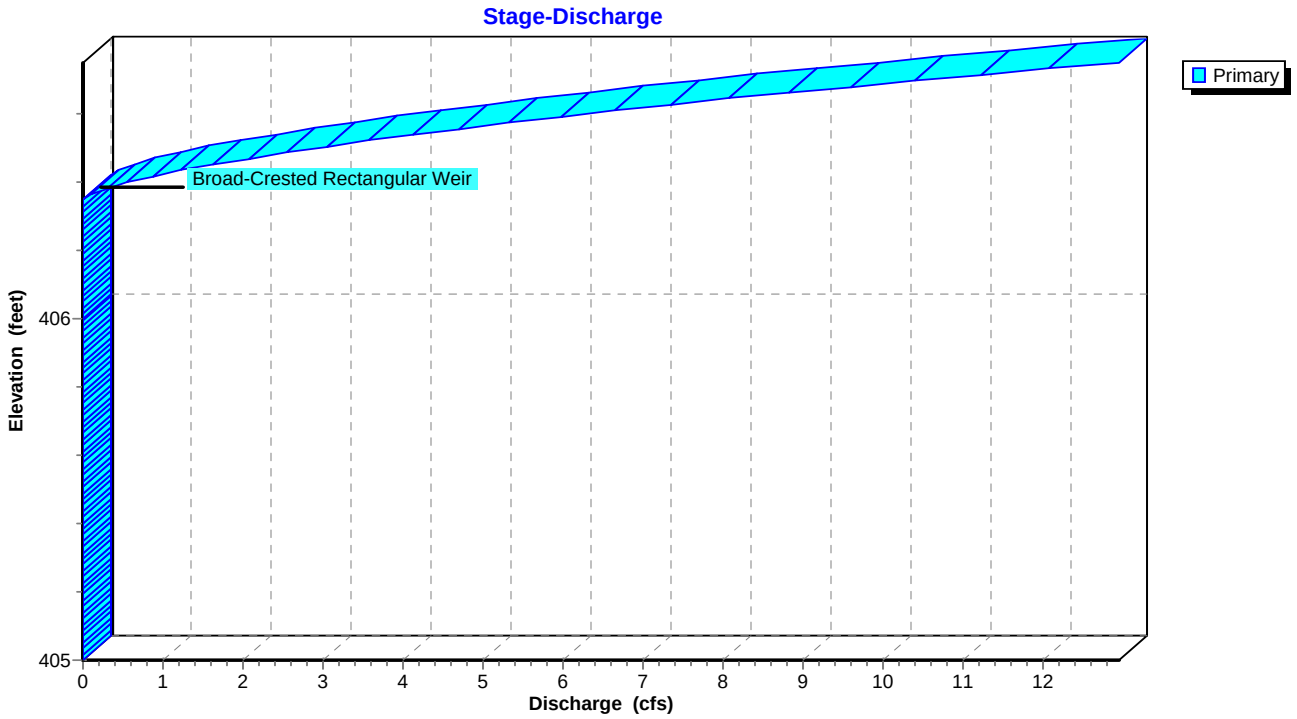
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.35 cfs @ 12.87 hrs HW=406.39' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 0.35 cfs @ 0.48 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 3.19" for 5-yr event
Inflow = 10.79 cfs @ 12.18 hrs, Volume= 0.934 af
Outflow = 5.24 cfs @ 12.46 hrs, Volume= 0.913 af, Atten= 51%, Lag= 16.5 min
Primary = 5.24 cfs @ 12.46 hrs, Volume= 0.913 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 425.46' @ 12.46 hrs Surf.Area= 6,382 sf Storage= 12,884 cf

Plug-Flow detention time= 55.2 min calculated for 0.913 af (98% of inflow)
Center-of-Mass det. time= 41.6 min (857.0 - 815.4)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

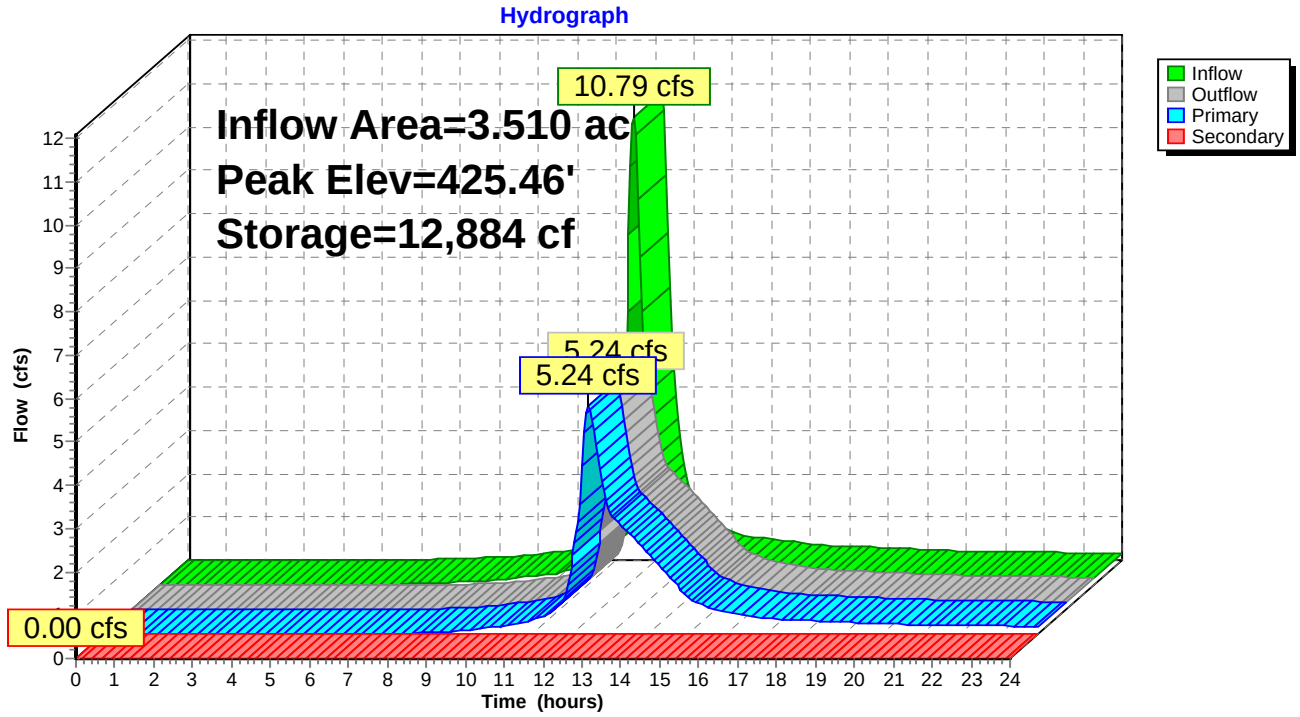
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

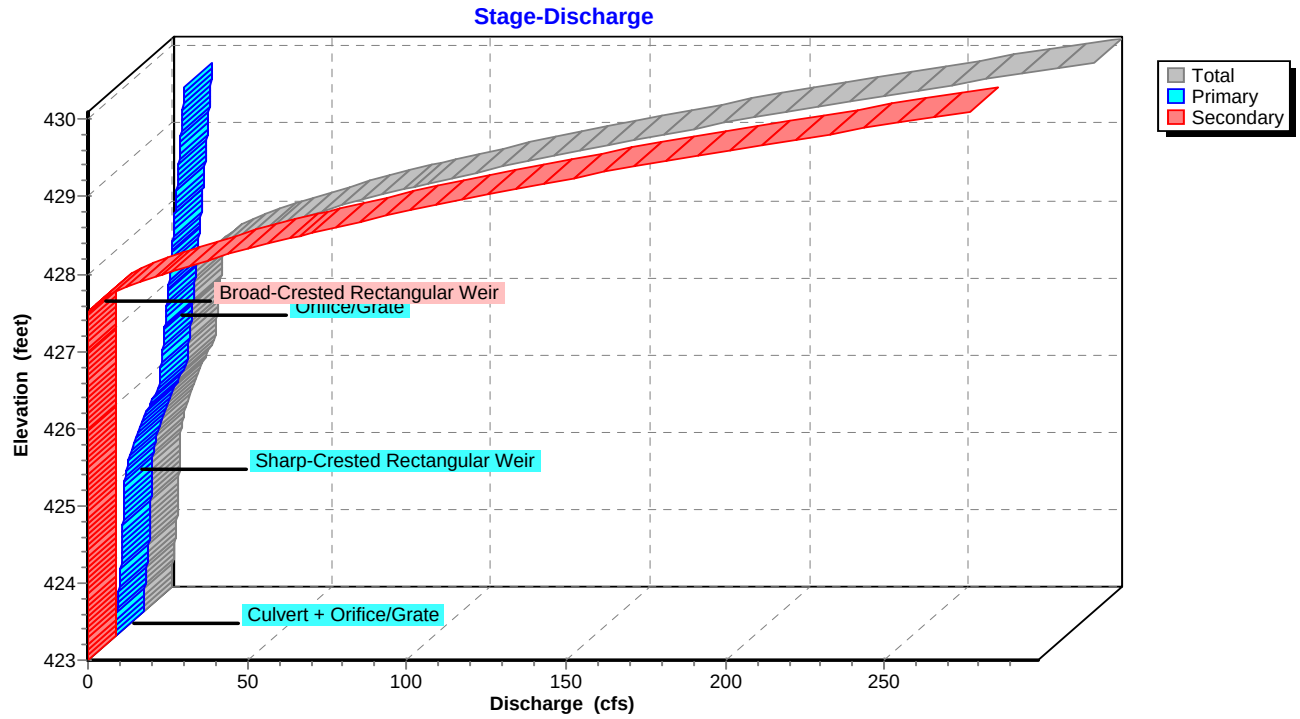
Primary OutFlow Max=5.23 cfs @ 12.46 hrs HW=425.46' (Free Discharge)
└**1=Culvert** (Passes 5.23 cfs of 11.12 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.07 cfs @ 6.95 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 2.16 cfs @ 2.46 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 2.55" for 5-yr event
Inflow = 2.45 cfs @ 12.08 hrs, Volume= 0.162 af
Outflow = 1.55 cfs @ 12.22 hrs, Volume= 0.105 af, Atten= 37%, Lag= 8.6 min
Discarded = 1.55 cfs @ 12.22 hrs, Volume= 0.105 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 407.83' @ 12.22 hrs Surf.Area= 2,399 sf Storage= 2,818 cf

Plug-Flow detention time= 176.4 min calculated for 0.105 af (65% of inflow)
Center-of-Mass det. time= 71.2 min (899.9 - 828.7)

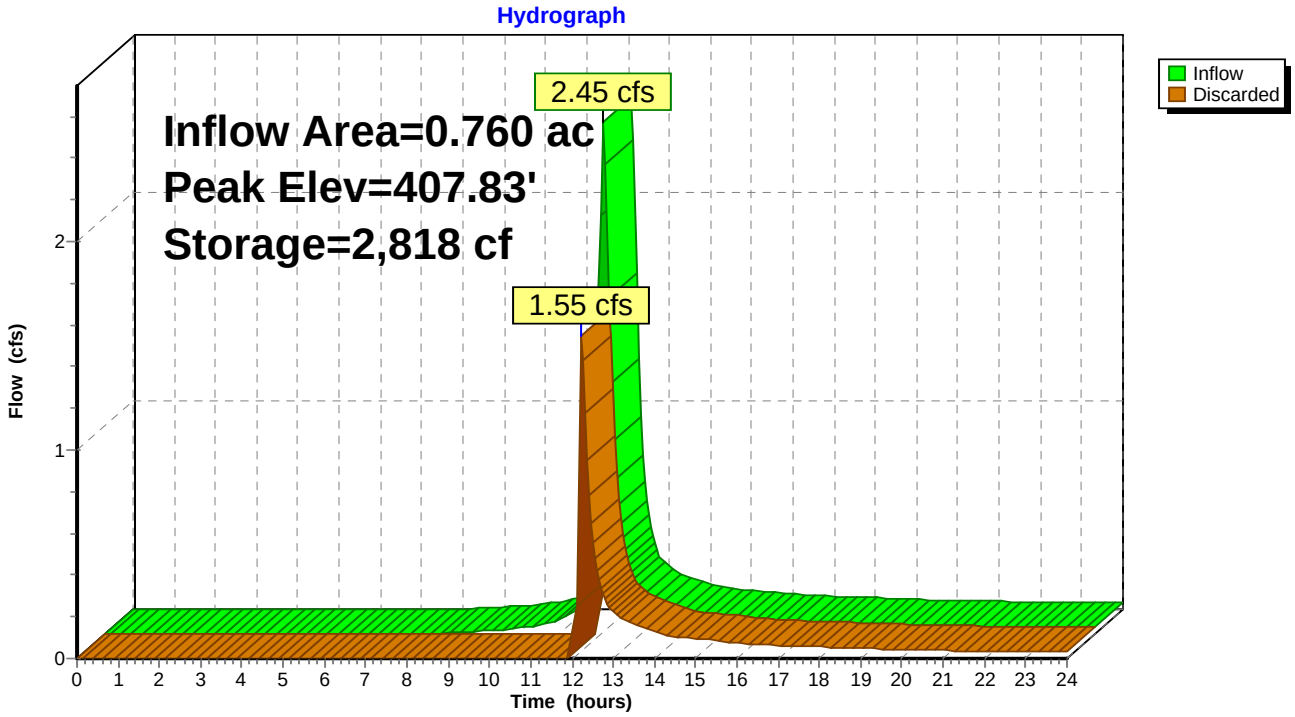
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

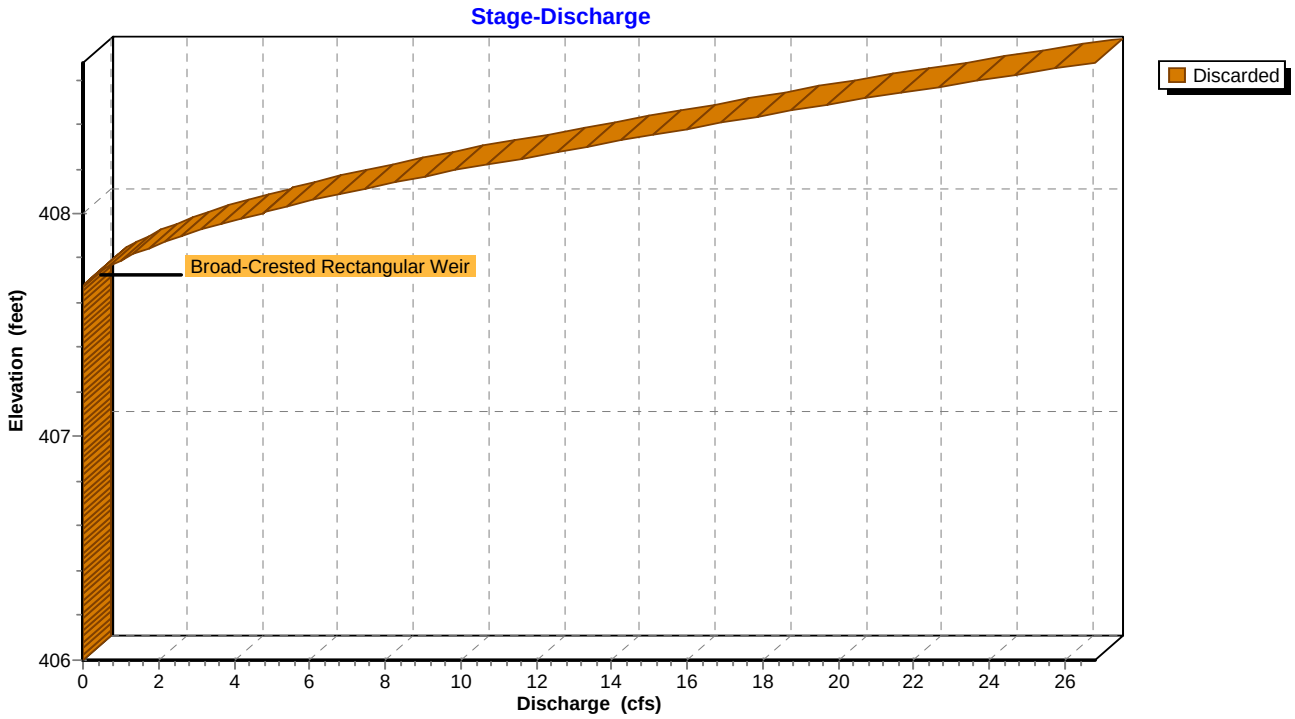
Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=1.45 cfs @ 12.22 hrs HW=407.82' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 1.45 cfs @ 0.95 fps)

Pond Sed-2: Sed Trap 2



Pond Sed-2: Sed Trap 2



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>2.74"
Flow Length=777' Tc=38.6 min CN=74 Runoff=45.73 cfs 5.204 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>2.94"
Flow Length=209' Tc=23.3 min CN=76 Runoff=48.22 cfs 3.944 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>4.00"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=17.30 cfs 2.250 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>3.99"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=39.30 cfs 5.790 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>4.57"
Tc=9.2 min CN=92 Runoff=7.00 cfs 0.404 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>3.32"
Tc=15.6 min CN=80 Runoff=3.18 cfs 0.210 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>2.80"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=11.76 cfs 2.265 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>4.02"
Flow Length=234' Tc=25.2 min CN=87 Runoff=13.48 cfs 1.176 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>2.93"
Flow Length=590' Tc=36.5 min CN=76 Runoff=7.55 cfs 0.821 af

Reach R-1: R-1 Avg. Flow Depth=0.63' Max Vel=4.57 fps Inflow=17.87 cfs 3.826 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=17.84 cfs 3.811 af

Reach R-2: R-2 Avg. Flow Depth=2.02' Max Vel=2.00 fps Inflow=61.99 cfs 9.016 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=52.45 cfs 8.861 af

Reach R-3: R-3 Avg. Flow Depth=3.07' Max Vel=1.44 fps Inflow=59.49 cfs 12.446 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=58.92 cfs 12.395 af

Reach R-4: R-4 Avg. Flow Depth=3.29' Max Vel=1.34 fps Inflow=59.39 cfs 12.581 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=58.99 cfs 12.538 af

Pond Pond 1b: Pond 1b Peak Elev=444.20' Storage=55,419 cf Inflow=48.22 cfs 3.944 af
Outflow=17.87 cfs 3.826 af

Pond Pond 1c: Pond 1c Peak Elev=414.19' Storage=43,437 cf Inflow=17.30 cfs 2.250 af
Discarded=4.38 cfs 0.122 af Primary=7.08 cfs 1.379 af Outflow=11.46 cfs 1.501 af

Pond Pond 1d: Pond 1d Peak Elev=415.87' Storage=175,013 cf Inflow=39.30 cfs 5.790 af
Discarded=0.00 cfs 0.000 af Primary=4.41 cfs 2.206 af Outflow=4.41 cfs 2.206 af

Pond Pond 1e: Pond 1e Peak Elev=406.46' Storage=10,264 cf Inflow=7.00 cfs 0.404 af
Outflow=1.74 cfs 0.186 af

Pond Pond 3: Pond 3 Peak Elev=425.75' Storage=14,806 cf Inflow=13.48 cfs 1.176 af
Primary=7.98 cfs 1.152 af Secondary=0.00 cfs 0.000 af Outflow=7.98 cfs 1.152 af

Pond Sed-2: Sed Trap 2 Peak Elev=407.90' Storage=2,998 cf Inflow=3.18 cfs 0.210 af
Outflow=2.78 cfs 0.154 af

Summary for Subcatchment P-1a: P-1a

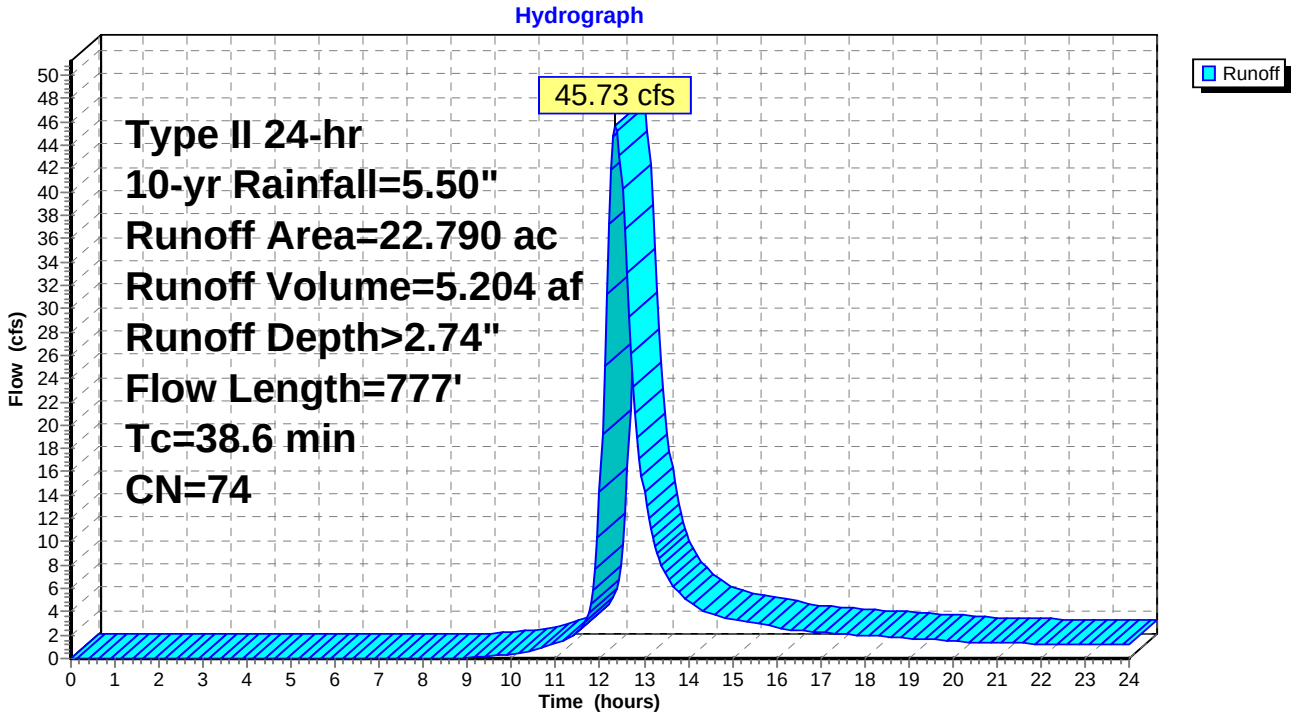
Runoff = 45.73 cfs @ 12.36 hrs, Volume= 5.204 af, Depth> 2.74"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

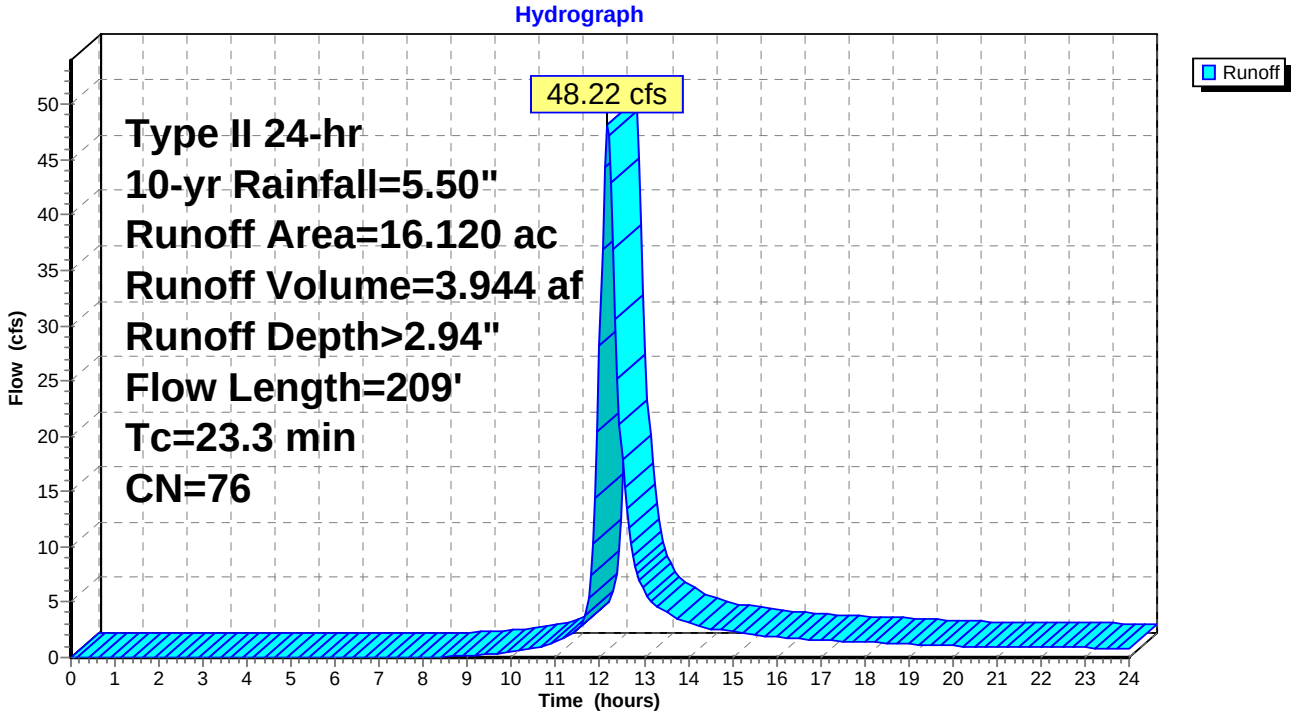
Runoff = 48.22 cfs @ 12.17 hrs, Volume= 3.944 af, Depth> 2.94"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

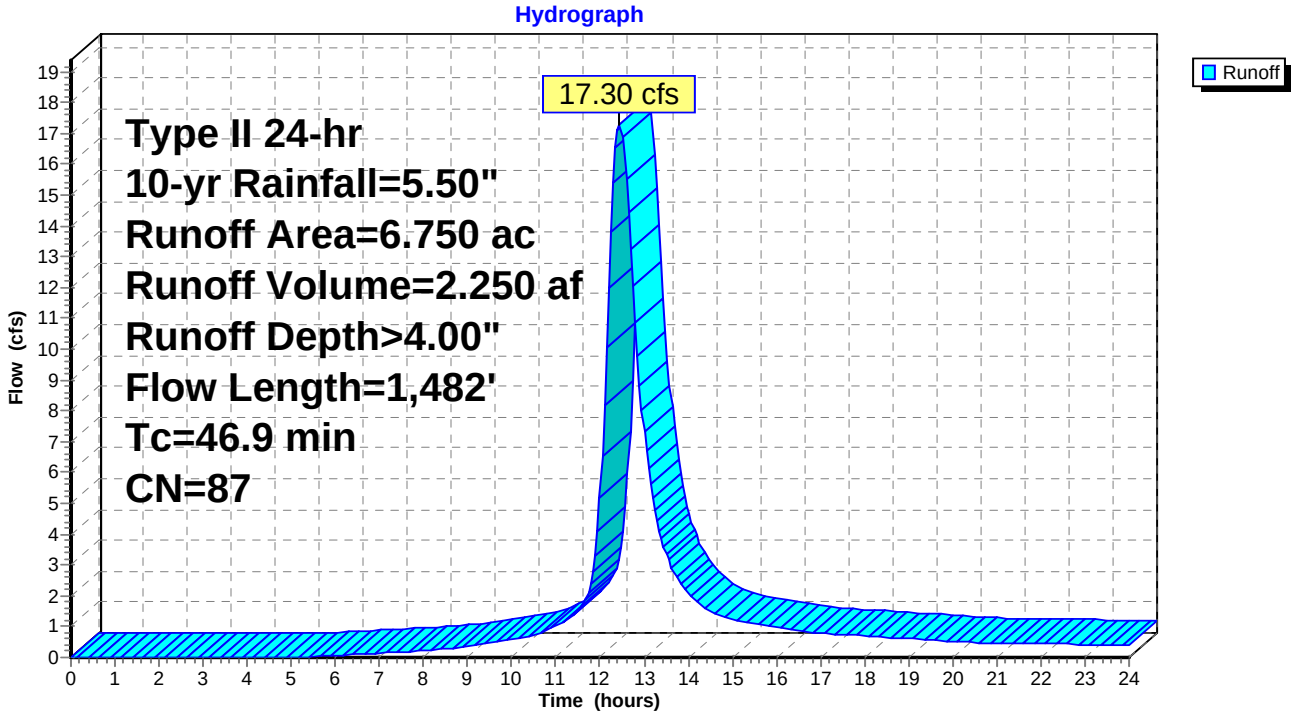
Runoff = 17.30 cfs @ 12.44 hrs, Volume= 2.250 af, Depth> 4.00"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

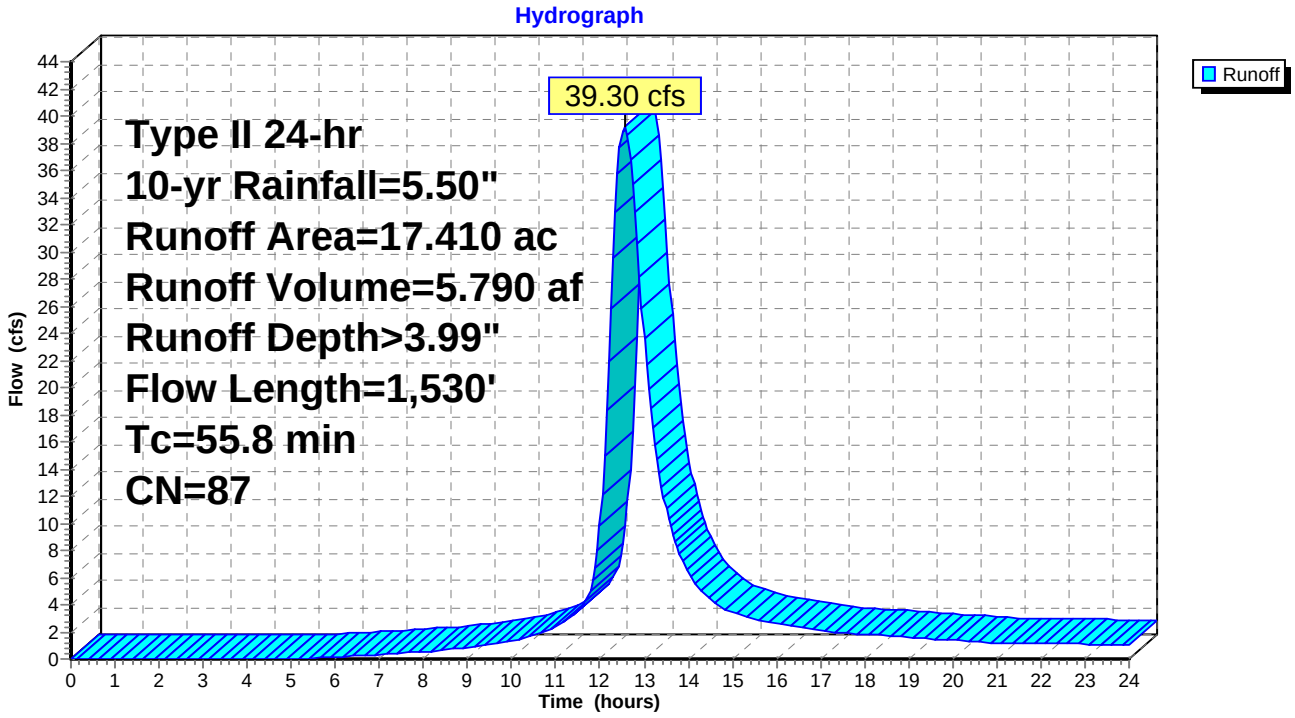
Runoff = 39.30 cfs @ 12.56 hrs, Volume= 5.790 af, Depth> 3.99"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

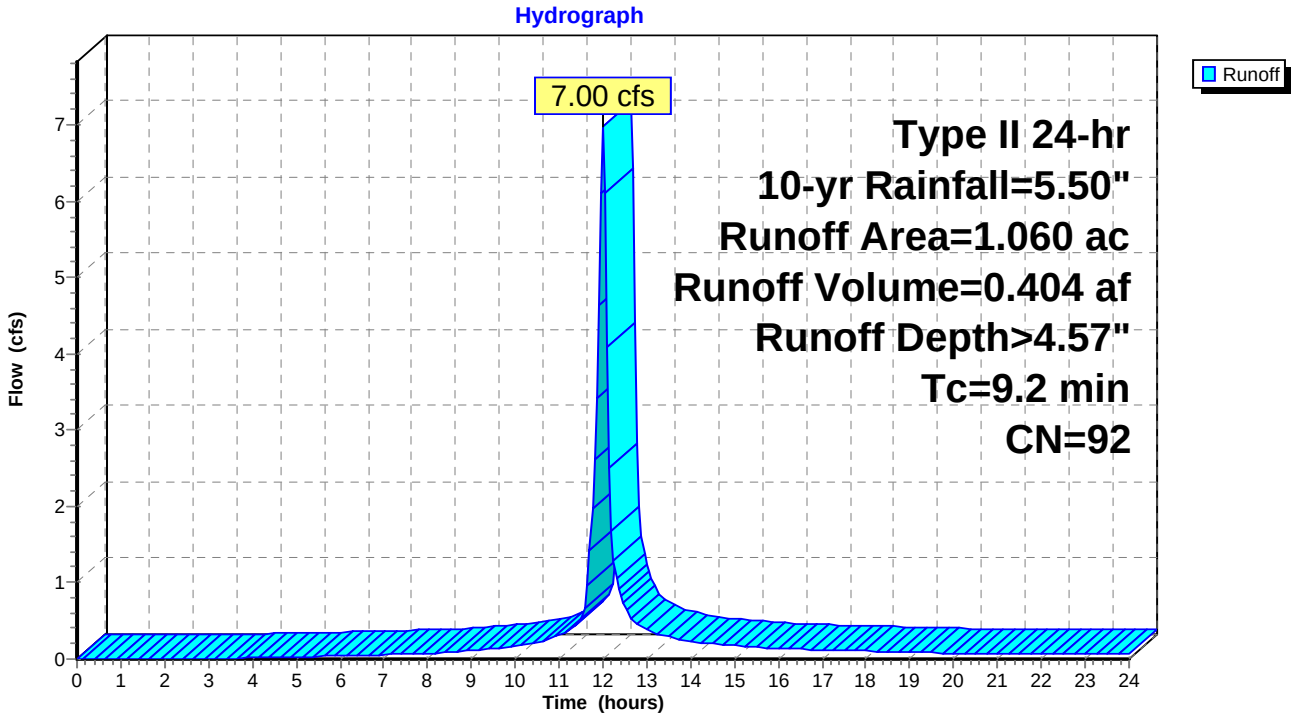
Runoff = 7.00 cfs @ 12.00 hrs, Volume= 0.404 af, Depth> 4.57"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

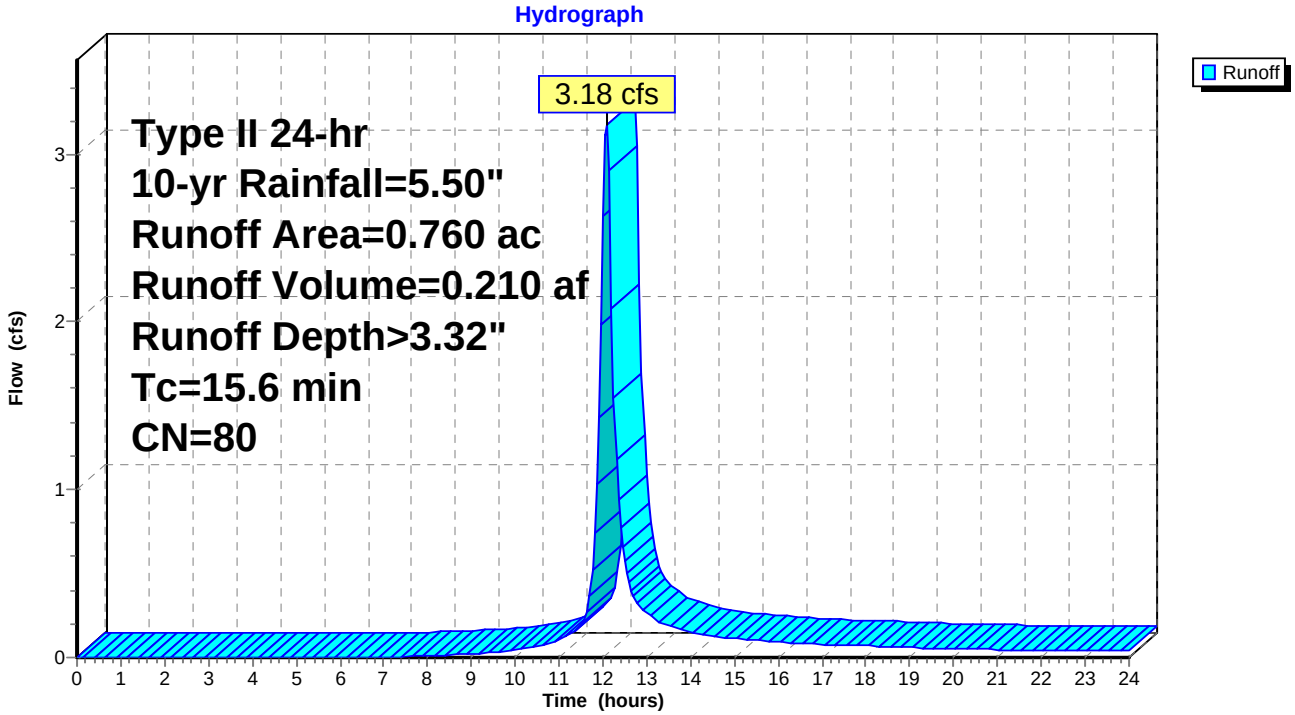
Runoff = 3.18 cfs @ 12.08 hrs, Volume= 0.210 af, Depth> 3.32"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

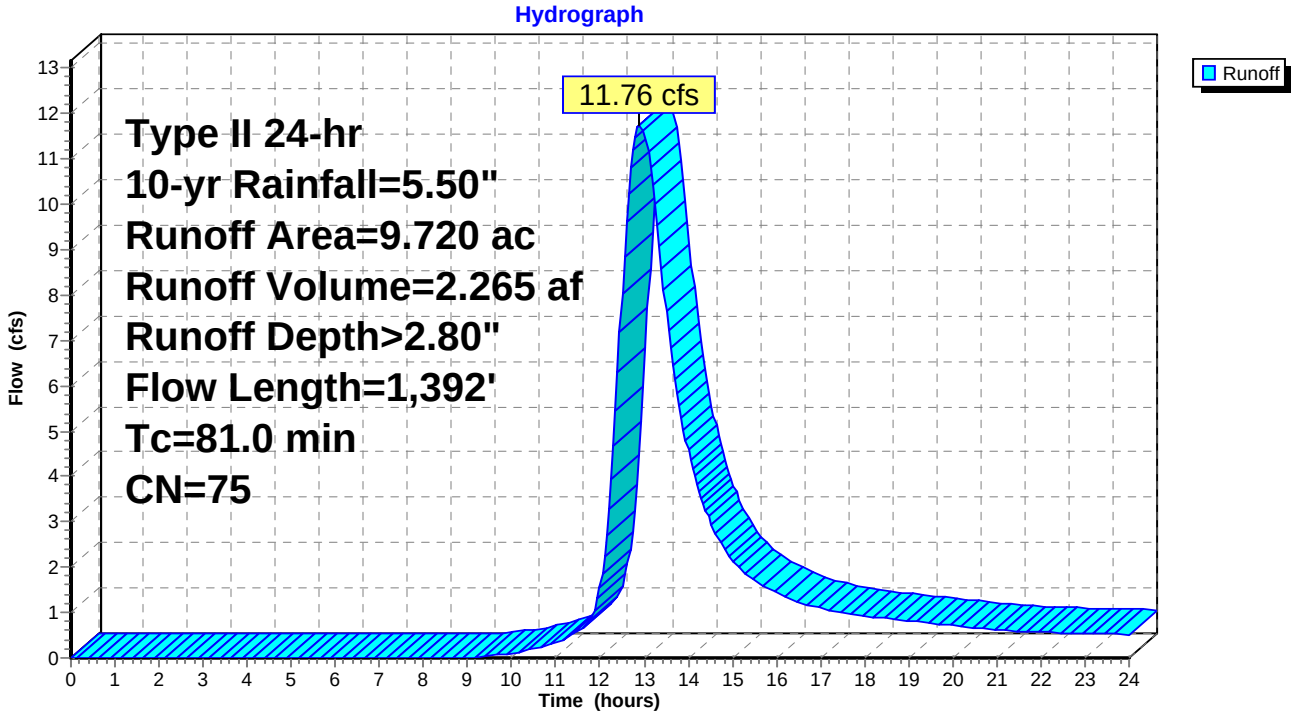
Runoff = 11.76 cfs @ 12.90 hrs, Volume= 2.265 af, Depth> 2.80"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

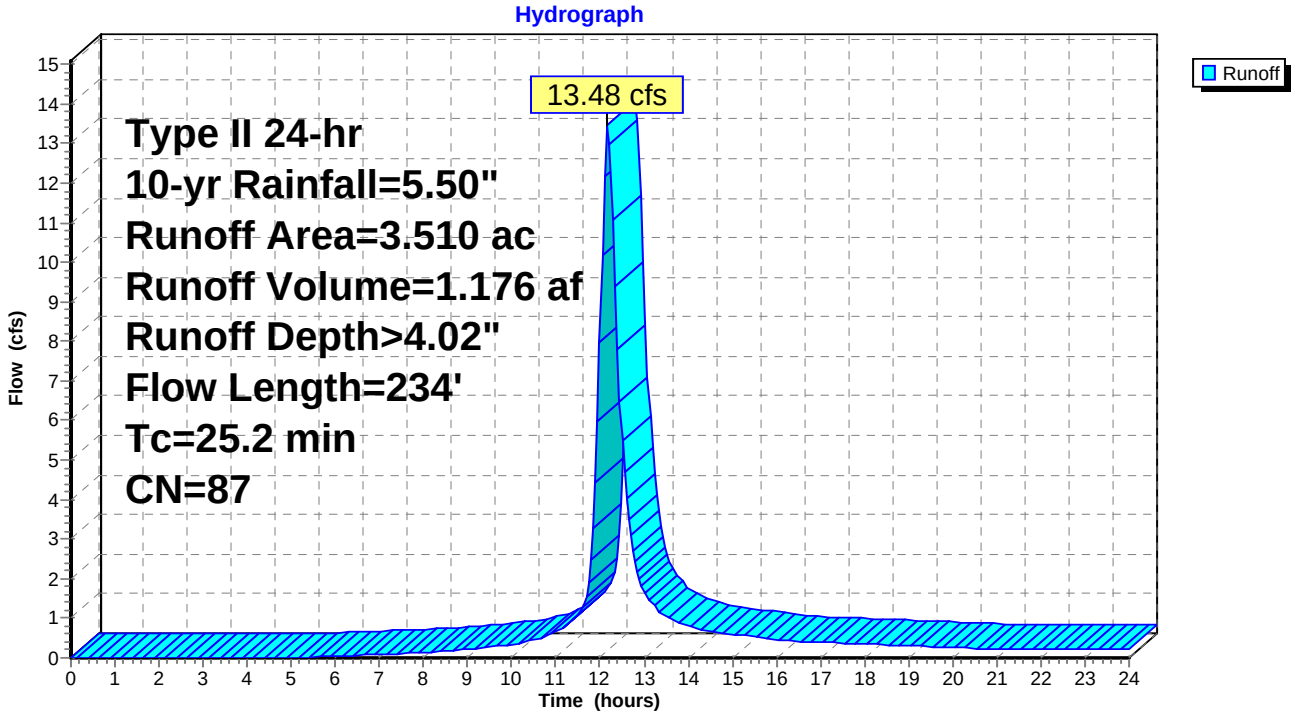
Runoff = 13.48 cfs @ 12.18 hrs, Volume= 1.176 af, Depth> 4.02"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

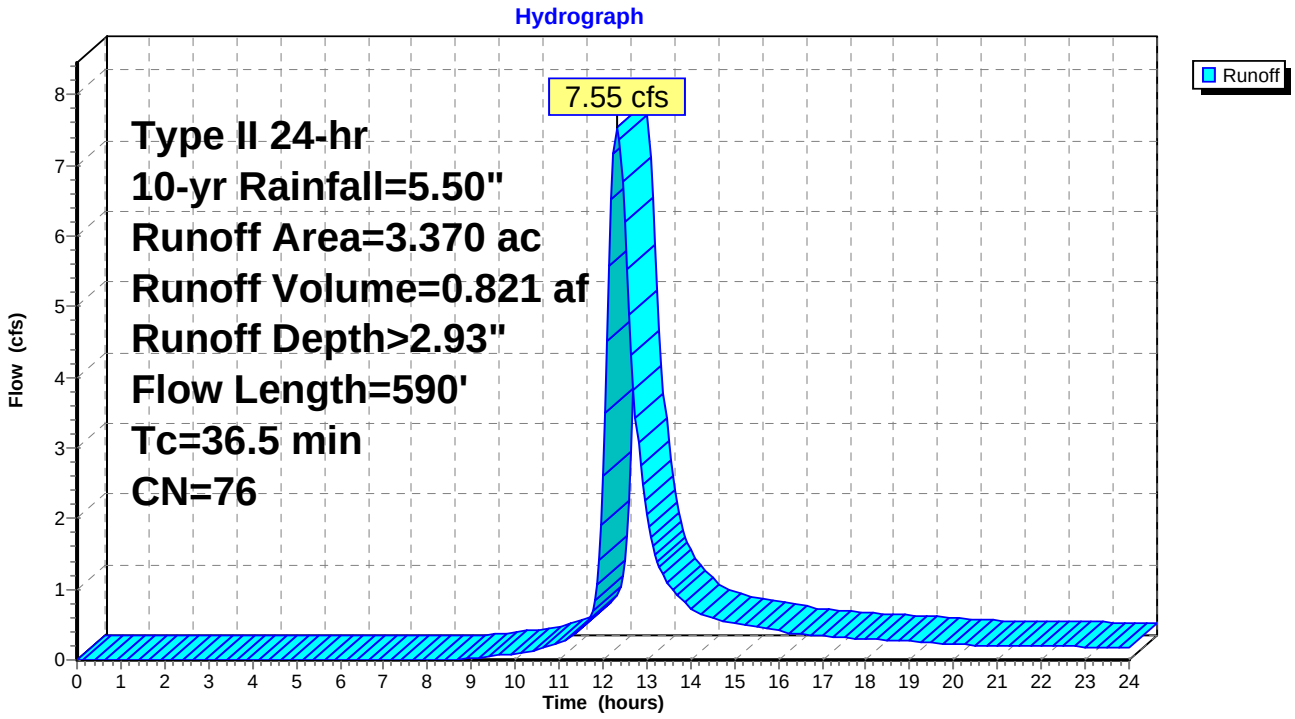
Runoff = 7.55 cfs @ 12.32 hrs, Volume= 0.821 af, Depth> 2.93"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.85" for 10-yr event
Inflow = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af
Outflow = 17.84 cfs @ 12.60 hrs, Volume= 3.811 af, Atten= 0%, Lag= 5.7 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.57 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 2.16 fps, Avg. Travel Time= 6.8 min

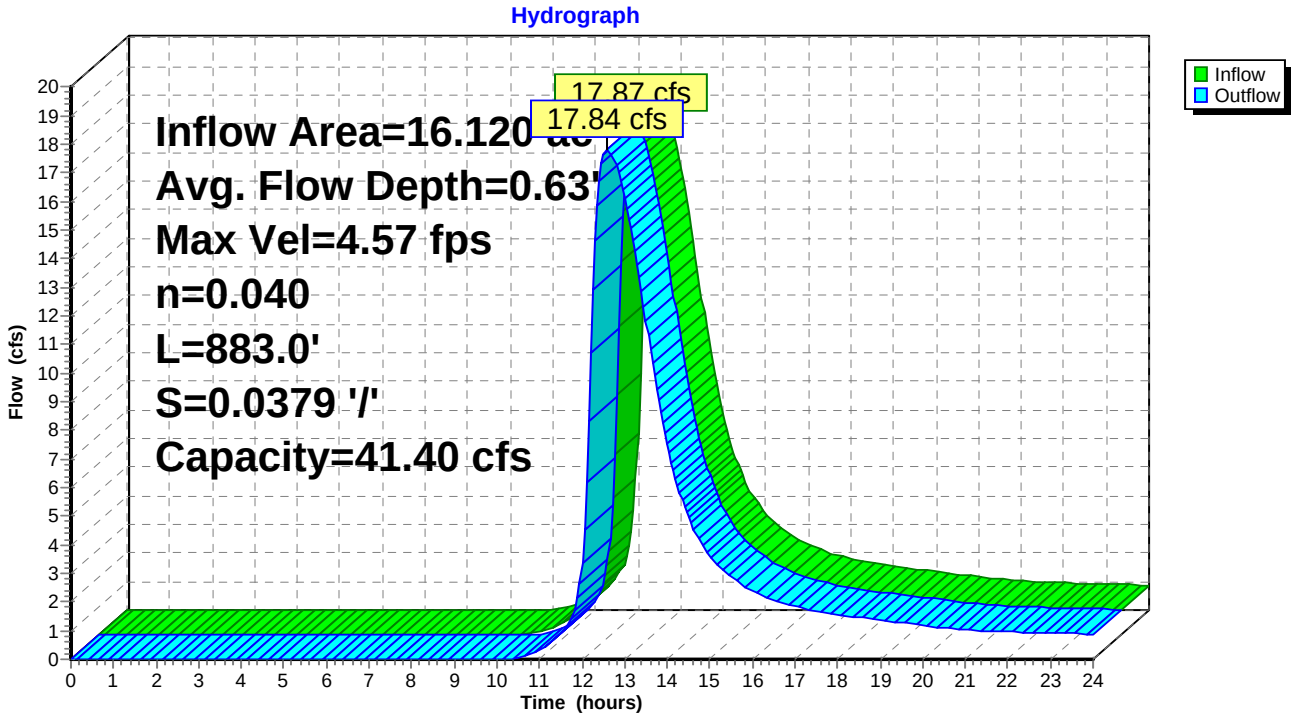
Peak Storage= 3,451 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.63' , Surface Width= 7.50'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

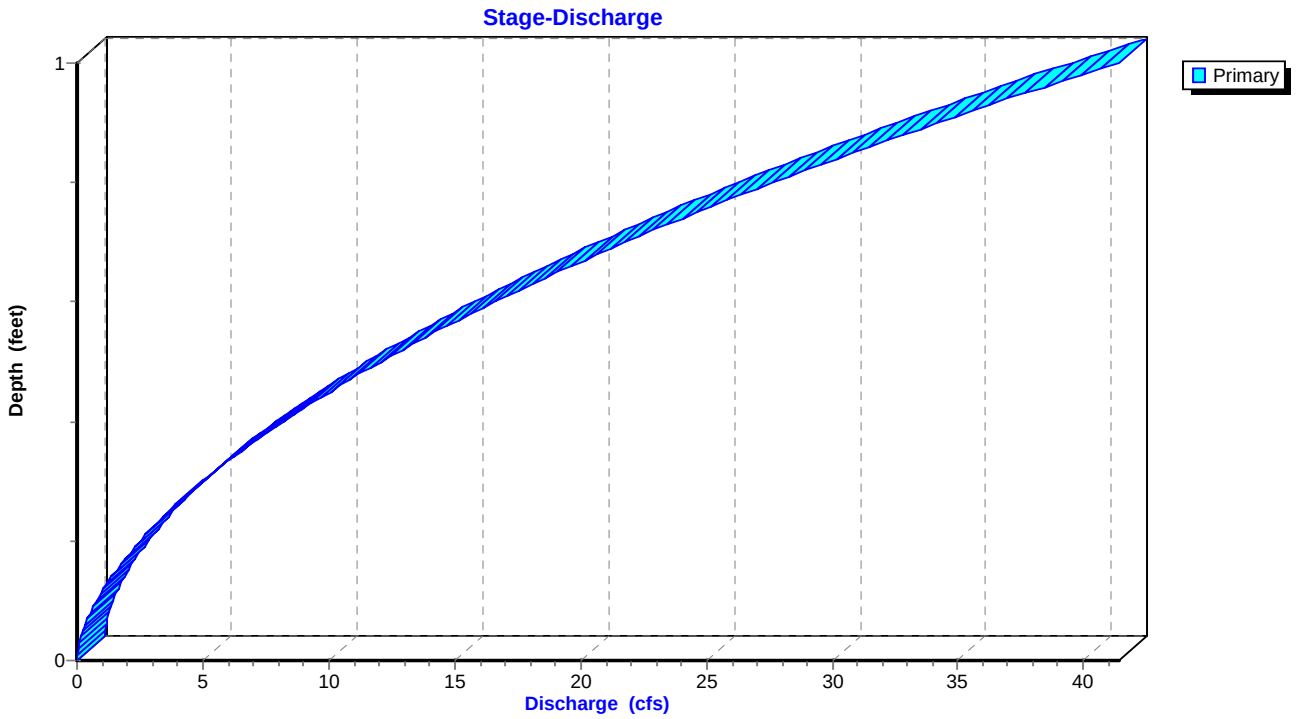


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Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Depth (feet)
Discharge (cfs)
Primary
0
1
0
5
10
15
20
25
30
35
40

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 2.73" for 10-yr event
Inflow = 61.99 cfs @ 12.38 hrs, Volume= 9.016 af
Outflow = 52.45 cfs @ 12.82 hrs, Volume= 8.861 af, Atten= 15%, Lag= 26.2 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.00 fps, Min. Travel Time= 14.3 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 32.1 min

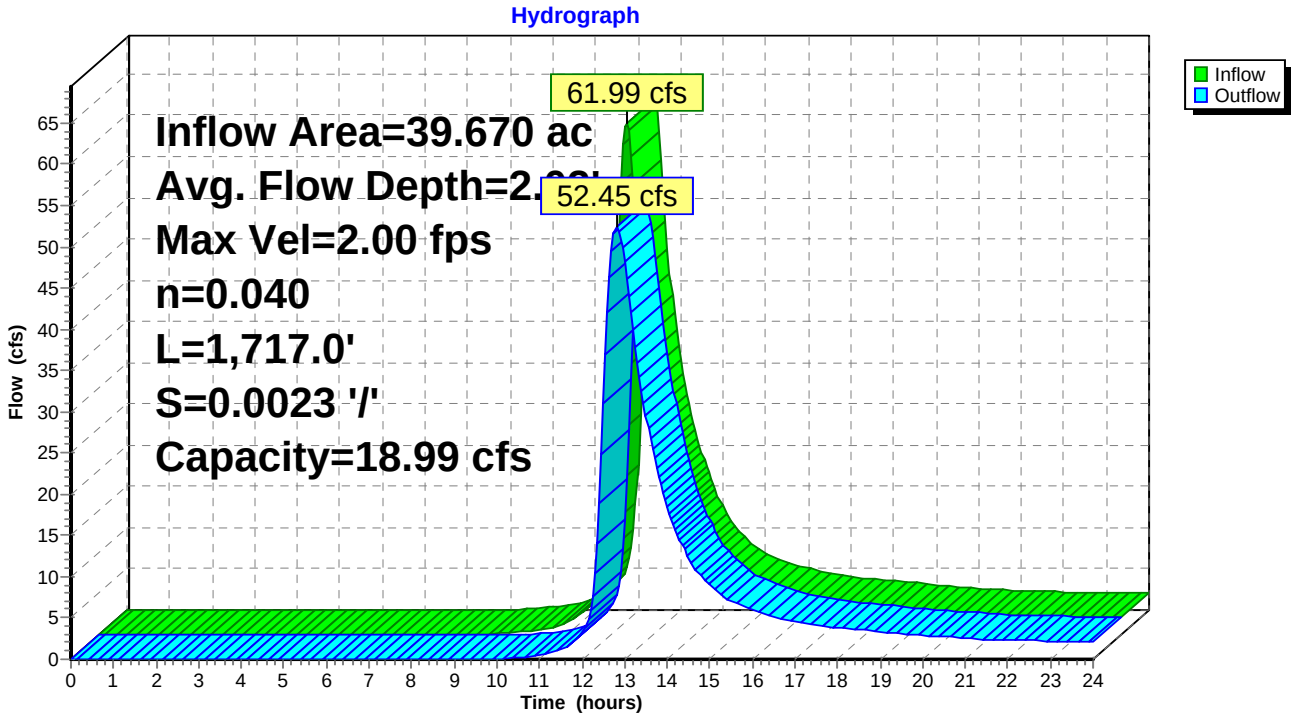
Peak Storage= 45,066 cf @ 12.58 hrs
Average Depth at Peak Storage= 2.02' , Surface Width= 18.08'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

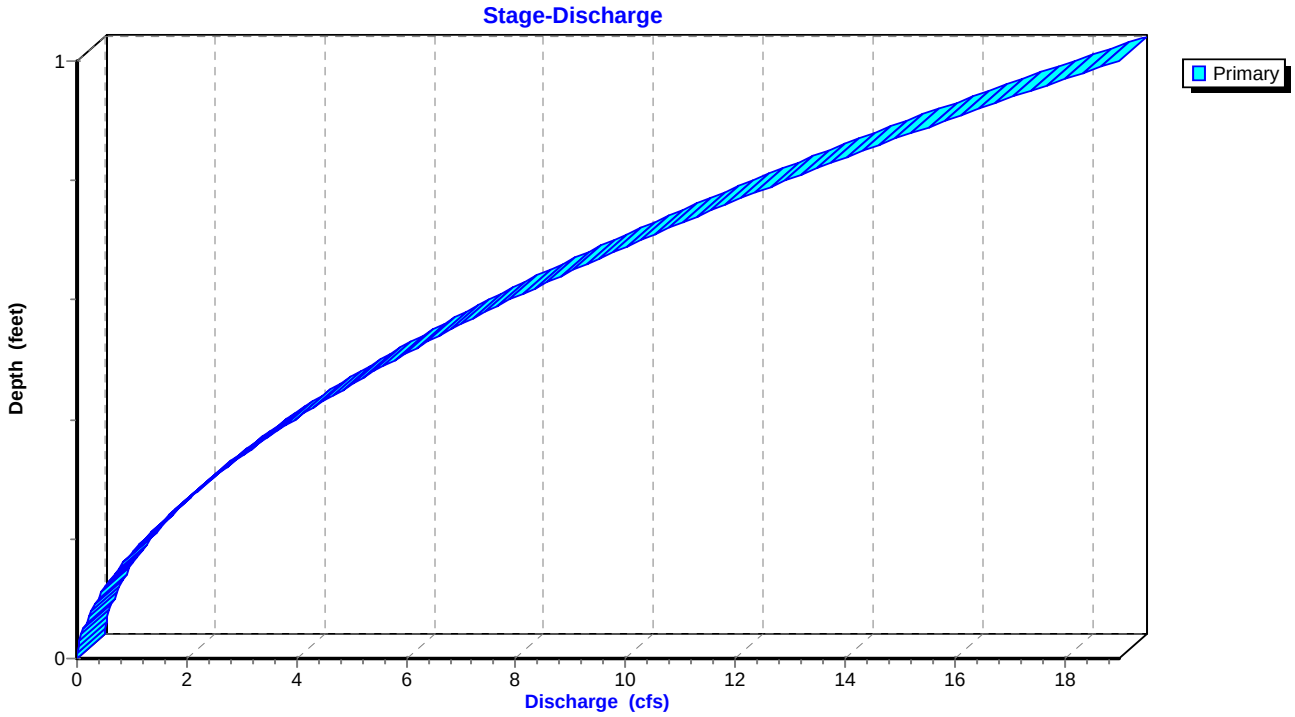


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Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Depth (feet)
Discharge (cfs)
Primary
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 2.34" for 10-yr event
Inflow = 59.49 cfs @ 12.81 hrs, Volume= 12.446 af
Outflow = 58.92 cfs @ 12.92 hrs, Volume= 12.395 af, Atten= 1%, Lag= 6.5 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.44 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 5.9 min

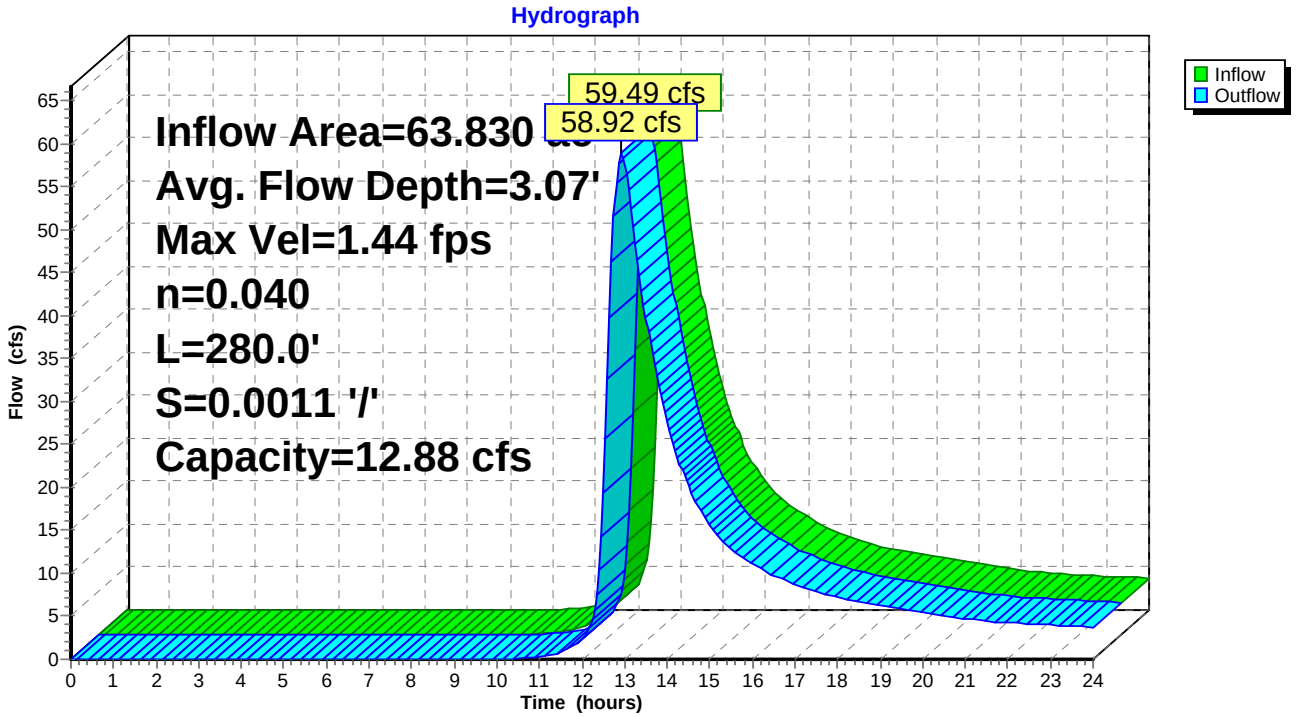
Peak Storage= 11,448 cf @ 12.87 hrs
Average Depth at Peak Storage= 3.07' , Surface Width= 22.26'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

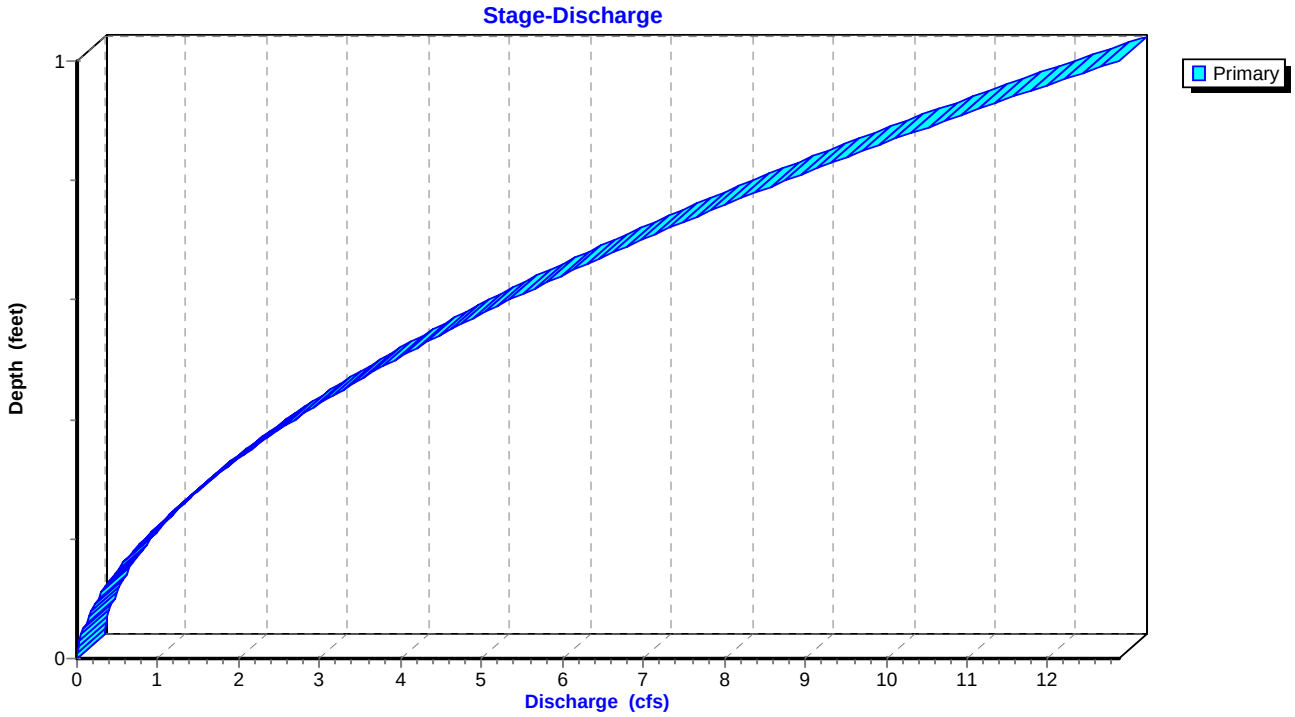


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Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 2.33" for 10-yr event
Inflow = 59.39 cfs @ 12.92 hrs, Volume= 12.581 af
Outflow = 58.99 cfs @ 13.01 hrs, Volume= 12.538 af, Atten= 1%, Lag= 5.5 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.34 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.76 fps, Avg. Travel Time= 4.8 min

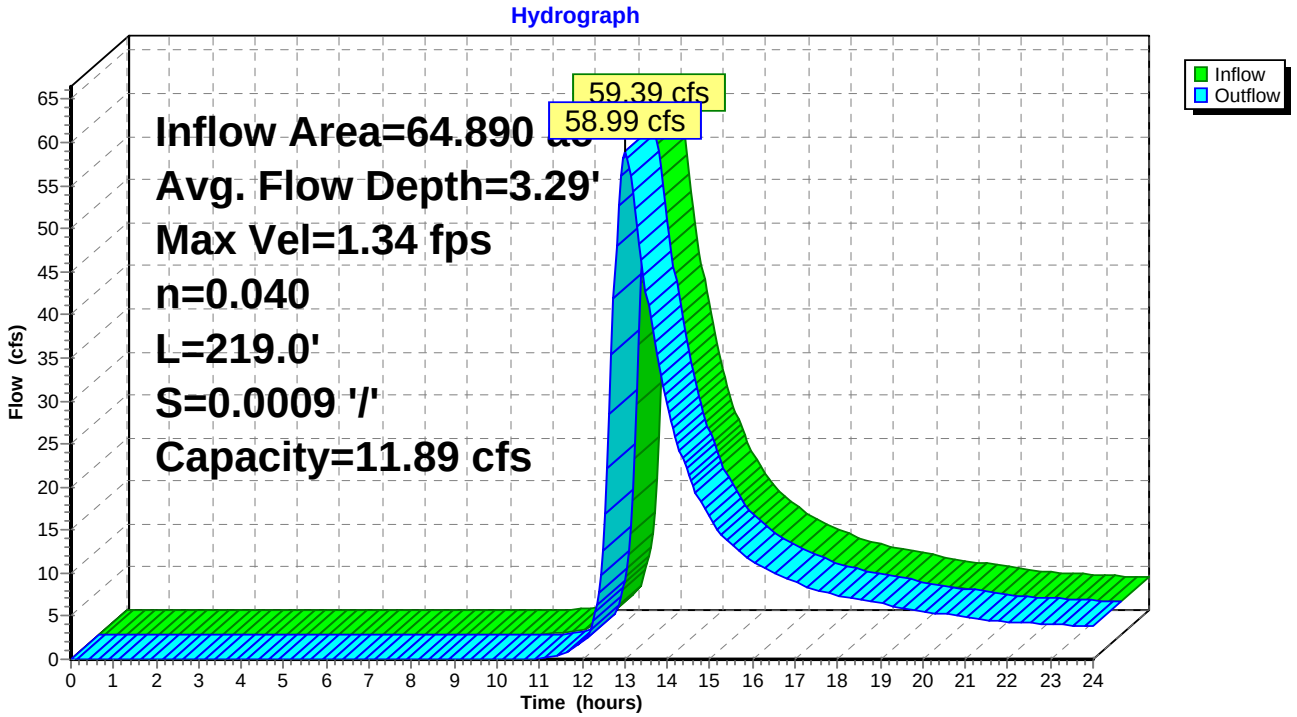
Peak Storage= 9,637 cf @ 12.97 hrs
Average Depth at Peak Storage= 3.29' , Surface Width= 23.16'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

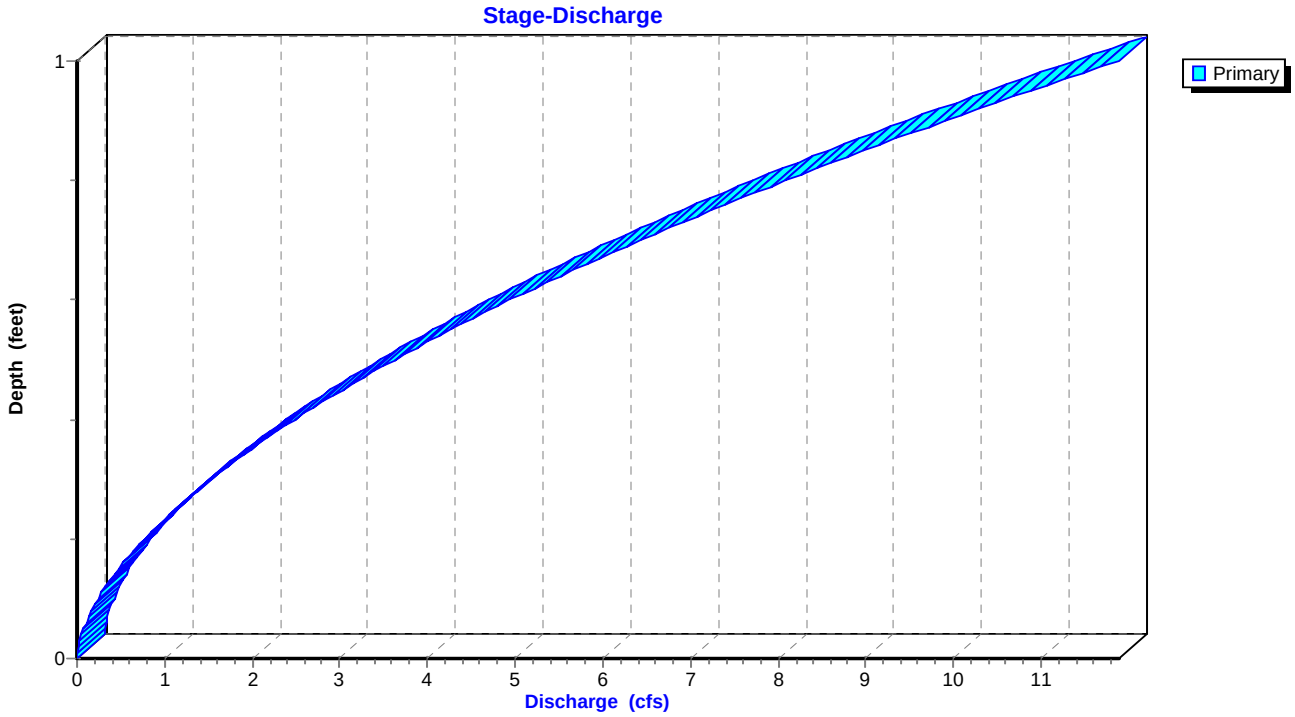


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Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 2.94" for 10-yr event
Inflow = 48.22 cfs @ 12.17 hrs, Volume= 3.944 af
Outflow = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af, Atten= 63%, Lag= 20.3 min
Primary = 17.87 cfs @ 12.50 hrs, Volume= 3.826 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.20' @ 12.50 hrs Surf.Area= 35,125 sf Storage= 55,419 cf

Plug-Flow detention time= 55.6 min calculated for 3.818 af (97% of inflow)
Center-of-Mass det. time= 38.8 min (876.0 - 837.2)

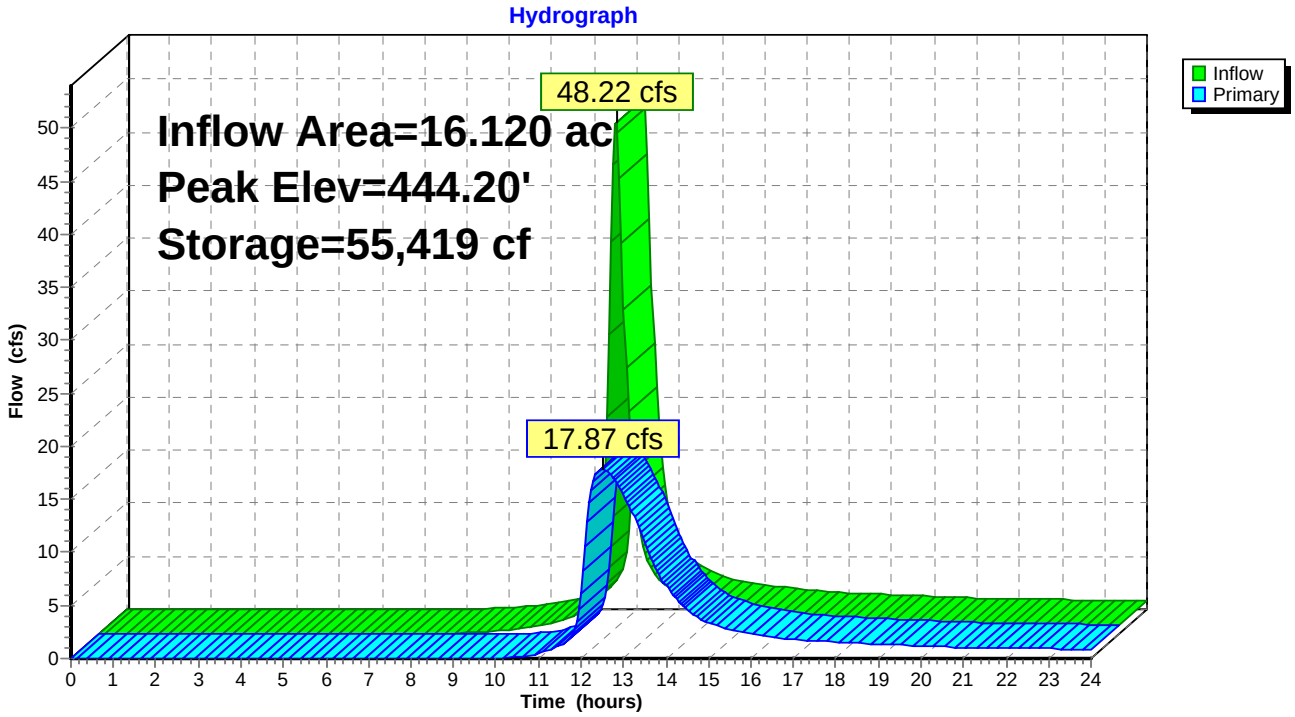
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

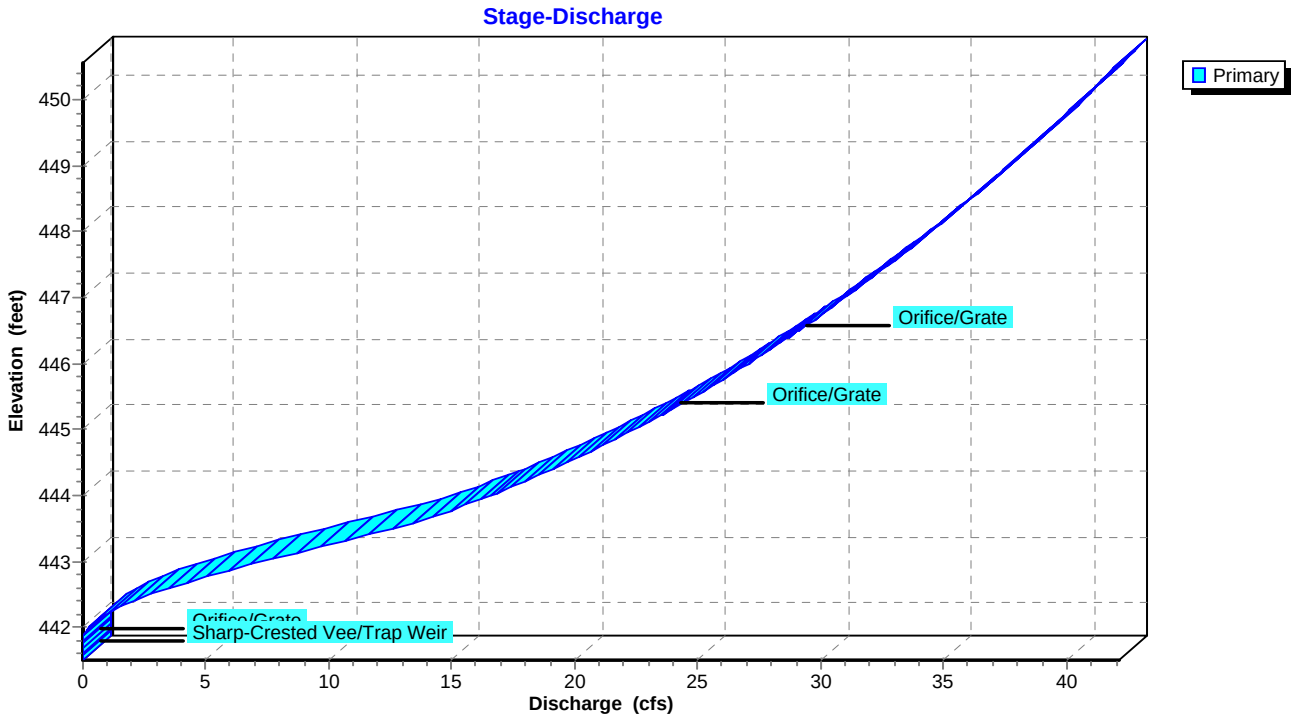
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=17.87 cfs @ 12.50 hrs HW=444.20' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 17.87 cfs @ 5.69 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 17.87 cfs of 34.05 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 4.00" for 10-yr event
Inflow = 17.30 cfs @ 12.44 hrs, Volume= 2.250 af
Outflow = 11.46 cfs @ 12.78 hrs, Volume= 1.501 af, Atten= 34%, Lag= 20.1 min
Discarded = 4.38 cfs @ 12.78 hrs, Volume= 0.122 af
Primary = 7.08 cfs @ 12.78 hrs, Volume= 1.379 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.19' @ 12.78 hrs Surf.Area= 11,356 sf Storage= 43,437 cf

Plug-Flow detention time= 182.3 min calculated for 1.501 af (67% of inflow)
Center-of-Mass det. time= 87.4 min (913.4 - 826.0)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

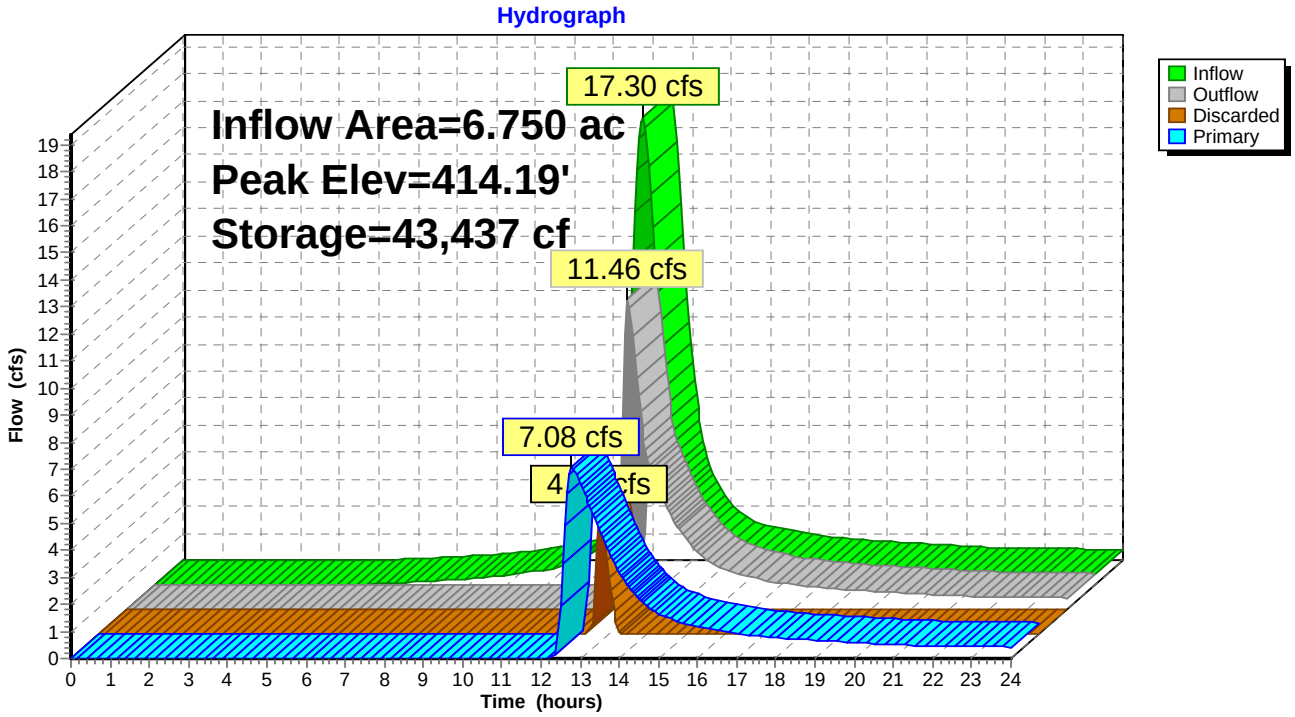
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

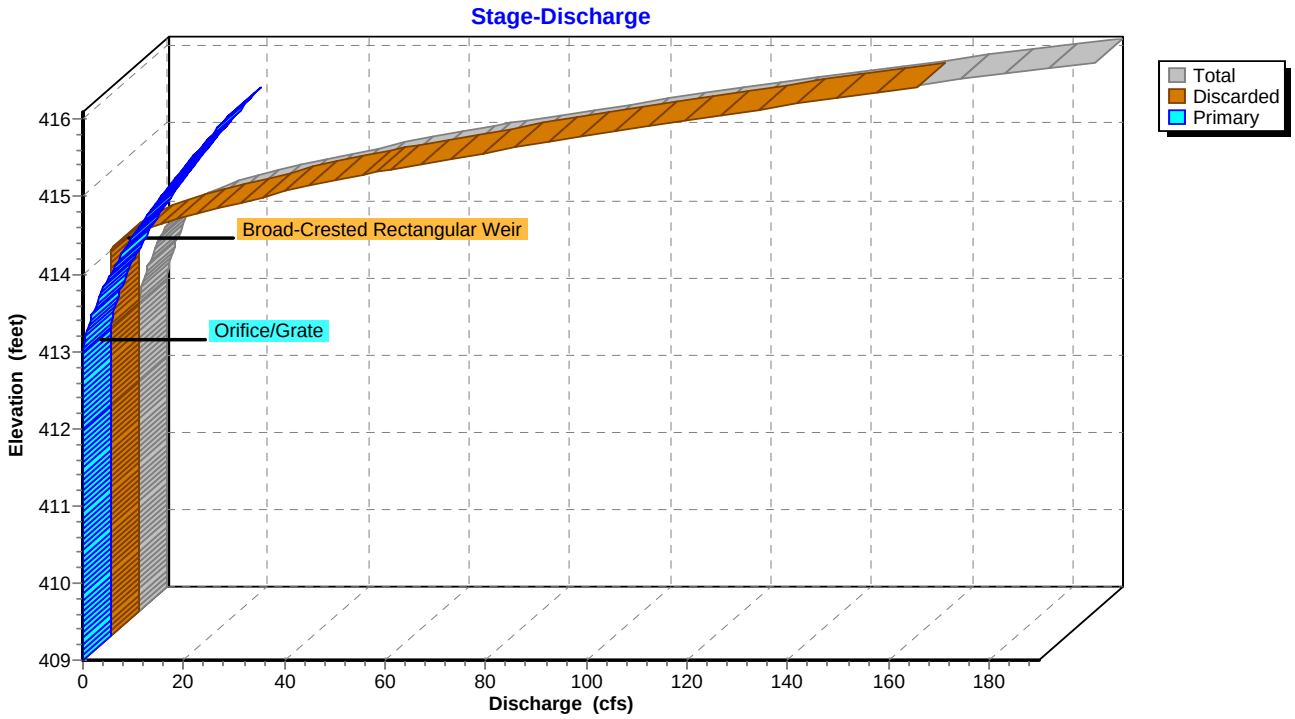
Discarded OutFlow Max=4.31 cfs @ 12.78 hrs HW=414.19' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 4.31 cfs @ 1.15 fps)

Primary OutFlow Max=7.07 cfs @ 12.78 hrs HW=414.19' (Free Discharge)
└**1=Culvert** (Passes 7.07 cfs of 34.45 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 7.07 cfs @ 3.50 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 3.99" for 10-yr event
Inflow = 39.30 cfs @ 12.56 hrs, Volume= 5.790 af
Outflow = 4.41 cfs @ 14.51 hrs, Volume= 2.206 af, Atten= 89%, Lag= 116.9 min
Discarded = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Primary = 4.41 cfs @ 14.51 hrs, Volume= 2.206 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 415.87' @ 14.51 hrs Surf.Area= 39,014 sf Storage= 175,013 cf

Plug-Flow detention time= 340.3 min calculated for 2.202 af (38% of inflow)
Center-of-Mass det. time= 215.5 min (1,048.5 - 833.0)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

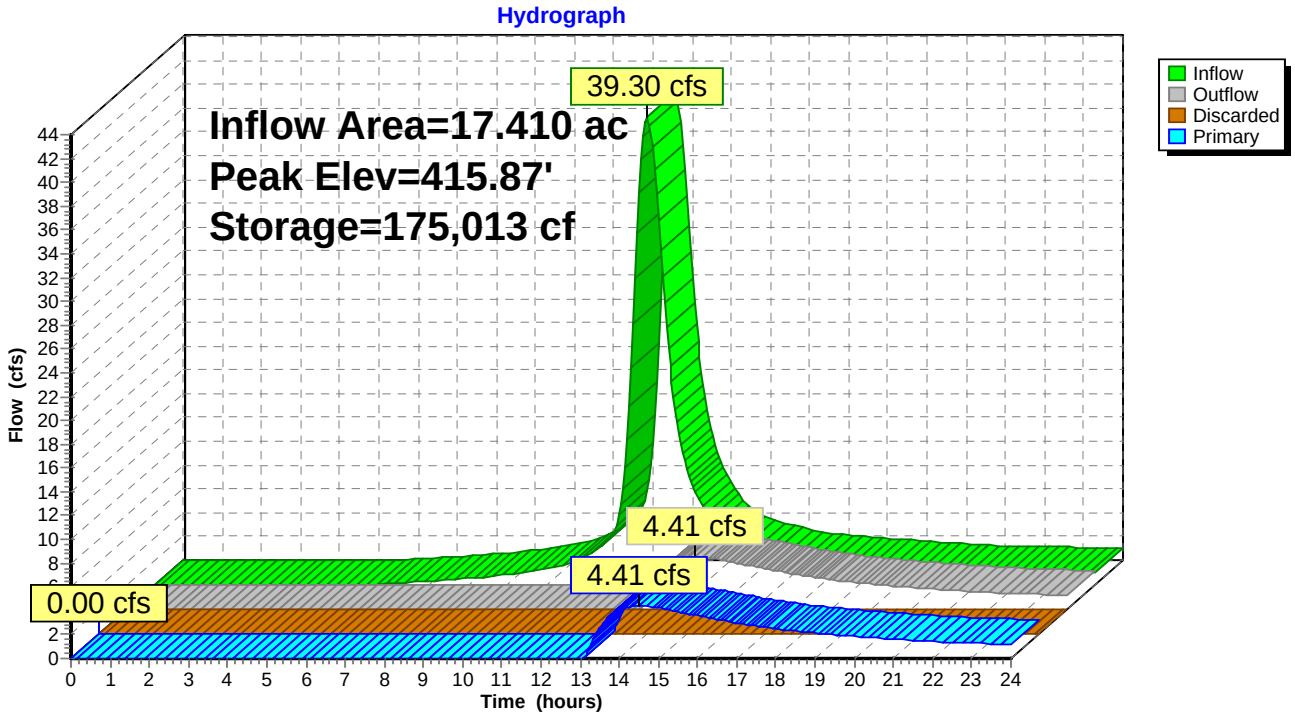
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

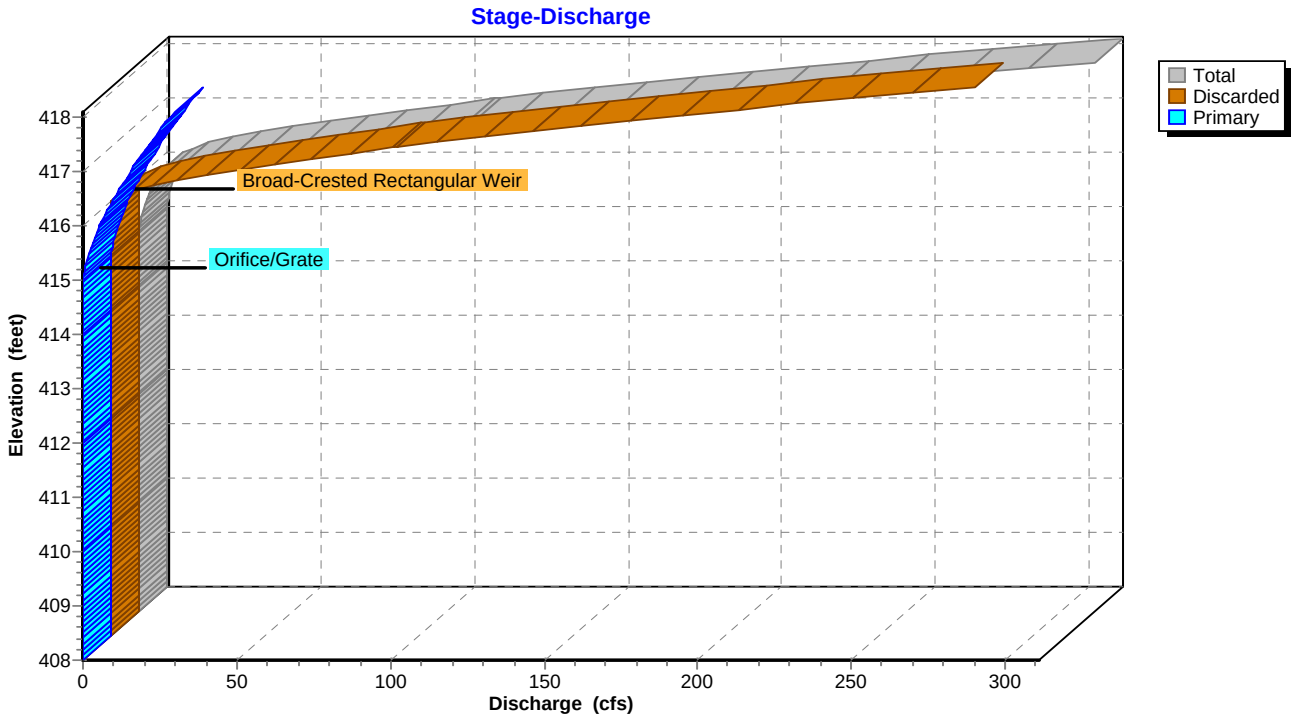
Discarded OutFlow Max=0.00 cfs @ 0.00 hrs HW=408.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Primary OutFlow Max=4.41 cfs @ 14.51 hrs HW=415.87' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 4.41 cfs @ 2.99 fps)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 4.57" for 10-yr event
Inflow = 7.00 cfs @ 12.00 hrs, Volume= 0.404 af
Outflow = 1.74 cfs @ 12.21 hrs, Volume= 0.186 af, Atten= 75%, Lag= 12.6 min
Primary = 1.74 cfs @ 12.21 hrs, Volume= 0.186 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.46' @ 12.21 hrs Surf.Area= 8,000 sf Storage= 10,264 cf

Plug-Flow detention time= 256.2 min calculated for 0.186 af (46% of inflow)
Center-of-Mass det. time= 137.0 min (915.3 - 778.3)

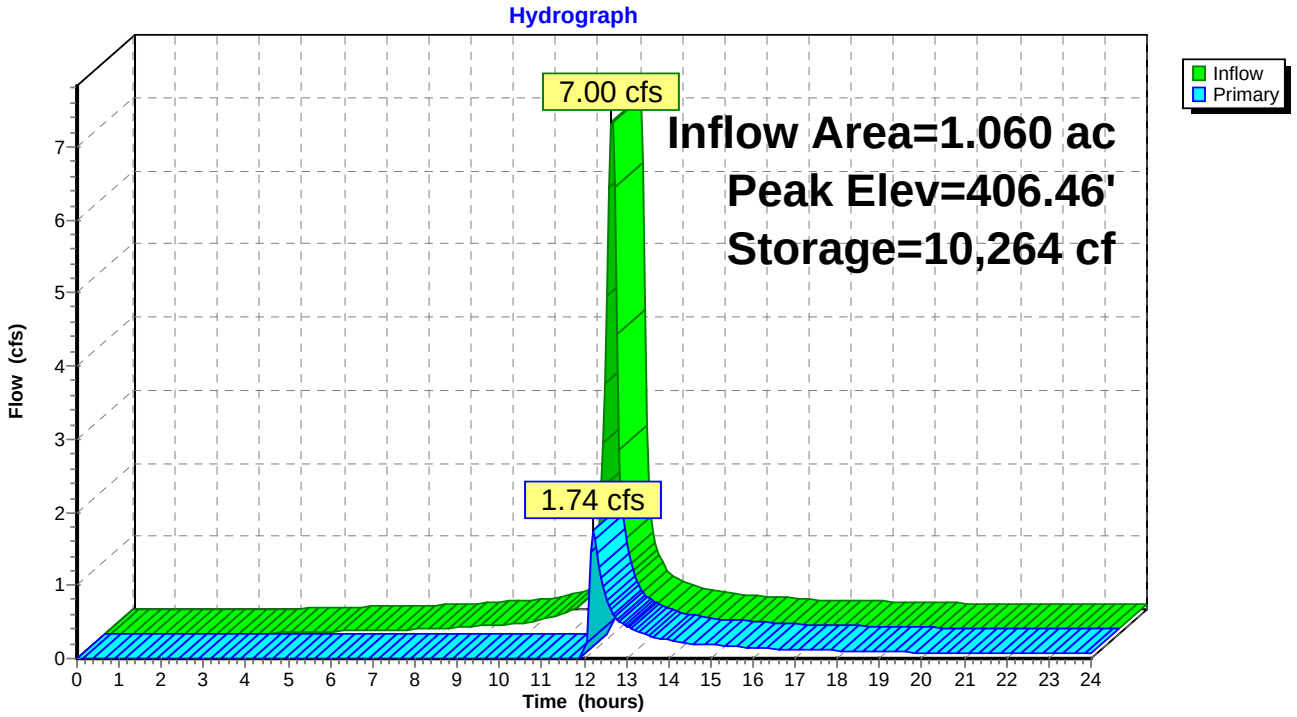
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

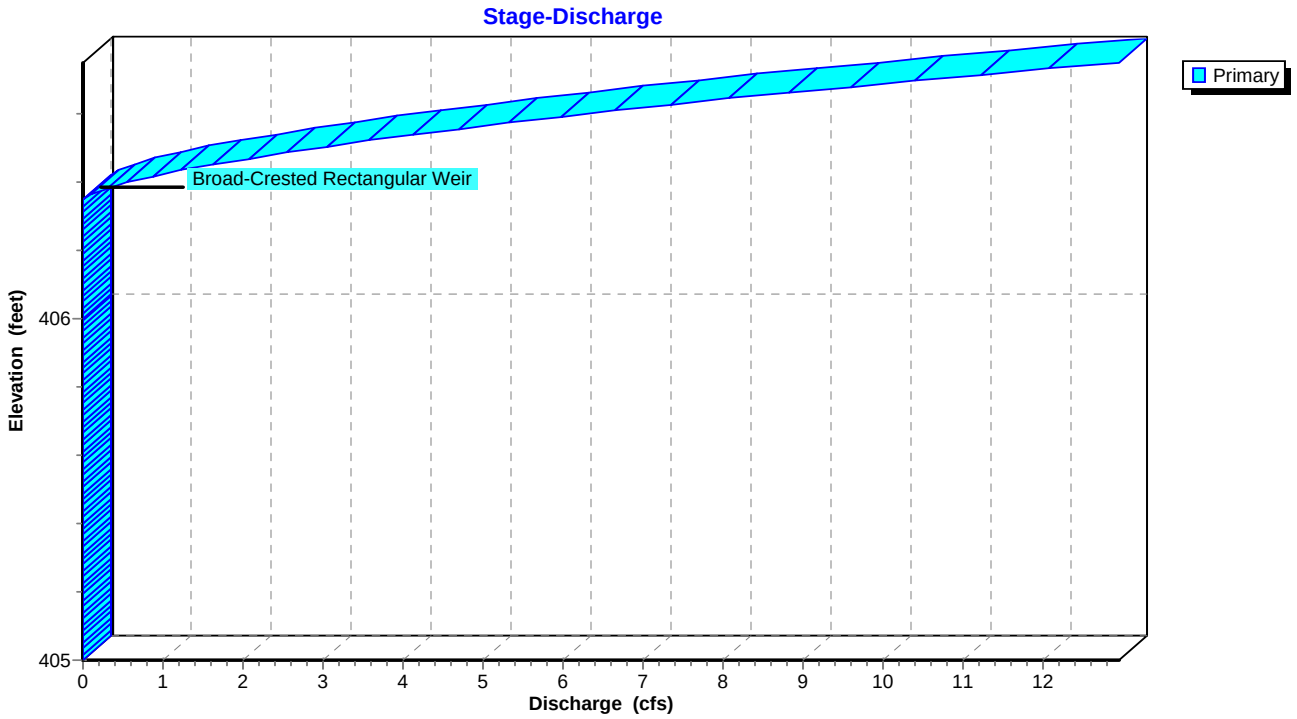
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=1.71 cfs @ 12.21 hrs HW=406.46' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 1.71 cfs @ 0.81 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 4.02" for 10-yr event
Inflow = 13.48 cfs @ 12.18 hrs, Volume= 1.176 af
Outflow = 7.98 cfs @ 12.40 hrs, Volume= 1.152 af, Atten= 41%, Lag= 13.2 min
Primary = 7.98 cfs @ 12.40 hrs, Volume= 1.152 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 425.75' @ 12.40 hrs Surf.Area= 6,656 sf Storage= 14,806 cf

Plug-Flow detention time= 50.7 min calculated for 1.152 af (98% of inflow)
Center-of-Mass det. time= 38.6 min (847.6 - 809.0)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

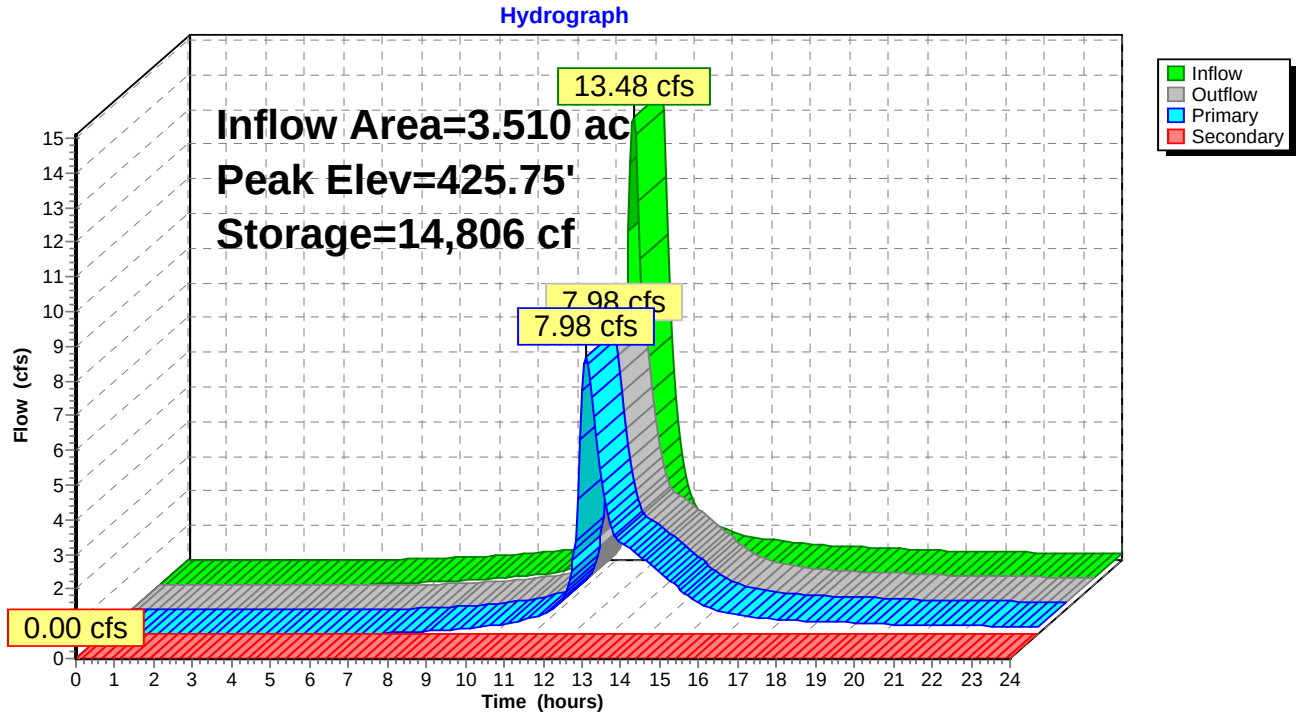
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

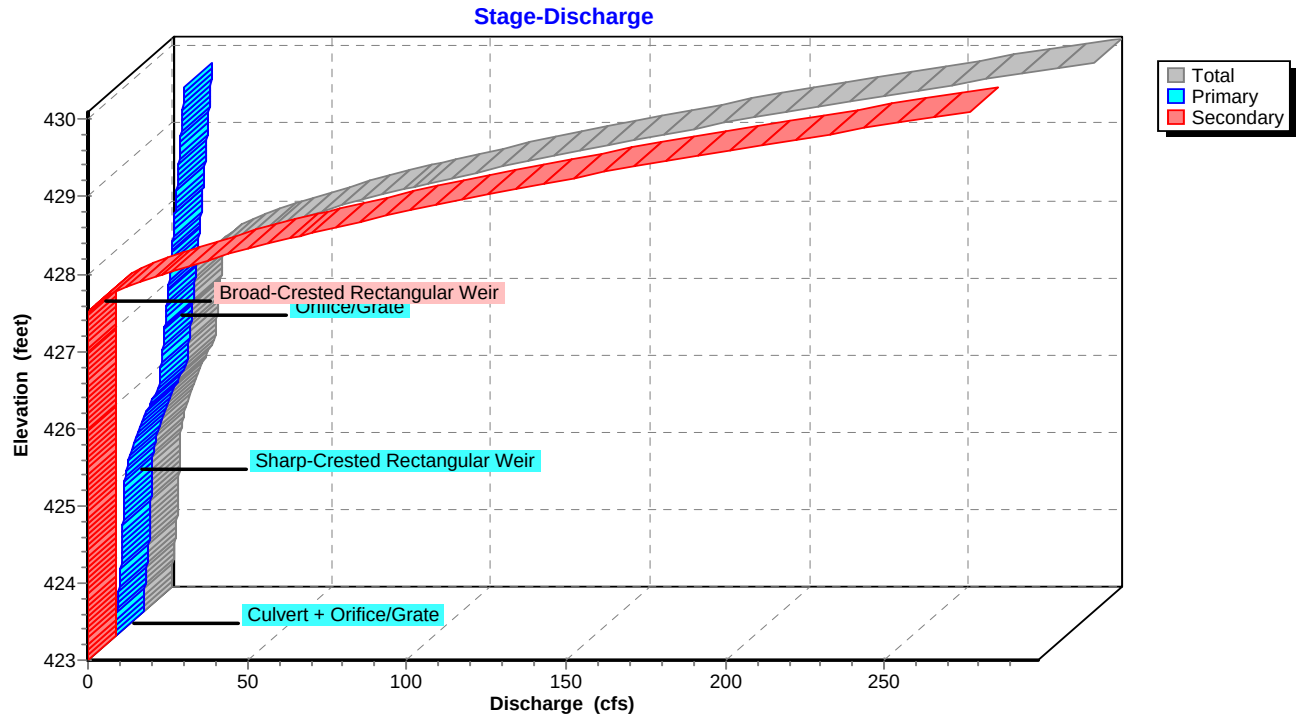
Primary OutFlow Max=7.98 cfs @ 12.40 hrs HW=425.75' (Free Discharge)
└**1=Culvert** (Passes 7.98 cfs of 12.05 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.28 cfs @ 7.43 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 4.70 cfs @ 3.37 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 3.32" for 10-yr event
Inflow = 3.18 cfs @ 12.08 hrs, Volume= 0.210 af
Outflow = 2.78 cfs @ 12.16 hrs, Volume= 0.154 af, Atten= 13%, Lag= 4.7 min
Discarded = 2.78 cfs @ 12.16 hrs, Volume= 0.154 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 407.90' @ 12.16 hrs Surf.Area= 2,469 sf Storage= 2,998 cf

Plug-Flow detention time= 145.6 min calculated for 0.153 af (73% of inflow)
Center-of-Mass det. time= 52.4 min (873.8 - 821.4)

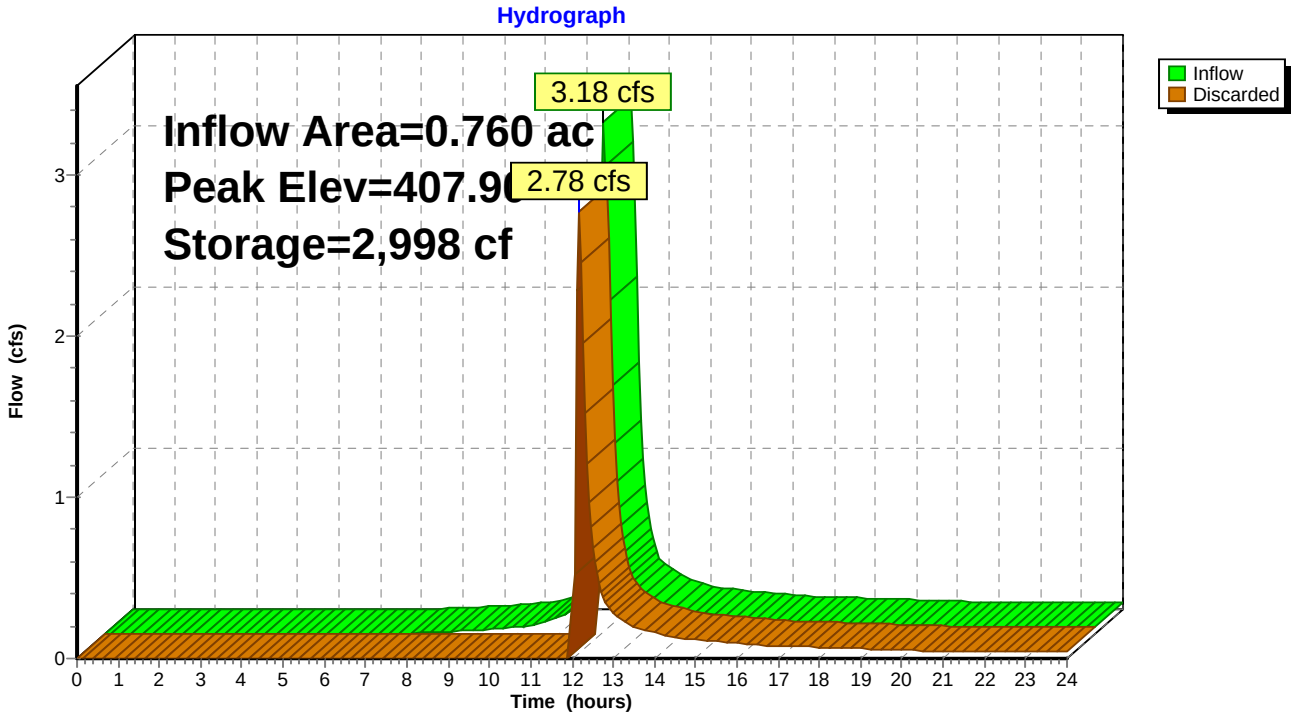
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

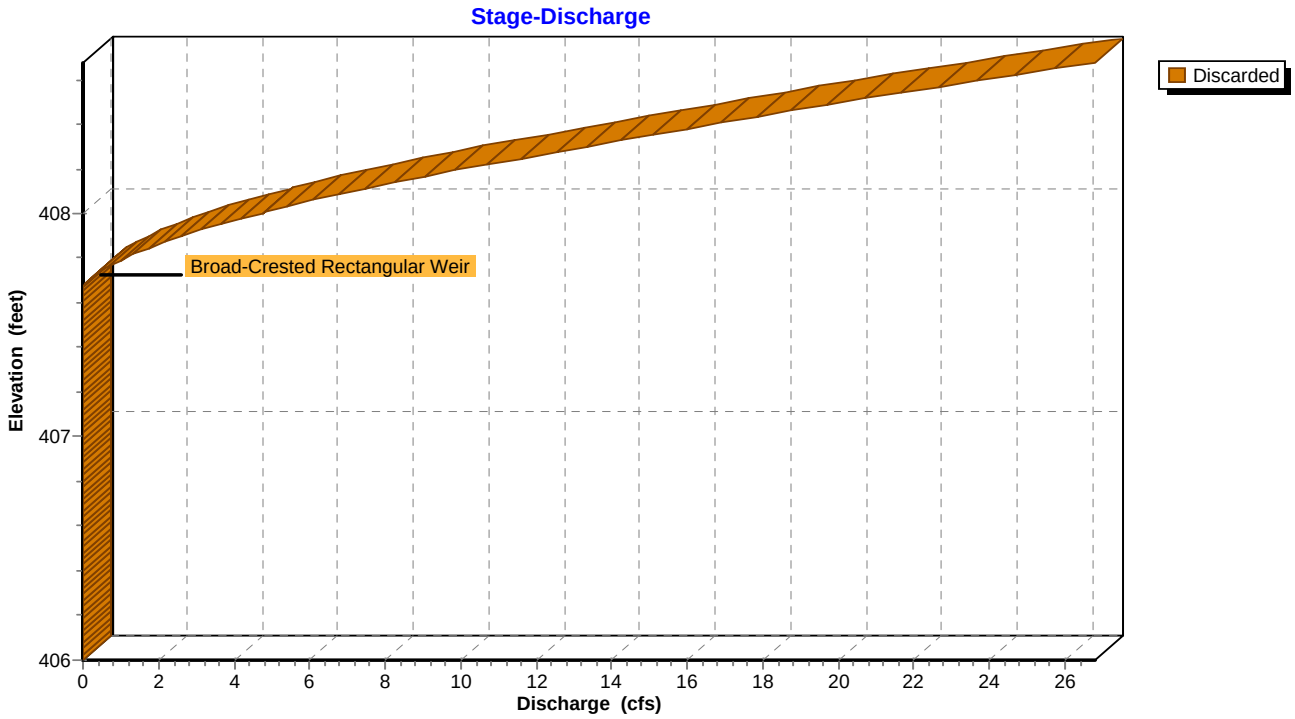
Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=2.74 cfs @ 12.16 hrs HW=407.90' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 2.74 cfs @ 1.18 fps)

Pond Sed-2: Sed Trap 2



Pond Sed-2: Sed Trap 2



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>3.75"
Flow Length=777' Tc=38.6 min CN=74 Runoff=63.03 cfs 7.128 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>3.98"
Flow Length=209' Tc=23.3 min CN=76 Runoff=65.36 cfs 5.344 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>5.15"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=22.08 cfs 2.896 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>5.14"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=50.18 cfs 7.455 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>5.76"
Tc=9.2 min CN=92 Runoff=8.69 cfs 0.509 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>4.41"
Tc=15.6 min CN=80 Runoff=4.19 cfs 0.279 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>3.81"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=16.14 cfs 3.089 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>5.17"
Flow Length=234' Tc=25.2 min CN=87 Runoff=17.17 cfs 1.513 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>3.96"
Flow Length=590' Tc=36.5 min CN=76 Runoff=10.26 cfs 1.113 af

Reach R-1: R-1 Avg. Flow Depth=0.70' Max Vel=4.85 fps Inflow=21.65 cfs 5.211 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=21.63 cfs 5.193 af

Reach R-2: R-2 Avg. Flow Depth=2.56' Max Vel=2.08 fps Inflow=82.64 cfs 12.322 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=70.24 cfs 12.139 af

Reach R-3: R-3 Avg. Flow Depth=3.95' Max Vel=1.48 fps Inflow=79.21 cfs 17.029 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=78.72 cfs 16.969 af

Reach R-4: R-4 Avg. Flow Depth=4.26' Max Vel=1.37 fps Inflow=79.29 cfs 17.259 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=78.94 cfs 17.208 af

Pond Pond 1b: Pond 1b Peak Elev=444.85' Storage=78,683 cf Inflow=65.36 cfs 5.344 af
Outflow=21.65 cfs 5.211 af

Pond Pond 1c: Pond 1c Peak Elev=414.35' Storage=45,299 cf Inflow=22.08 cfs 2.896 af
Discarded=11.18 cfs 0.414 af Primary=8.58 cfs 1.728 af Outflow=19.76 cfs 2.142 af

Pond Pond 1d: Pond 1d Peak Elev=416.24' Storage=189,707 cf Inflow=50.18 cfs 7.455 af
Discarded=10.56 cfs 0.665 af Primary=7.51 cfs 3.162 af Outflow=18.07 cfs 3.827 af

Pond Pond 1e: Pond 1e Peak Elev=406.58' Storage=11,220 cf Inflow=8.69 cfs 0.509 af
Outflow=5.34 cfs 0.290 af

Pond Pond 3: Pond 3 Peak Elev=426.08' Storage=17,042 cf Inflow=17.17 cfs 1.513 af
Primary=11.82 cfs 1.486 af Secondary=0.00 cfs 0.000 af Outflow=11.82 cfs 1.486 af

Pond Sed-2: Sed Trap 2 Peak Elev=407.97' Storage=3,158 cf Inflow=4.19 cfs 0.279 af
Outflow=4.04 cfs 0.223 af

Summary for Subcatchment P-1a: P-1a

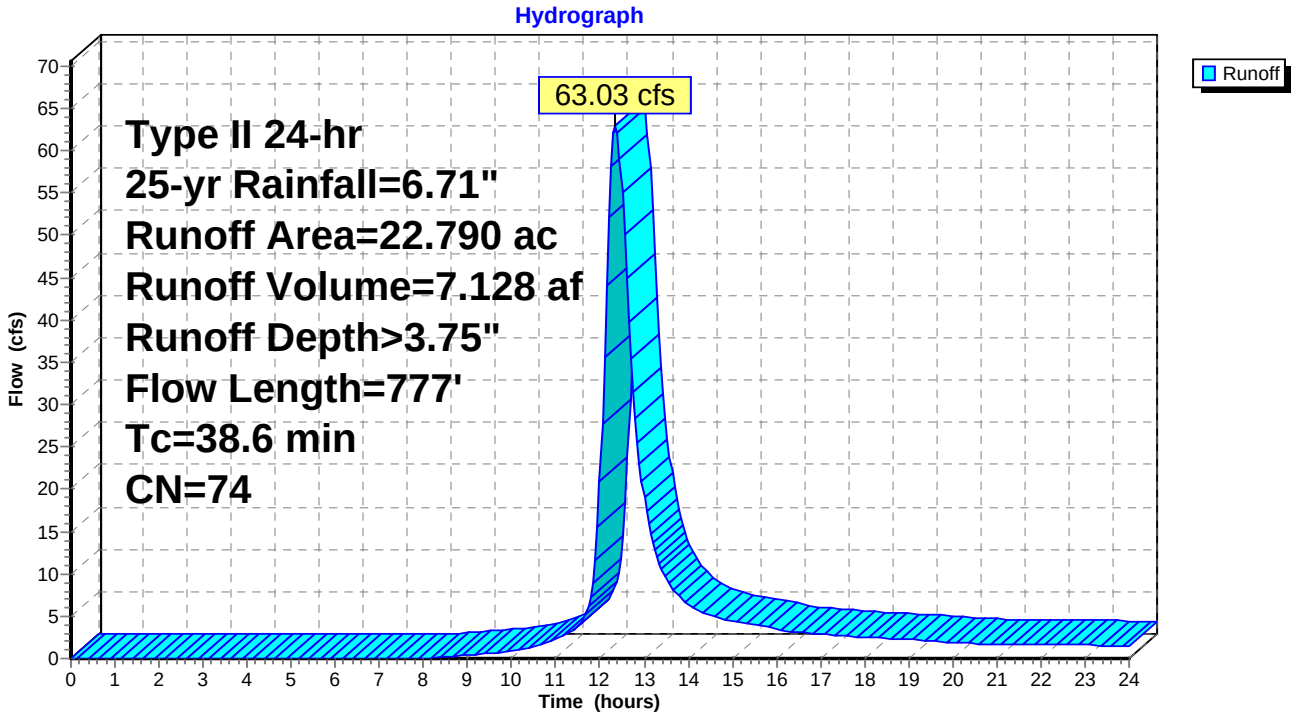
Runoff = 63.03 cfs @ 12.35 hrs, Volume= 7.128 af, Depth> 3.75"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

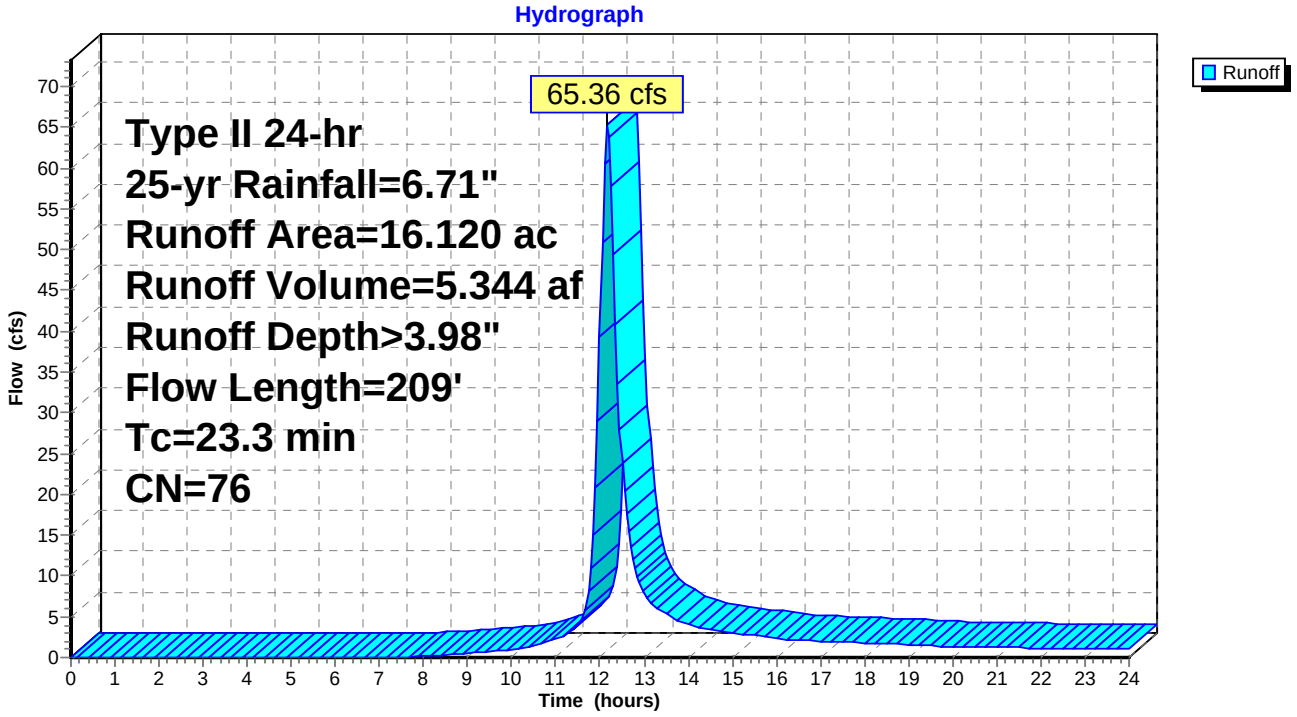
Runoff = 65.36 cfs @ 12.16 hrs, Volume= 5.344 af, Depth> 3.98"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

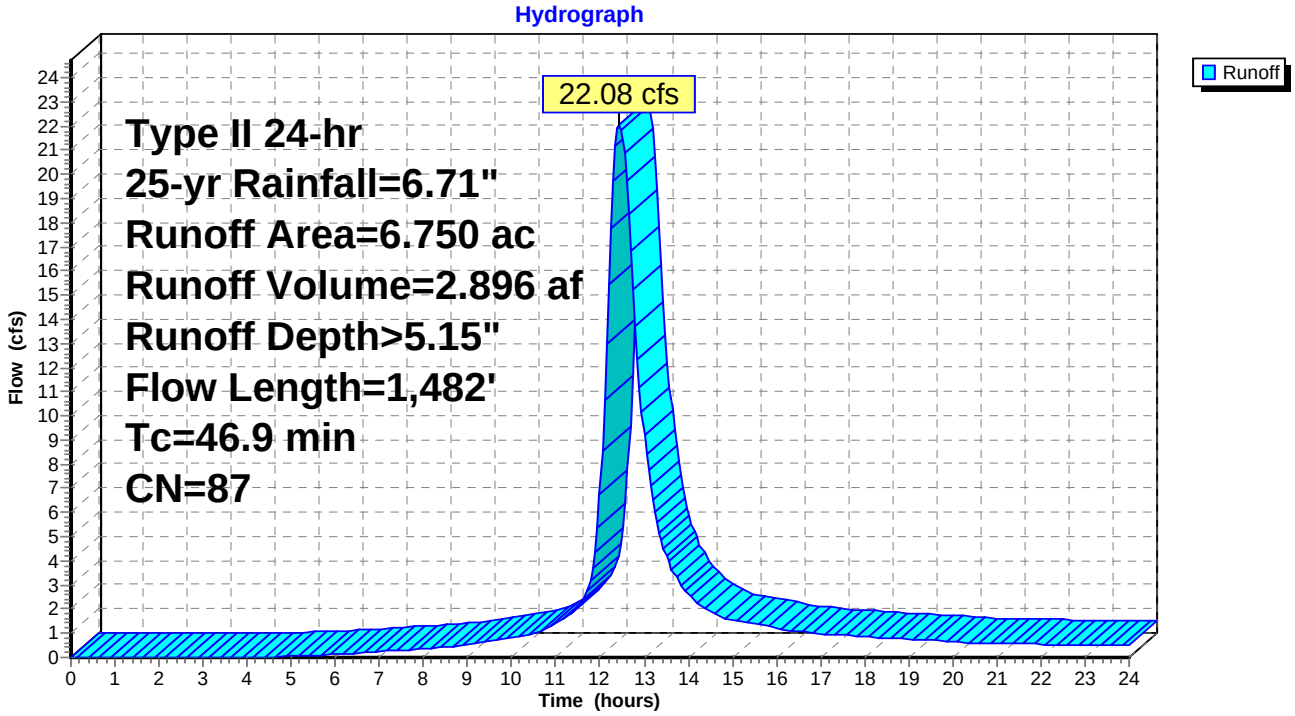
Runoff = 22.08 cfs @ 12.44 hrs, Volume= 2.896 af, Depth> 5.15"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

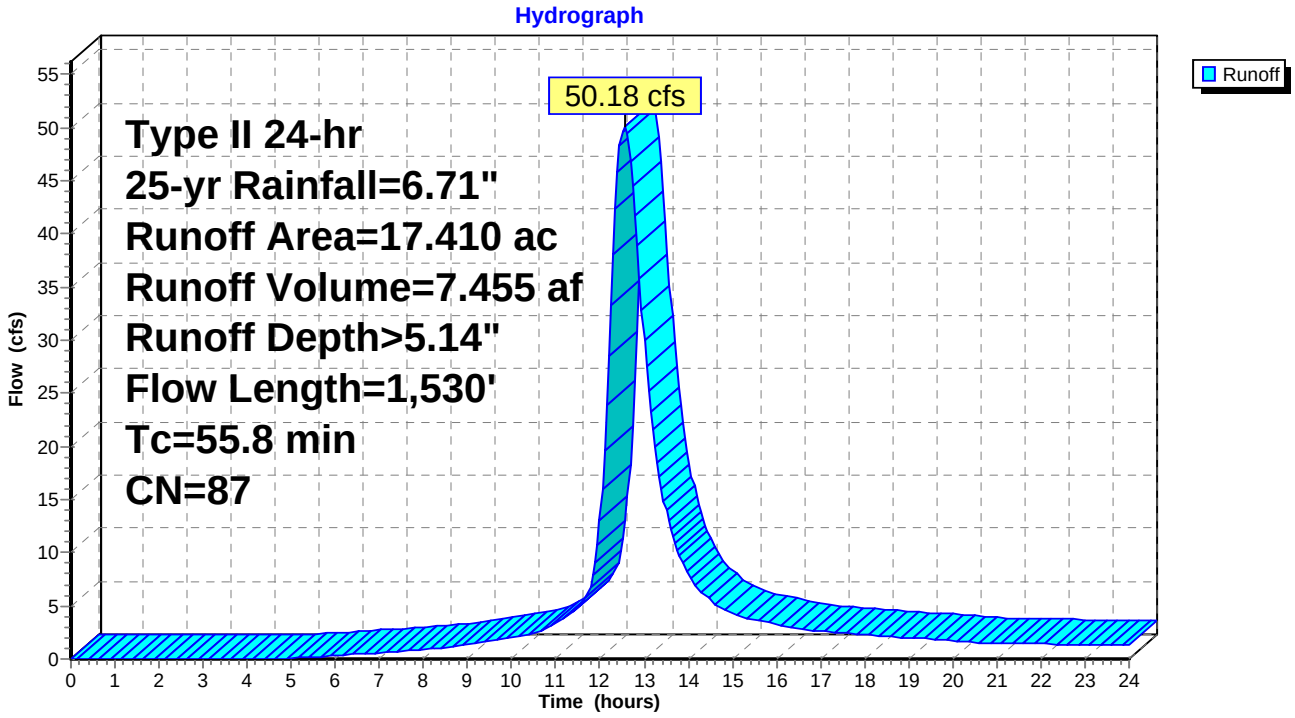
Runoff = 50.18 cfs @ 12.55 hrs, Volume= 7.455 af, Depth> 5.14"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

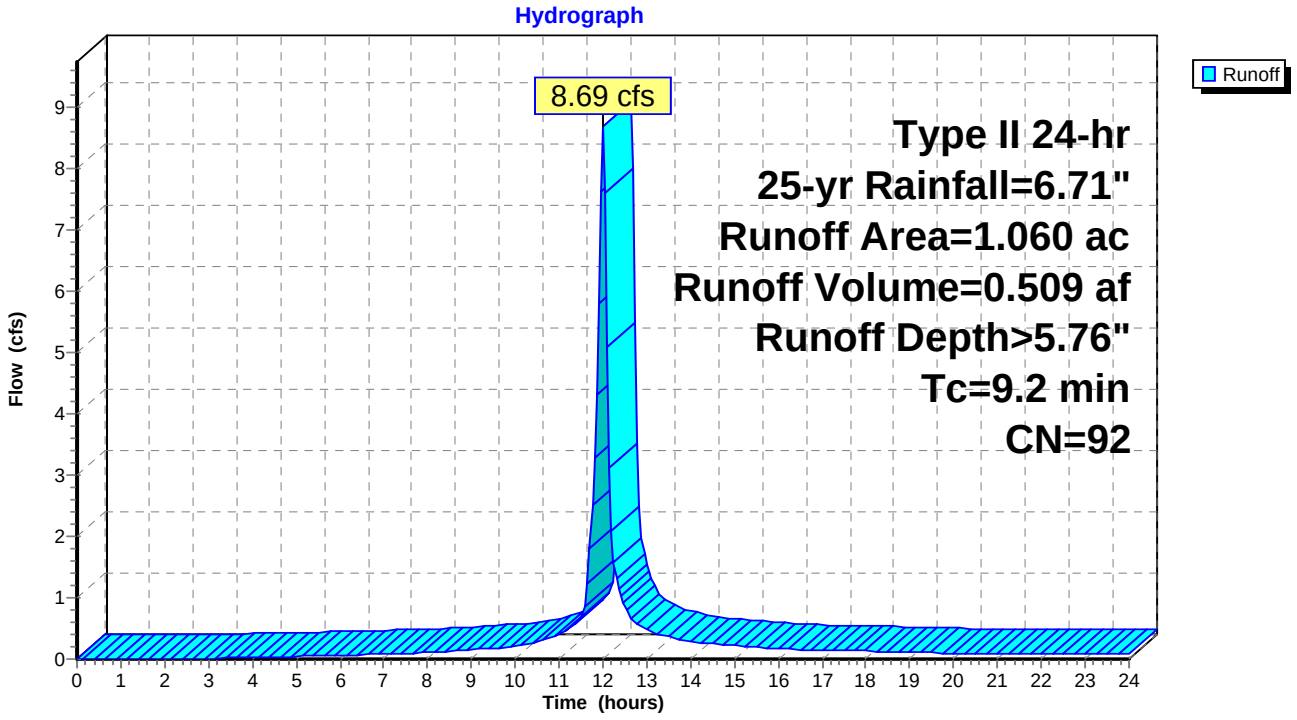
Runoff = 8.69 cfs @ 12.00 hrs, Volume= 0.509 af, Depth> 5.76"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

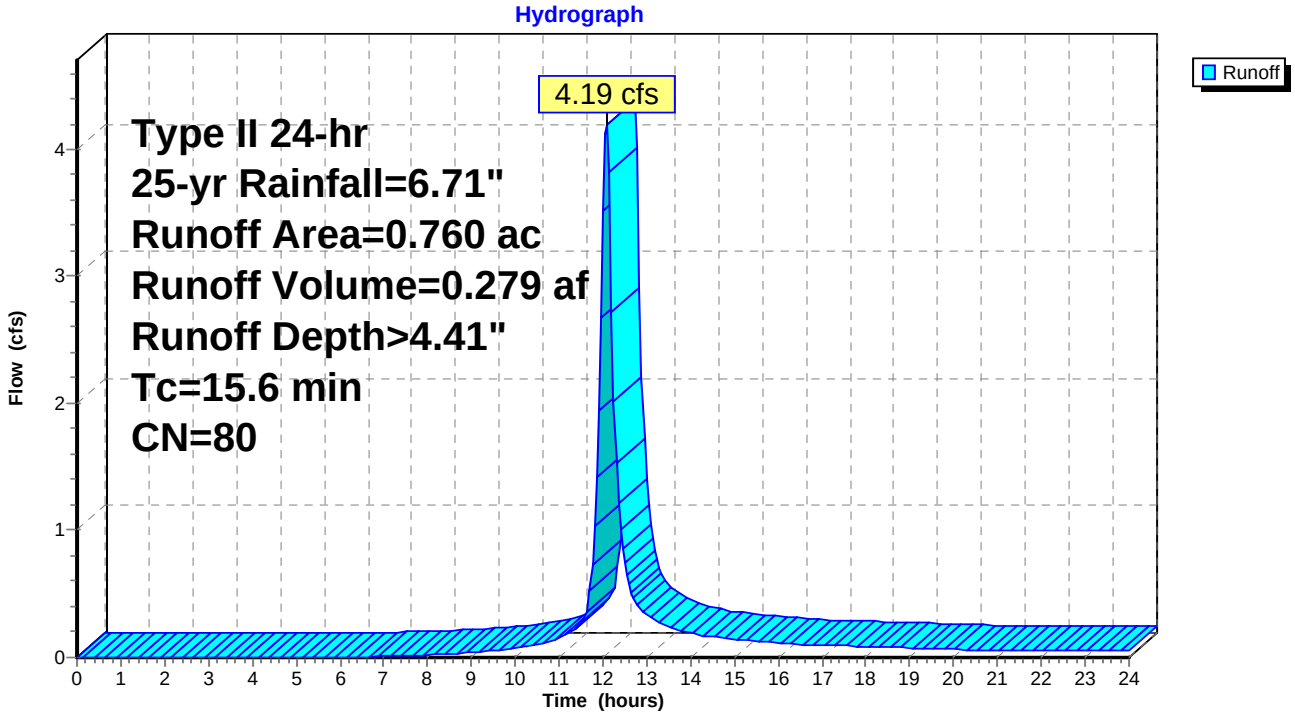
Runoff = 4.19 cfs @ 12.07 hrs, Volume= 0.279 af, Depth> 4.41"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

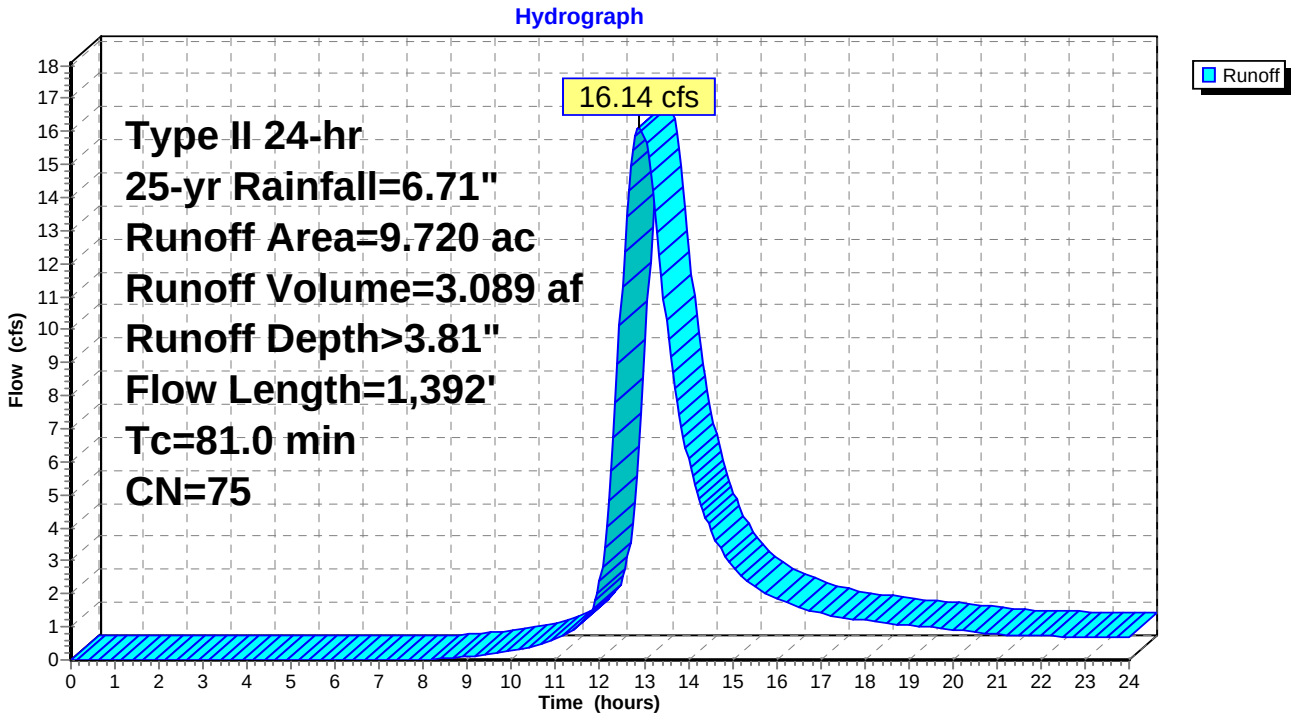
Runoff = 16.14 cfs @ 12.89 hrs, Volume= 3.089 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

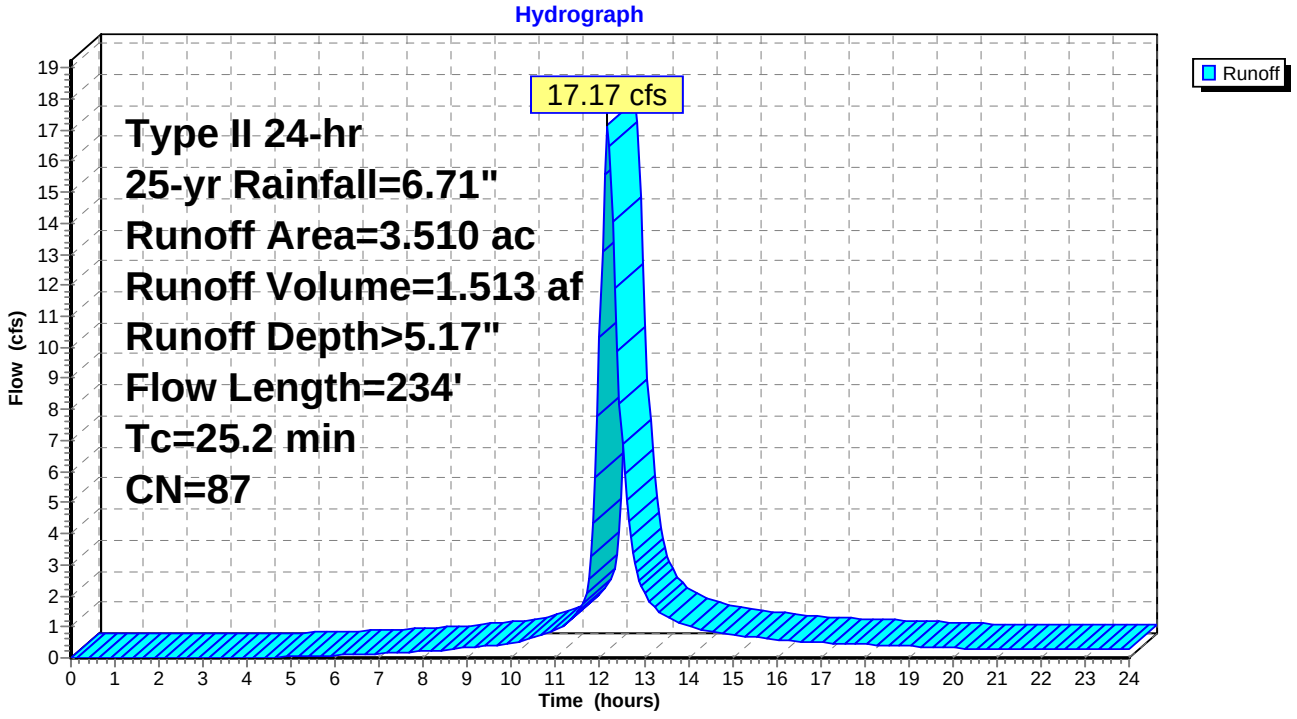
Runoff = 17.17 cfs @ 12.18 hrs, Volume= 1.513 af, Depth> 5.17"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

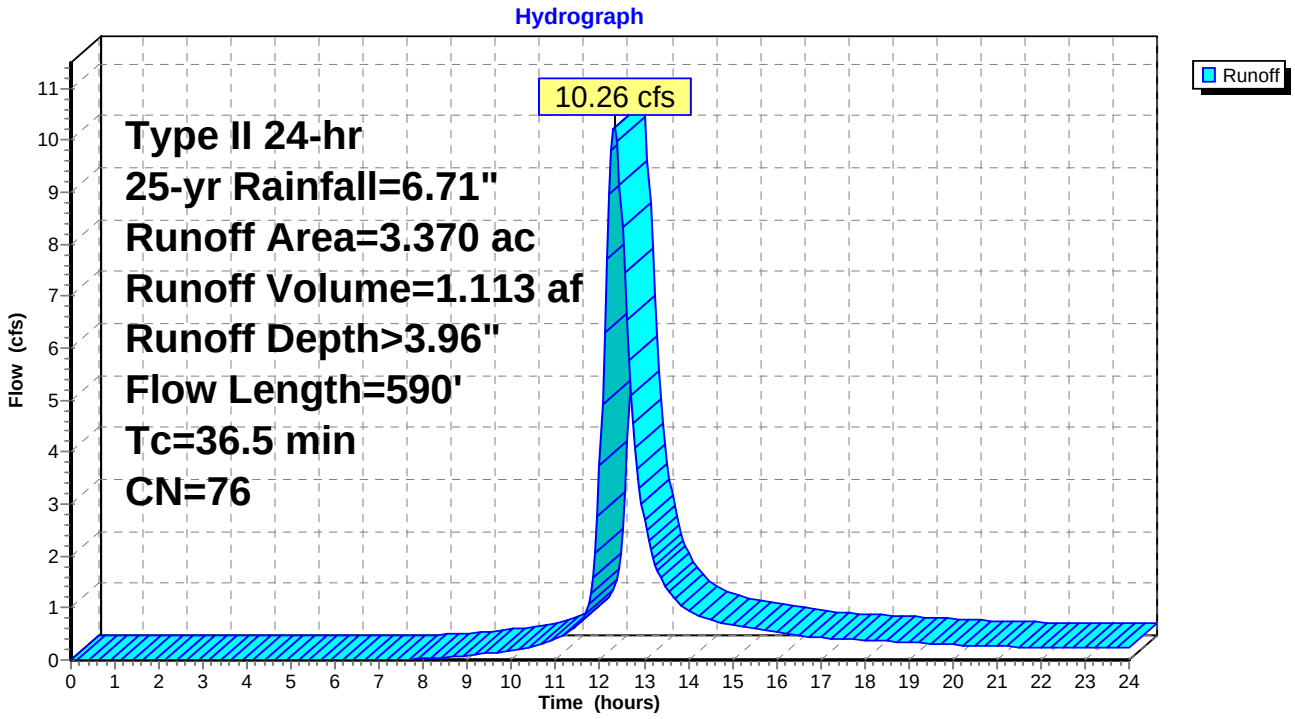
Runoff = 10.26 cfs @ 12.32 hrs, Volume= 1.113 af, Depth> 3.96"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 3.88" for 25-yr event
Inflow = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af
Outflow = 21.63 cfs @ 12.62 hrs, Volume= 5.193 af, Atten= 0%, Lag= 5.3 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.85 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 2.34 fps, Avg. Travel Time= 6.3 min

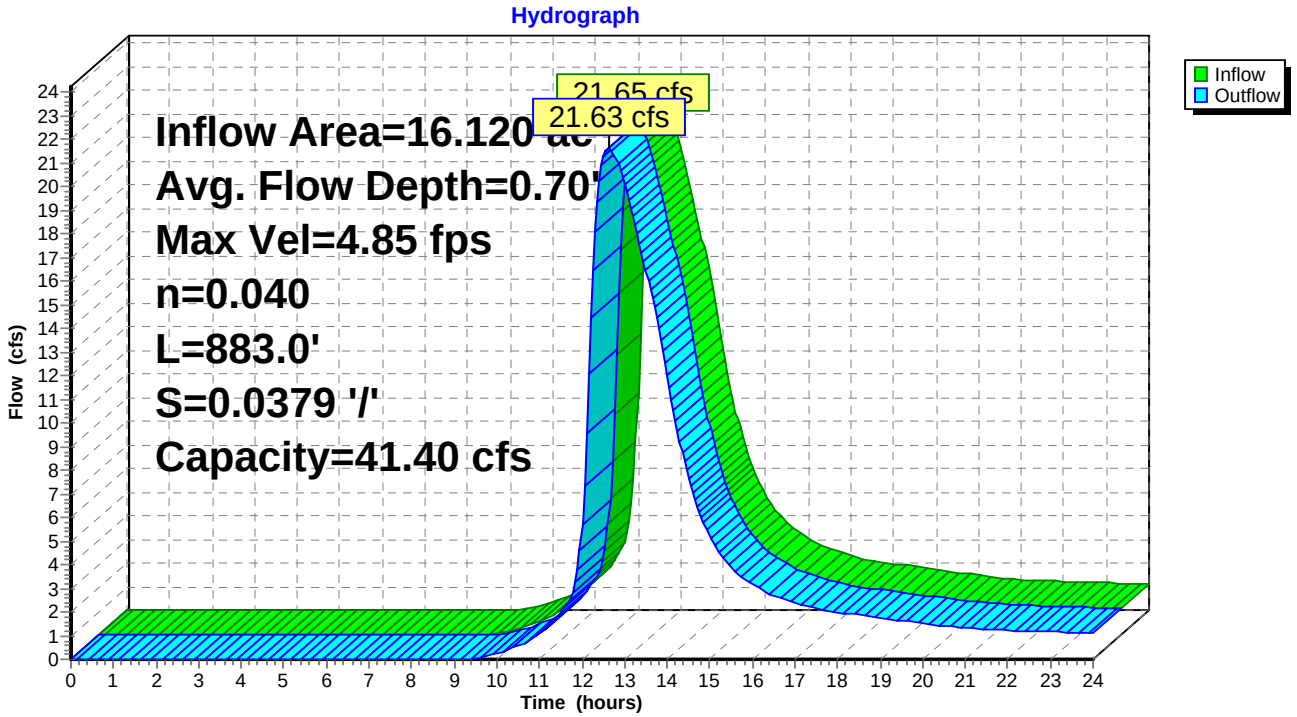
Peak Storage= 3,936 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.70' , Surface Width= 7.79'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

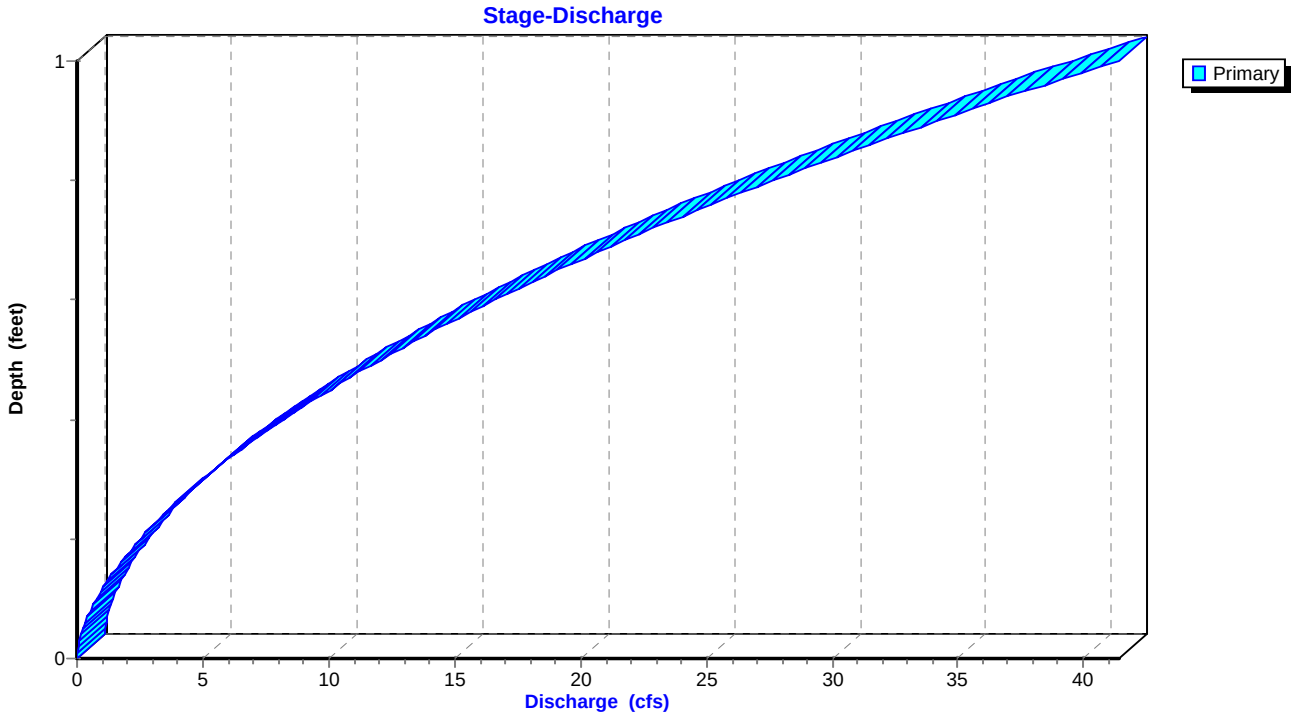


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Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Depth (feet)
1
0
0
5
10
15
20
25
30
35
40
Discharge (cfs)
Primary

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 3.73" for 25-yr event
Inflow = 82.64 cfs @ 12.37 hrs, Volume= 12.322 af
Outflow = 70.24 cfs @ 12.80 hrs, Volume= 12.139 af, Atten= 15%, Lag= 25.3 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 13.8 min
Avg. Velocity = 0.95 fps, Avg. Travel Time= 30.0 min

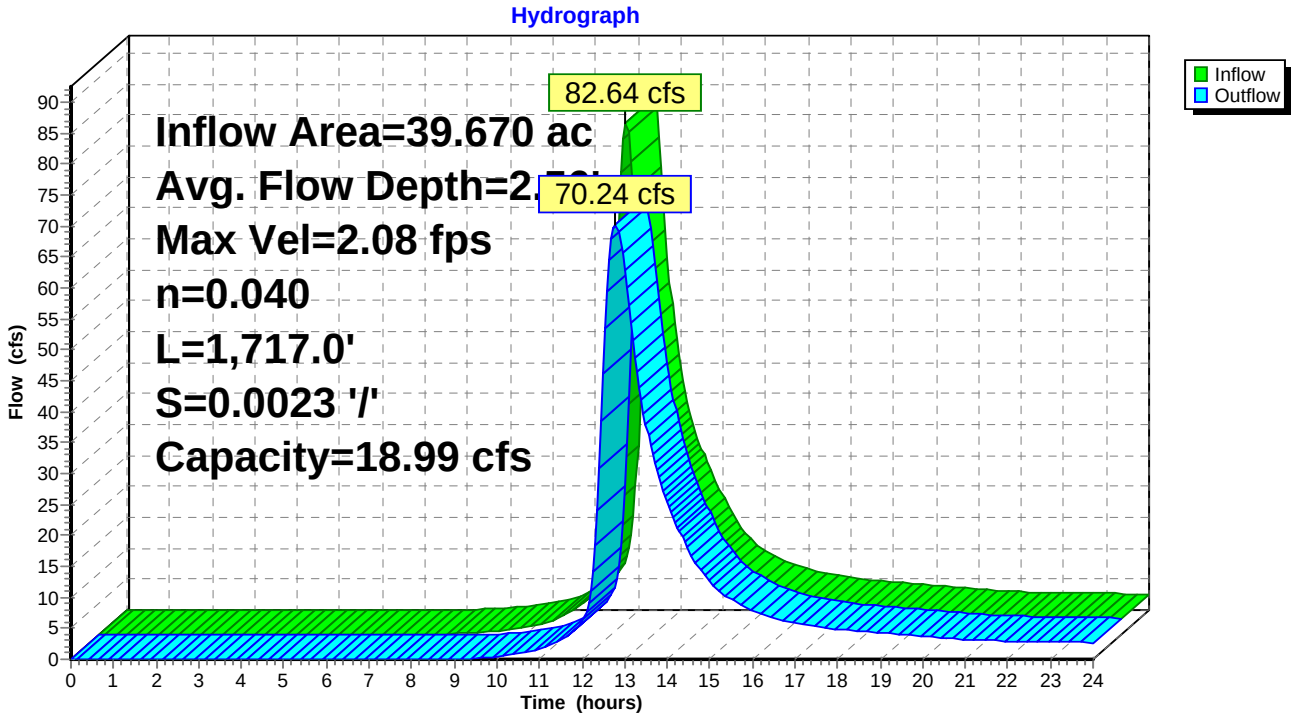
Peak Storage= 58,134 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.56' , Surface Width= 20.25'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

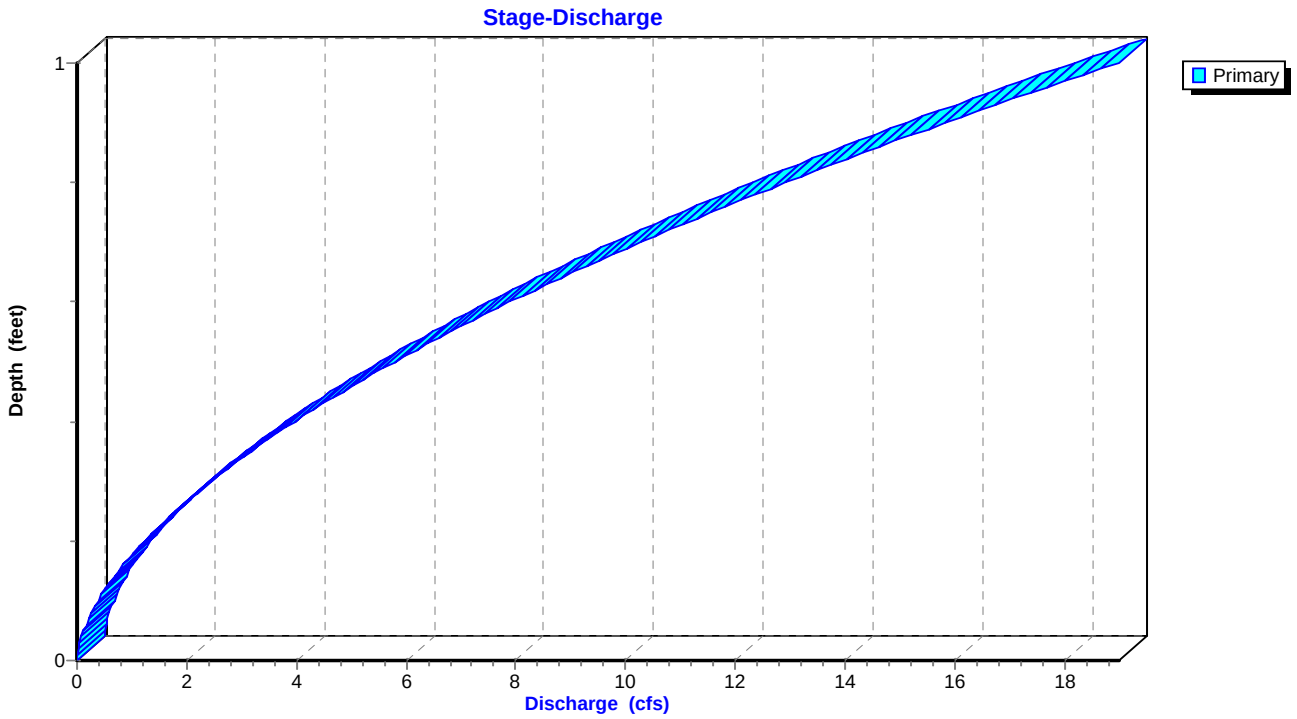


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Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 3.20" for 25-yr event
Inflow = 79.21 cfs @ 12.83 hrs, Volume= 17.029 af
Outflow = 78.72 cfs @ 12.93 hrs, Volume= 16.969 af, Atten= 1%, Lag= 6.2 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.48 fps, Min. Travel Time= 3.2 min
Avg. Velocity = 0.84 fps, Avg. Travel Time= 5.6 min

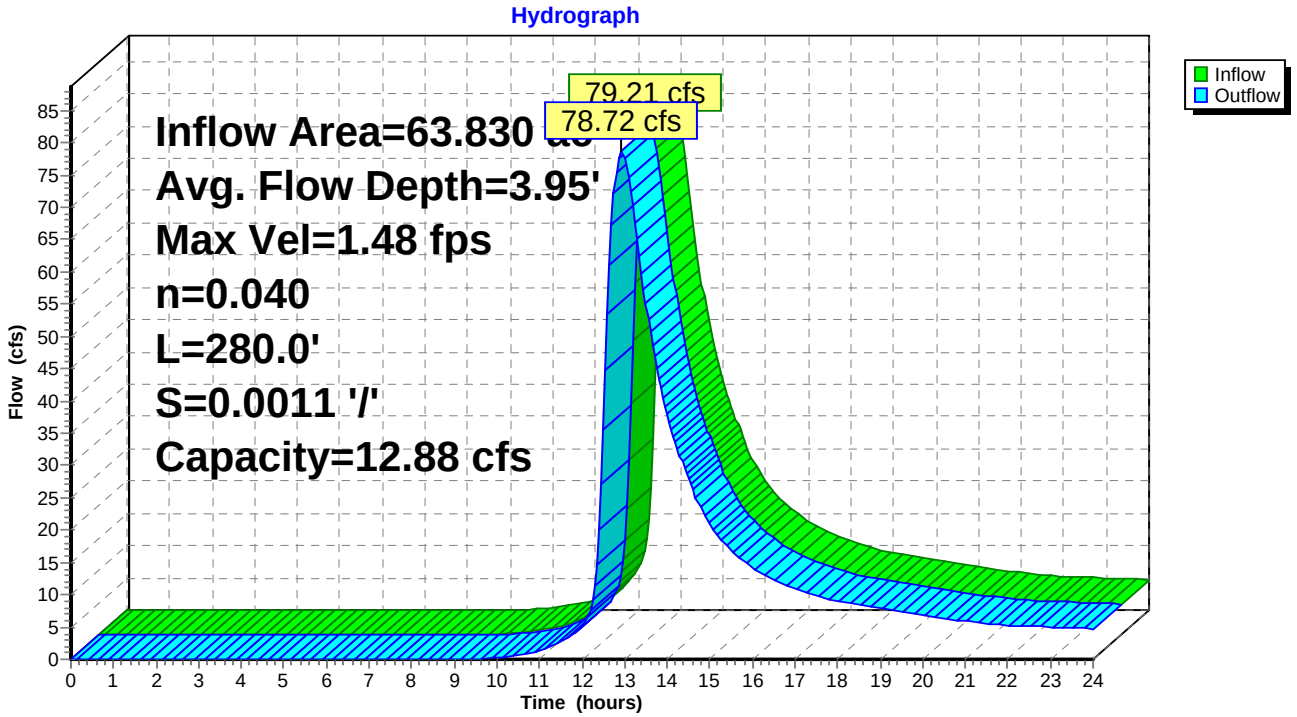
Peak Storage= 14,921 cf @ 12.88 hrs
Average Depth at Peak Storage= 3.95' , Surface Width= 25.81'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

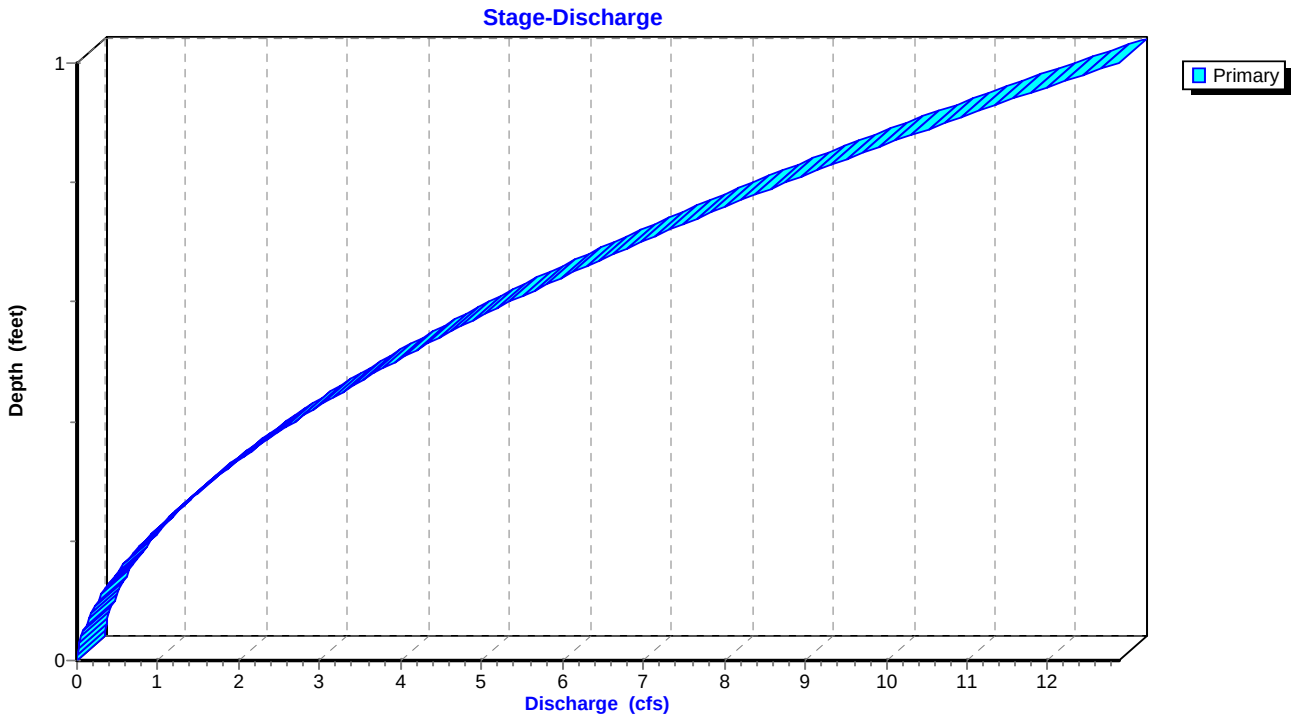


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Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 3.19" for 25-yr event
Inflow = 79.29 cfs @ 12.93 hrs, Volume= 17.259 af
Outflow = 78.94 cfs @ 13.02 hrs, Volume= 17.208 af, Atten= 0%, Lag= 5.3 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.37 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.80 fps, Avg. Travel Time= 4.6 min

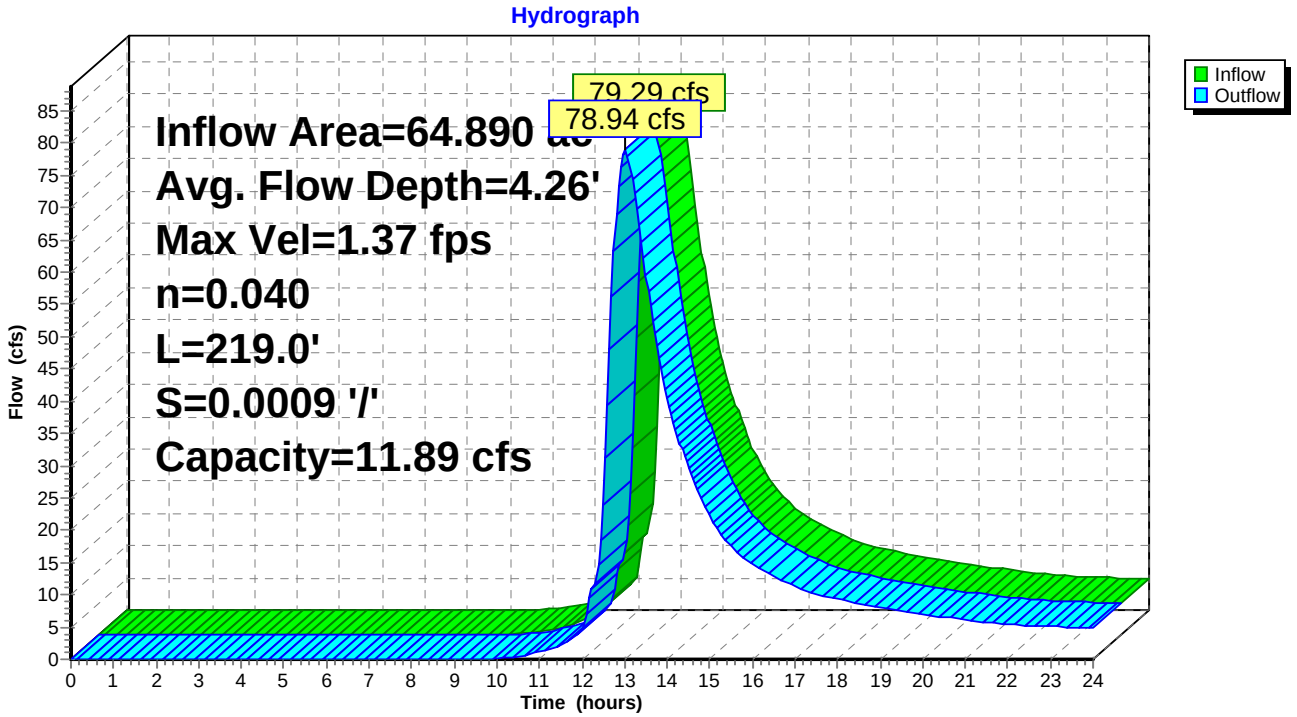
Peak Storage= 12,605 cf @ 12.97 hrs
Average Depth at Peak Storage= 4.26' , Surface Width= 27.04'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

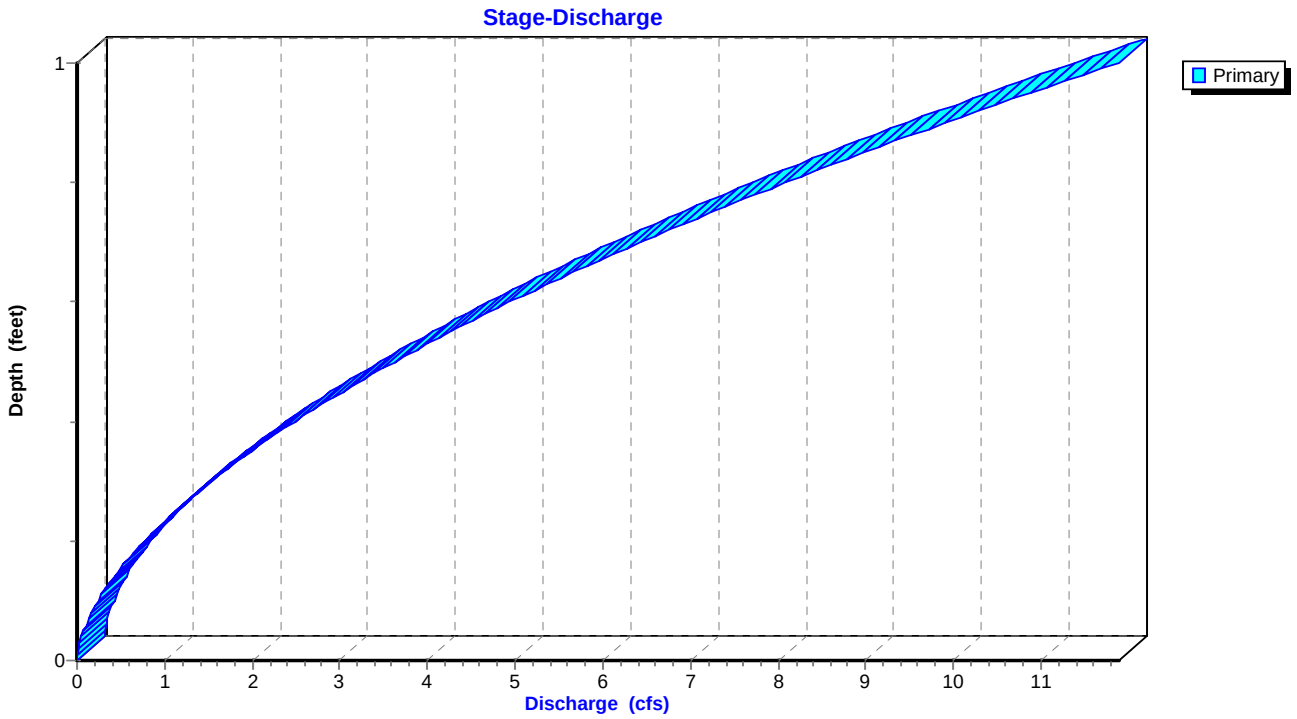


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Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 3.98" for 25-yr event
Inflow = 65.36 cfs @ 12.16 hrs, Volume= 5.344 af
Outflow = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af, Atten= 67%, Lag= 22.1 min
Primary = 21.65 cfs @ 12.53 hrs, Volume= 5.211 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 444.85' @ 12.53 hrs Surf.Area= 36,223 sf Storage= 78,683 cf

Plug-Flow detention time= 56.3 min calculated for 5.200 af (97% of inflow)
Center-of-Mass det. time= 42.0 min (870.7 - 828.7)

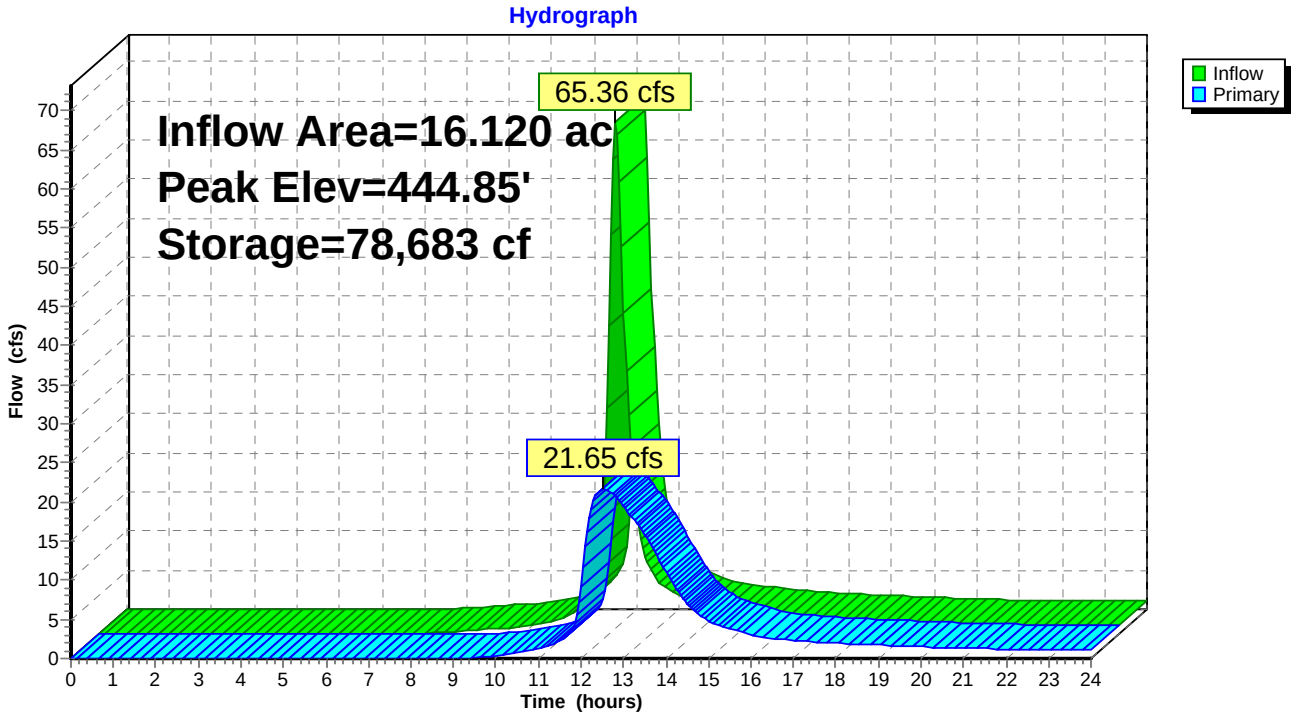
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

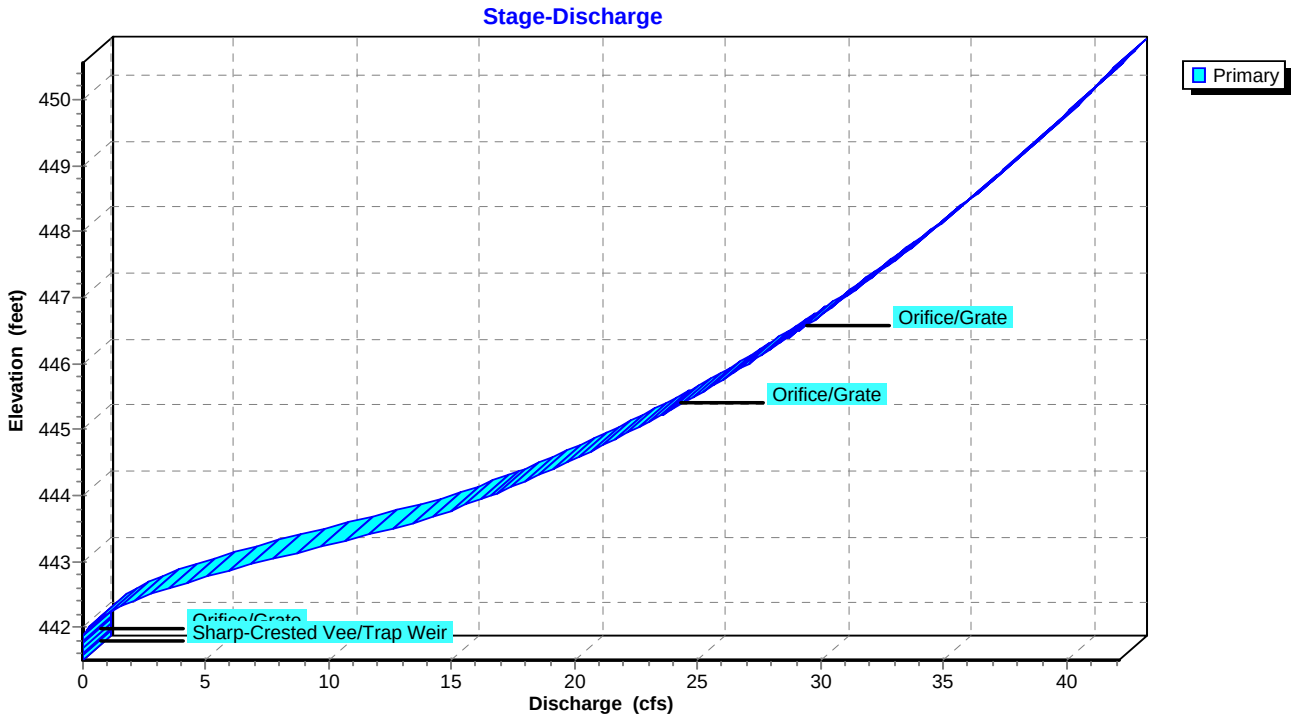
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=21.64 cfs @ 12.53 hrs HW=444.85' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 21.64 cfs @ 6.89 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes 21.64 cfs of 49.95 cfs potential flow)
└**3=Orifice/Grate** (Controls 0.00 cfs)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 5.15" for 25-yr event
Inflow = 22.08 cfs @ 12.44 hrs, Volume= 2.896 af
Outflow = 19.76 cfs @ 12.61 hrs, Volume= 2.142 af, Atten= 10%, Lag= 10.1 min
Discarded = 11.18 cfs @ 12.61 hrs, Volume= 0.414 af
Primary = 8.58 cfs @ 12.61 hrs, Volume= 1.728 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.35' @ 12.61 hrs Surf.Area= 11,562 sf Storage= 45,299 cf

Plug-Flow detention time= 155.9 min calculated for 2.137 af (74% of inflow)
Center-of-Mass det. time= 71.4 min (890.5 - 819.2)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

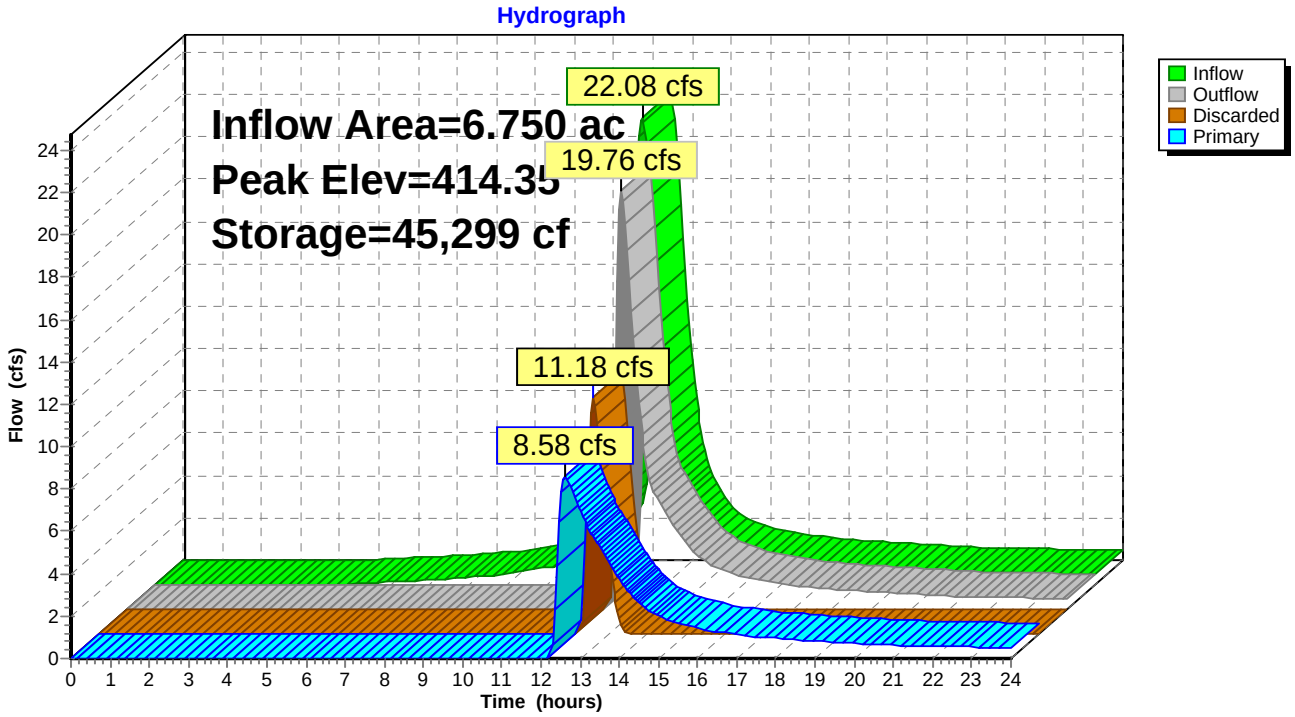
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

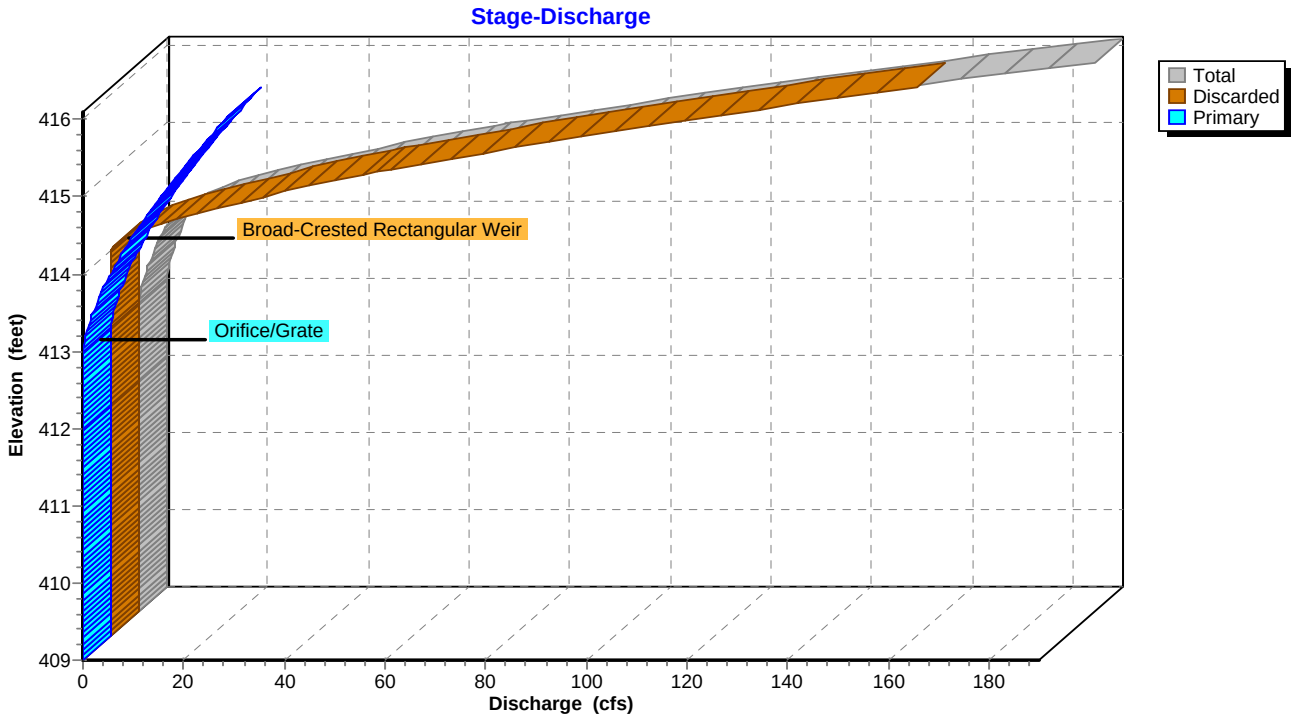
Discarded OutFlow Max=11.06 cfs @ 12.61 hrs HW=414.35' (Free Discharge)
↑—**3=Broad-Crested Rectangular Weir** (Weir Controls 11.06 cfs @ 1.58 fps)

Primary OutFlow Max=8.57 cfs @ 12.61 hrs HW=414.35' (Free Discharge)
↑—**1=Culvert** (Passes 8.57 cfs of 34.99 cfs potential flow)
↑—**2=Orifice/Grate** (Orifice Controls 8.57 cfs @ 3.73 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 5.14" for 25-yr event
Inflow = 50.18 cfs @ 12.55 hrs, Volume= 7.455 af
Outflow = 18.07 cfs @ 13.32 hrs, Volume= 3.827 af, Atten= 64%, Lag= 45.9 min
Discarded = 10.56 cfs @ 13.32 hrs, Volume= 0.665 af
Primary = 7.51 cfs @ 13.32 hrs, Volume= 3.162 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 416.24' @ 13.32 hrs Surf.Area= 40,400 sf Storage= 189,707 cf

Plug-Flow detention time= 263.1 min calculated for 3.819 af (51% of inflow)
Center-of-Mass det. time= 153.1 min (979.3 - 826.2)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

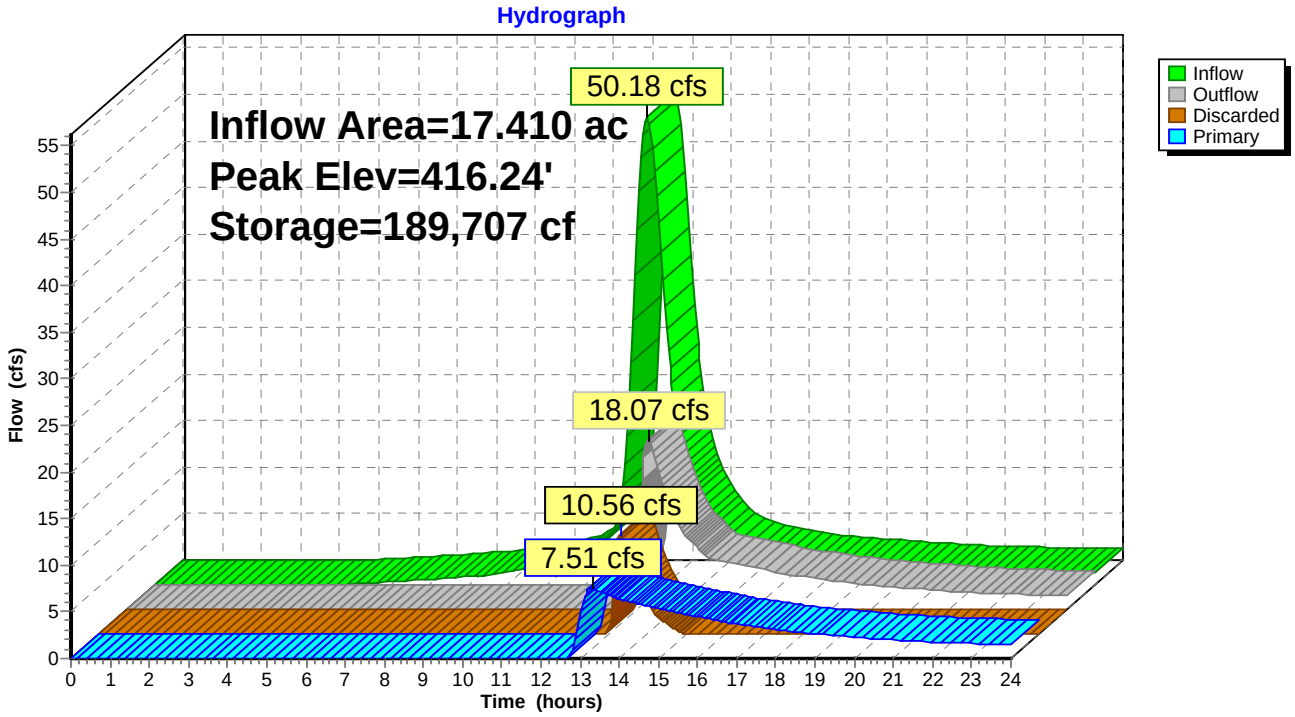
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

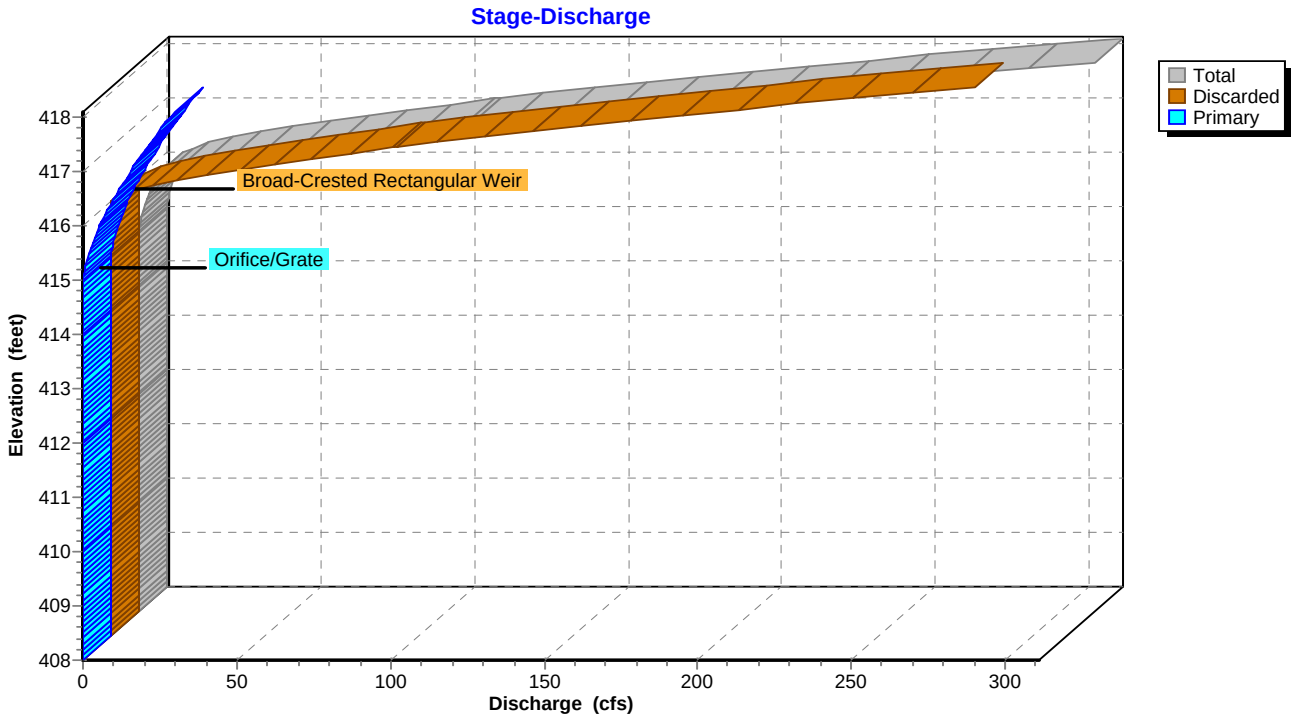
Discarded OutFlow Max=10.31 cfs @ 13.32 hrs HW=416.24' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 10.31 cfs @ 1.25 fps)

Primary OutFlow Max=7.49 cfs @ 13.32 hrs HW=416.24' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 7.49 cfs @ 3.57 fps)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 5.76" for 25-yr event
Inflow = 8.69 cfs @ 12.00 hrs, Volume= 0.509 af
Outflow = 5.34 cfs @ 12.11 hrs, Volume= 0.290 af, Atten= 39%, Lag= 6.5 min
Primary = 5.34 cfs @ 12.11 hrs, Volume= 0.290 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.58' @ 12.11 hrs Surf.Area= 8,159 sf Storage= 11,220 cf

Plug-Flow detention time= 208.4 min calculated for 0.290 af (57% of inflow)
Center-of-Mass det. time= 102.0 min (874.4 - 772.4)

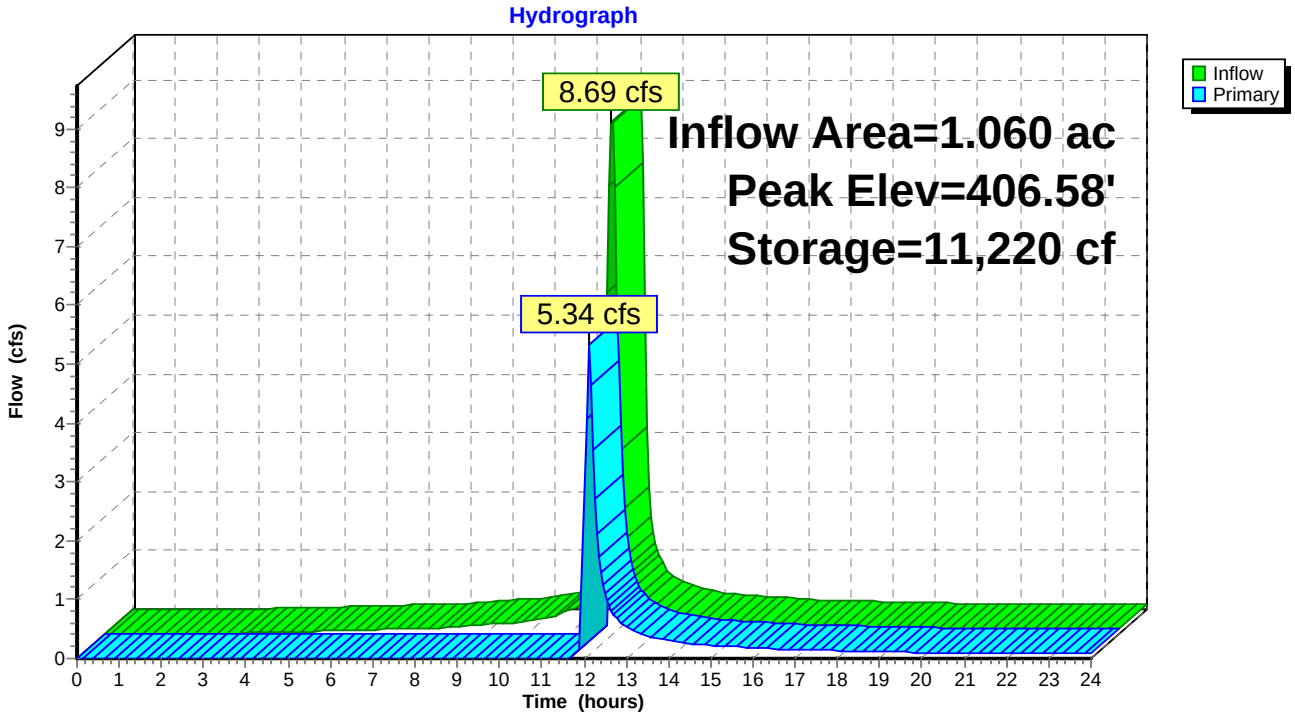
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

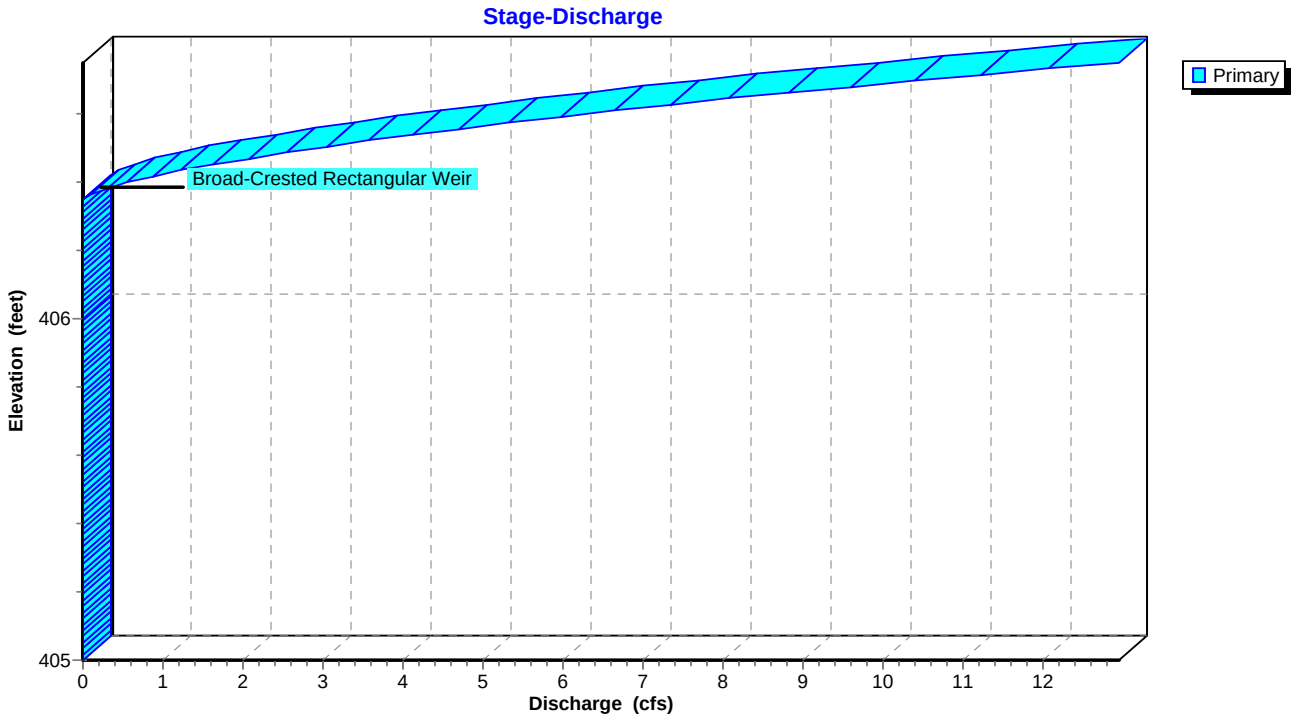
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=5.21 cfs @ 12.11 hrs HW=406.57' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.21 cfs @ 1.18 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 5.17" for 25-yr event
Inflow = 17.17 cfs @ 12.18 hrs, Volume= 1.513 af
Outflow = 11.82 cfs @ 12.36 hrs, Volume= 1.486 af, Atten= 31%, Lag= 10.8 min
Primary = 11.82 cfs @ 12.36 hrs, Volume= 1.486 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 426.08' @ 12.36 hrs Surf.Area= 6,972 sf Storage= 17,042 cf

Plug-Flow detention time= 46.0 min calculated for 1.486 af (98% of inflow)
Center-of-Mass det. time= 35.3 min (837.3 - 802.1)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

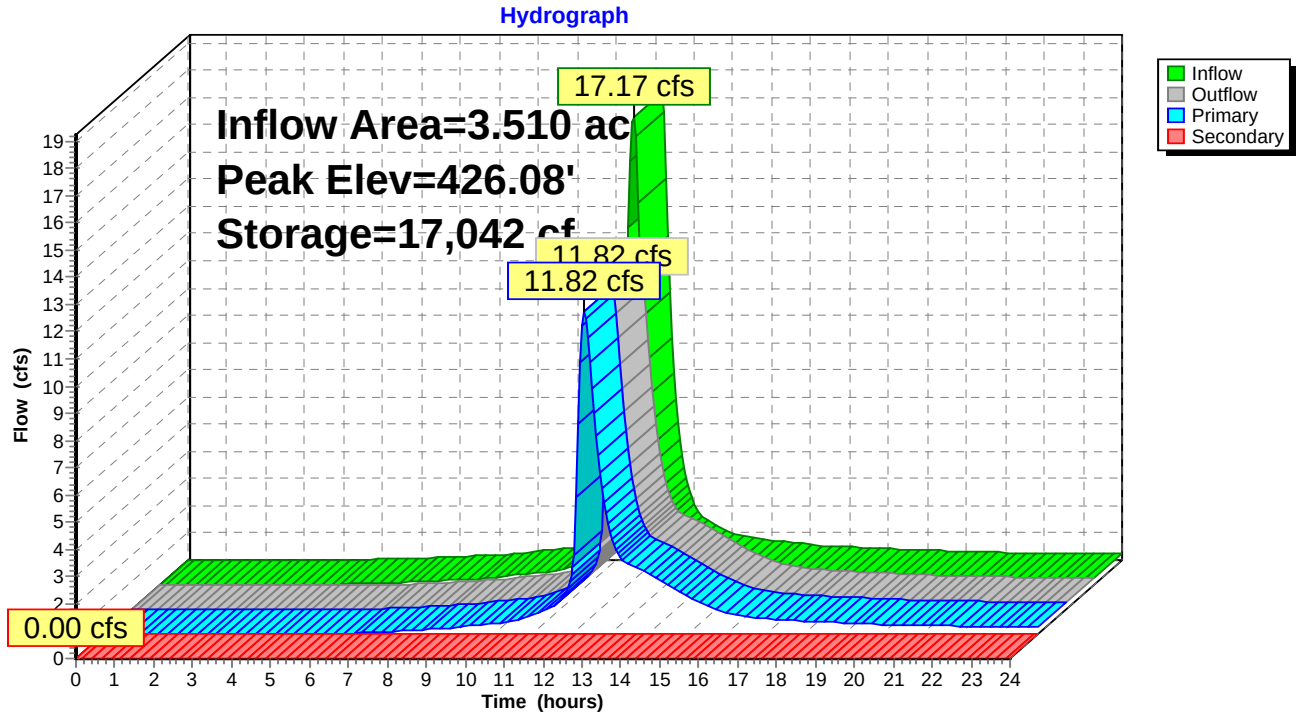
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

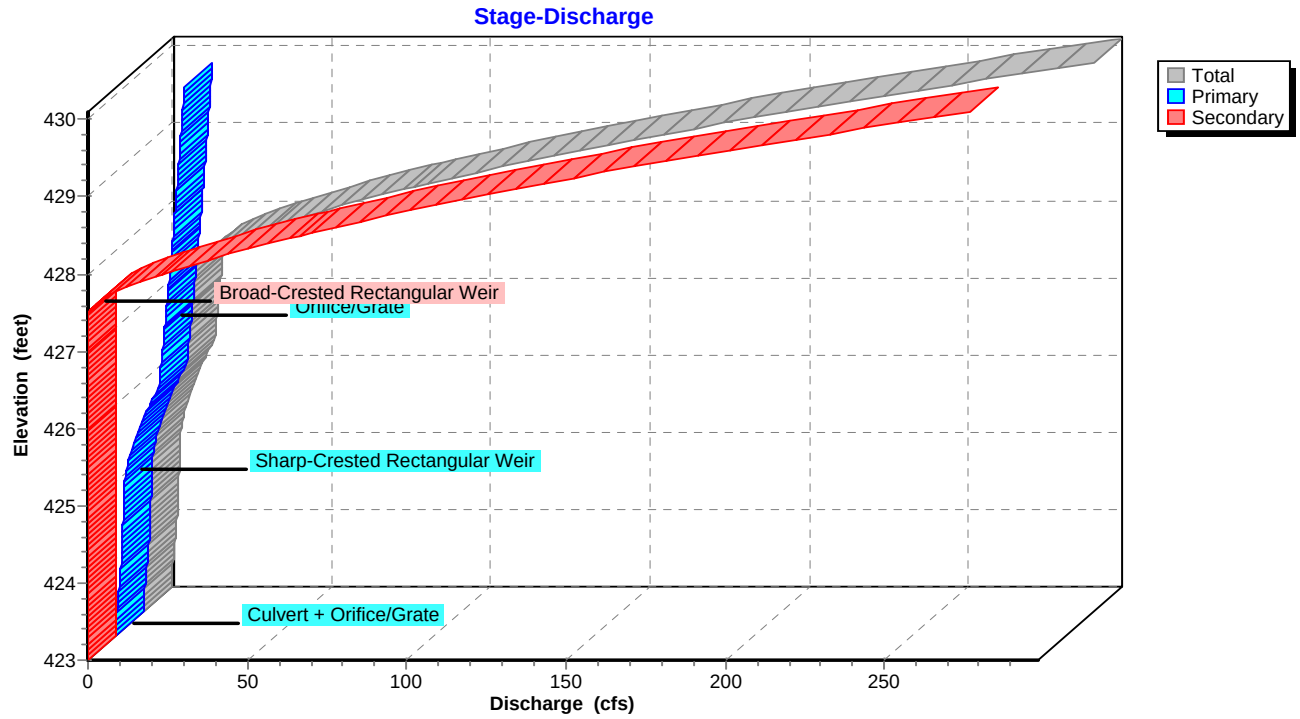
Primary OutFlow Max=11.77 cfs @ 12.36 hrs HW=426.08' (Free Discharge)
└**1=Culvert** (Passes 11.77 cfs of 12.99 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 3.50 cfs @ 7.92 fps)
  ├**3=Sharp-Crested Rectangular Weir** (Weir Controls 8.28 cfs @ 4.30 fps)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 4.41" for 25-yr event
Inflow = 4.19 cfs @ 12.07 hrs, Volume= 0.279 af
Outflow = 4.04 cfs @ 12.11 hrs, Volume= 0.223 af, Atten= 4%, Lag= 2.3 min
Discarded = 4.04 cfs @ 12.11 hrs, Volume= 0.223 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 407.97' @ 12.11 hrs Surf.Area= 2,529 sf Storage= 3,158 cf

Plug-Flow detention time= 121.7 min calculated for 0.223 af (80% of inflow)
Center-of-Mass det. time= 41.1 min (854.5 - 813.4)

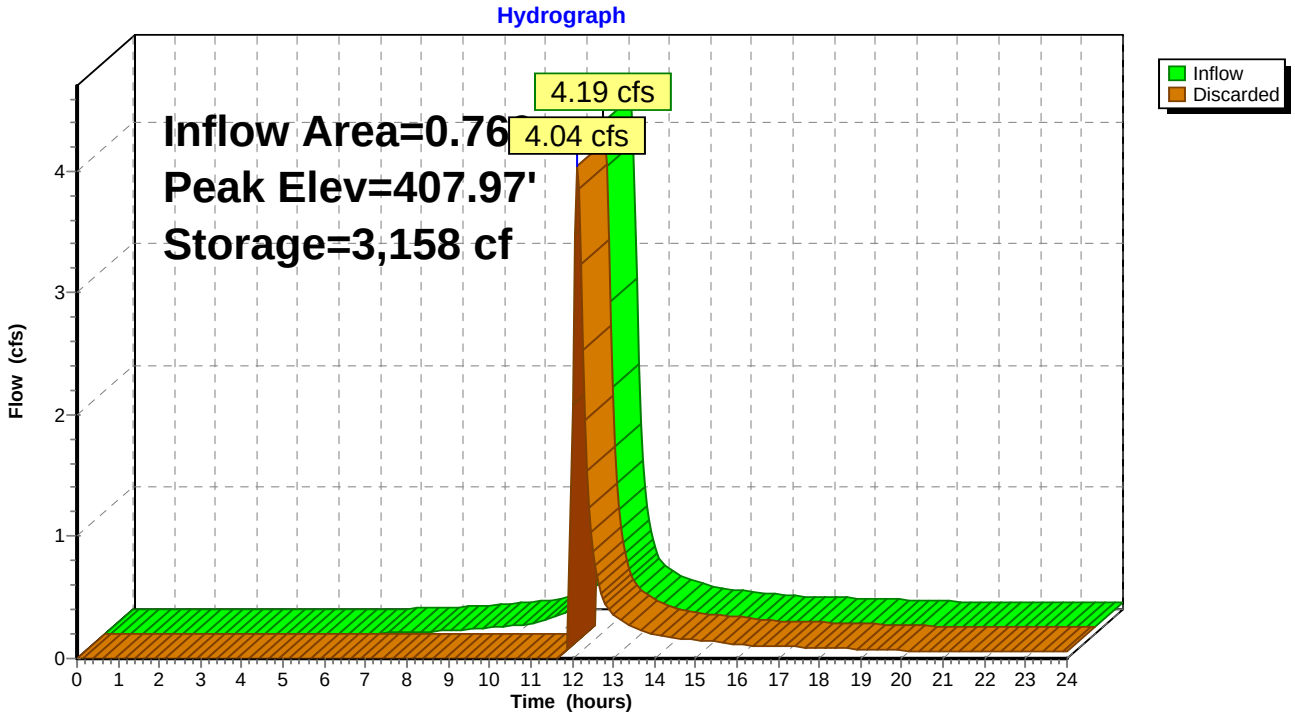
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

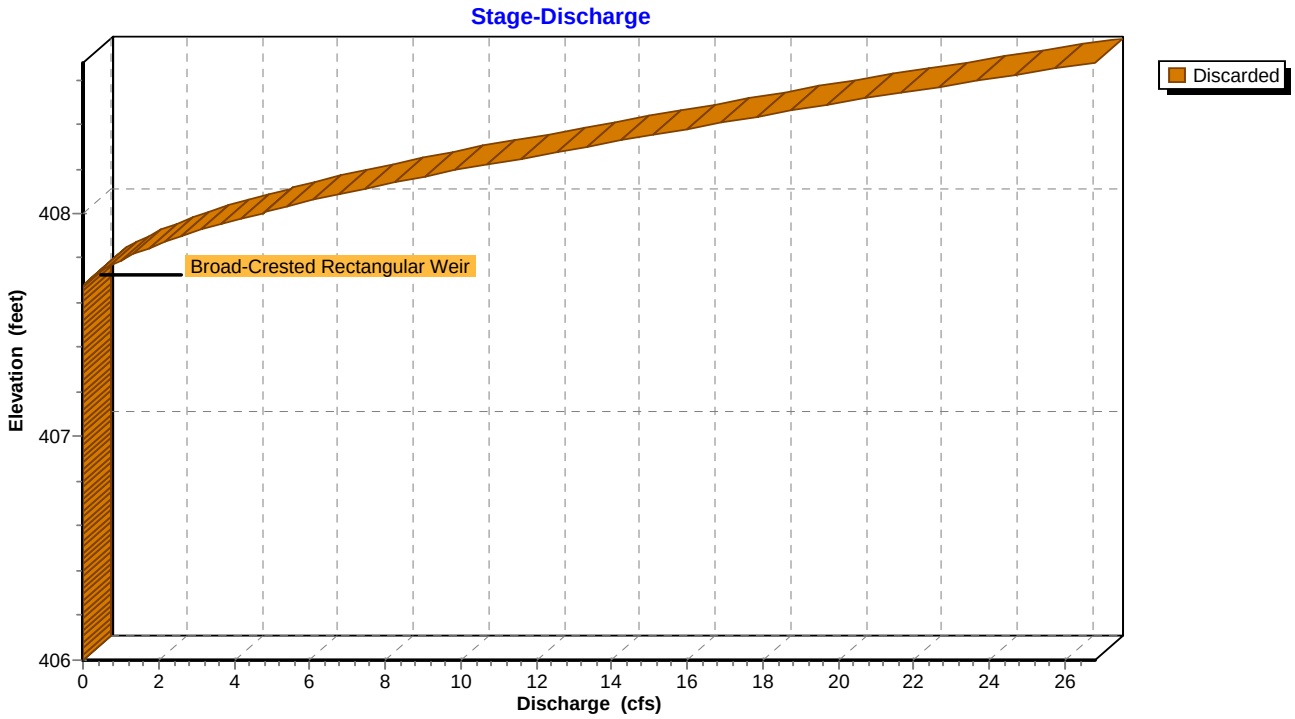
Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=3.97 cfs @ 12.11 hrs HW=407.96' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 3.97 cfs @ 1.35 fps)

Pond Sed-2: Sed Trap 2



Pond Sed-2: Sed Trap 2



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>4.54"
Flow Length=777' Tc=38.6 min CN=74 Runoff=76.25 cfs 8.613 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>4.78"
Flow Length=209' Tc=23.3 min CN=76 Runoff=78.35 cfs 6.419 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>6.01"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=25.63 cfs 3.382 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>6.00"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=58.26 cfs 8.706 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>6.65"
Tc=9.2 min CN=92 Runoff=9.94 cfs 0.587 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>5.24"
Tc=15.6 min CN=80 Runoff=4.95 cfs 0.332 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>4.60"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=19.49 cfs 3.723 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>6.04"
Flow Length=234' Tc=25.2 min CN=87 Runoff=19.91 cfs 1.767 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>4.76"
Flow Length=590' Tc=36.5 min CN=76 Runoff=12.32 cfs 1.338 af

Reach R-1: R-1 Avg. Flow Depth=0.74' Max Vel=5.02 fps Inflow=24.17 cfs 6.276 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=24.15 cfs 6.256 af

Reach R-2: R-2 Avg. Flow Depth=2.97' Max Vel=2.12 fps Inflow=98.06 cfs 14.870 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=83.46 cfs 14.667 af

Reach R-3: R-3 Avg. Flow Depth=4.76' Max Vel=1.50 fps Inflow=97.57 cfs 20.211 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=96.79 cfs 20.144 af

Reach R-4: R-4 Avg. Flow Depth=5.13' Max Vel=1.39 fps Inflow=97.44 cfs 20.513 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=96.85 cfs 20.456 af

Pond Pond 1b: Pond 1b Peak Elev=445.35' Storage=97,217 cf Inflow=78.35 cfs 6.419 af
Outflow=24.17 cfs 6.276 af

Pond Pond 1c: Pond 1c Peak Elev=414.43' Storage=46,216 cf Inflow=25.63 cfs 3.382 af
Discarded=15.19 cfs 0.660 af Primary=9.35 cfs 1.963 af Outflow=24.54 cfs 2.623 af

Pond Pond 1d: Pond 1d Peak Elev=416.40' Storage=196,241 cf Inflow=58.26 cfs 8.706 af
Discarded=23.03 cfs 1.467 af Primary=9.01 cfs 3.581 af Outflow=32.05 cfs 5.047 af

Pond Pond 1e: Pond 1e Peak Elev=406.64' Storage=11,728 cf Inflow=9.94 cfs 0.587 af
Outflow=7.73 cfs 0.368 af

Pond Pond 3: Pond 3 Peak Elev=426.32' Storage=18,736 cf Inflow=19.91 cfs 1.767 af
Primary=13.65 cfs 1.738 af Secondary=0.00 cfs 0.000 af Outflow=13.65 cfs 1.738 af

Pond Sed-2: Sed Trap 2 Peak Elev=408.00' Storage=3,246 cf Inflow=4.95 cfs 0.332 af
Outflow=4.81 cfs 0.275 af

Summary for Subcatchment P-1a: P-1a

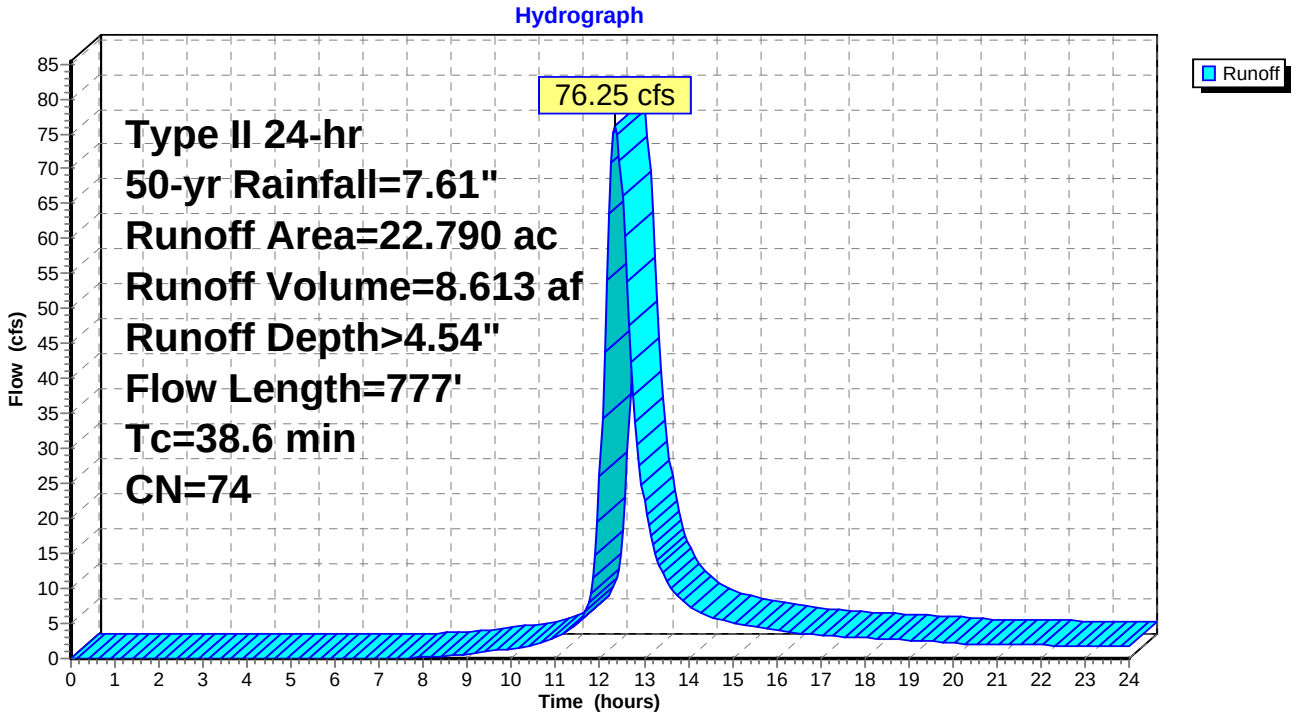
Runoff = 76.25 cfs @ 12.35 hrs, Volume= 8.613 af, Depth> 4.54"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

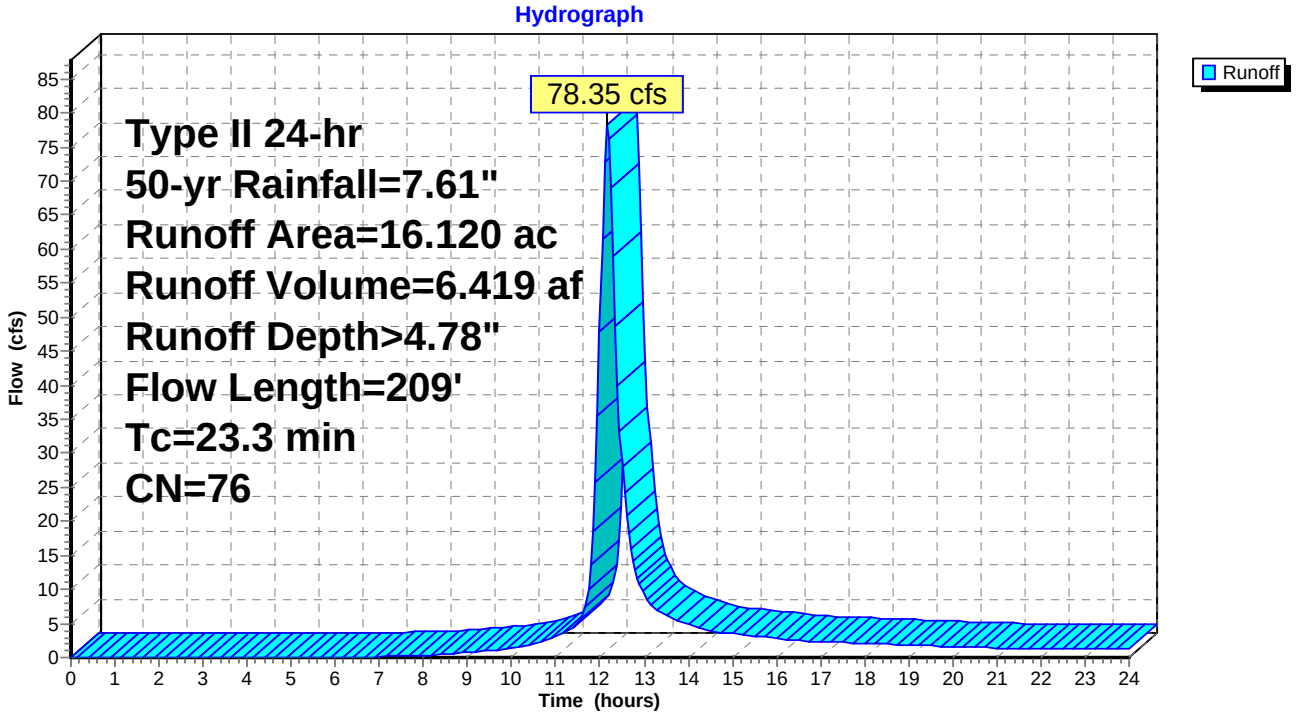
Runoff = 78.35 cfs @ 12.16 hrs, Volume= 6.419 af, Depth> 4.78"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

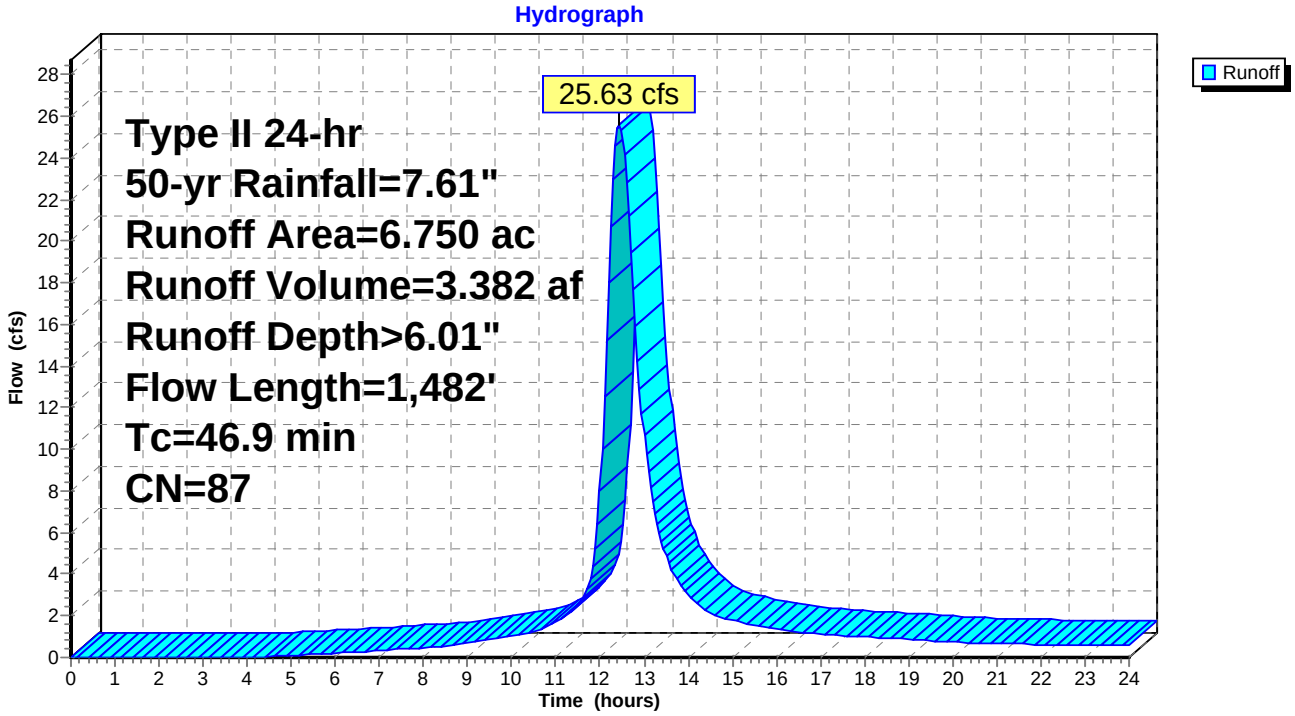
Runoff = 25.63 cfs @ 12.44 hrs, Volume= 3.382 af, Depth> 6.01"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

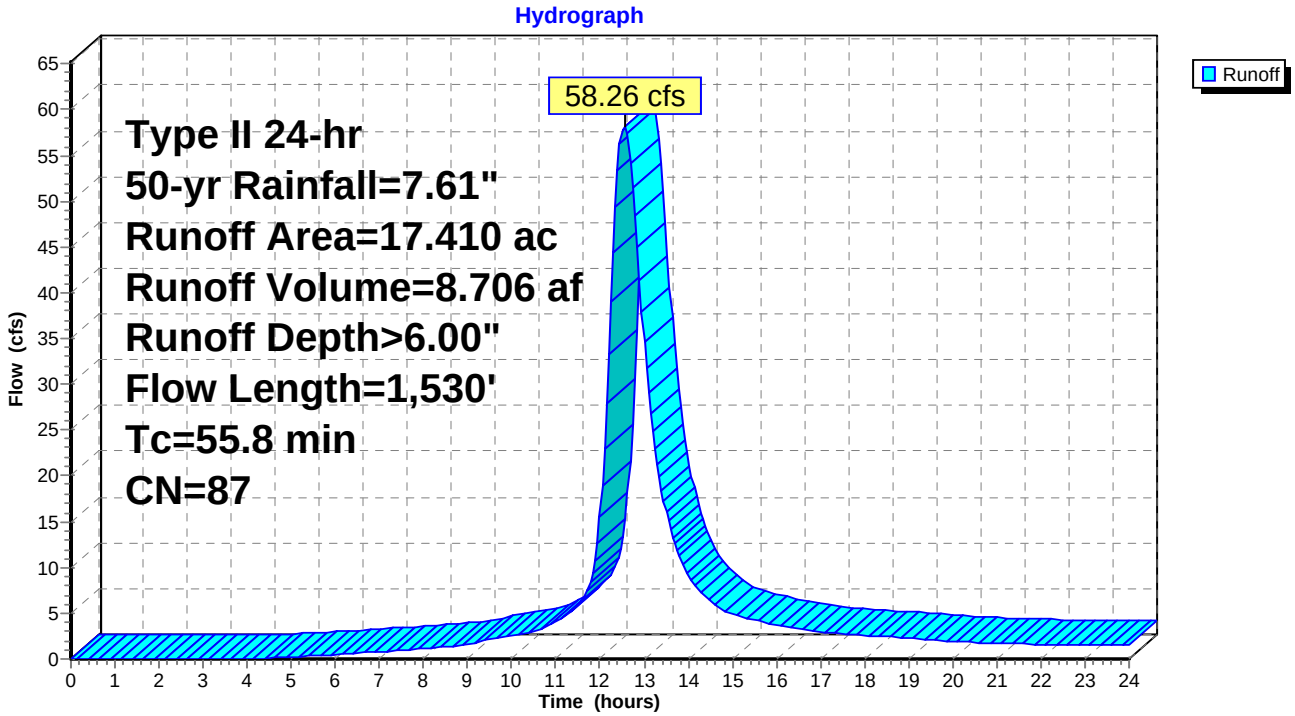
Runoff = 58.26 cfs @ 12.55 hrs, Volume= 8.706 af, Depth> 6.00"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

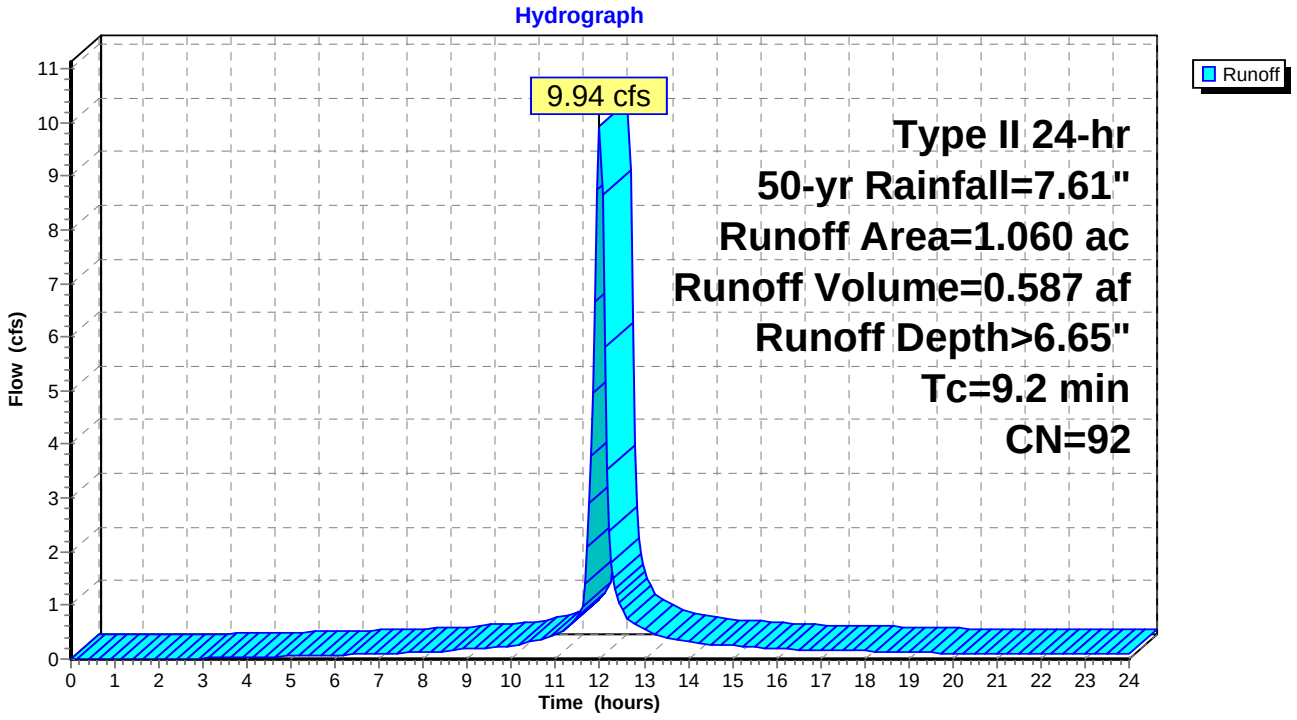
Runoff = 9.94 cfs @ 12.00 hrs, Volume= 0.587 af, Depth> 6.65"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

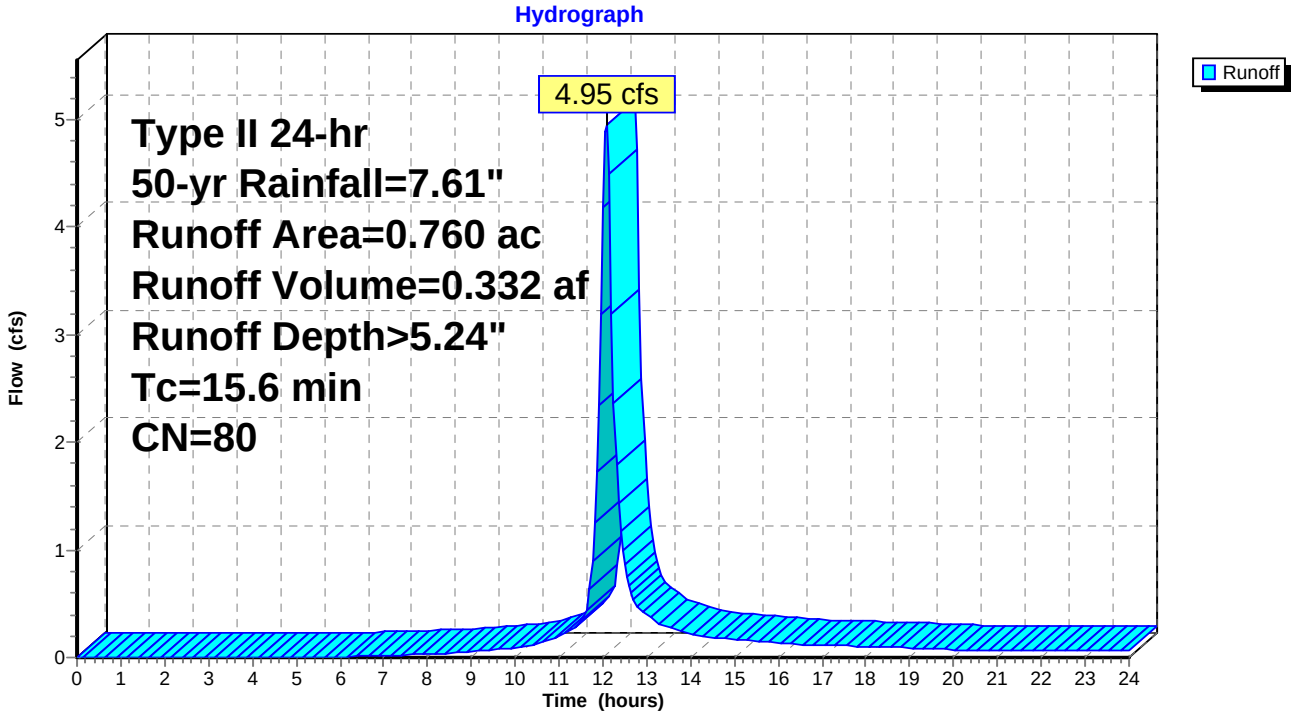
Runoff = 4.95 cfs @ 12.07 hrs, Volume= 0.332 af, Depth> 5.24"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

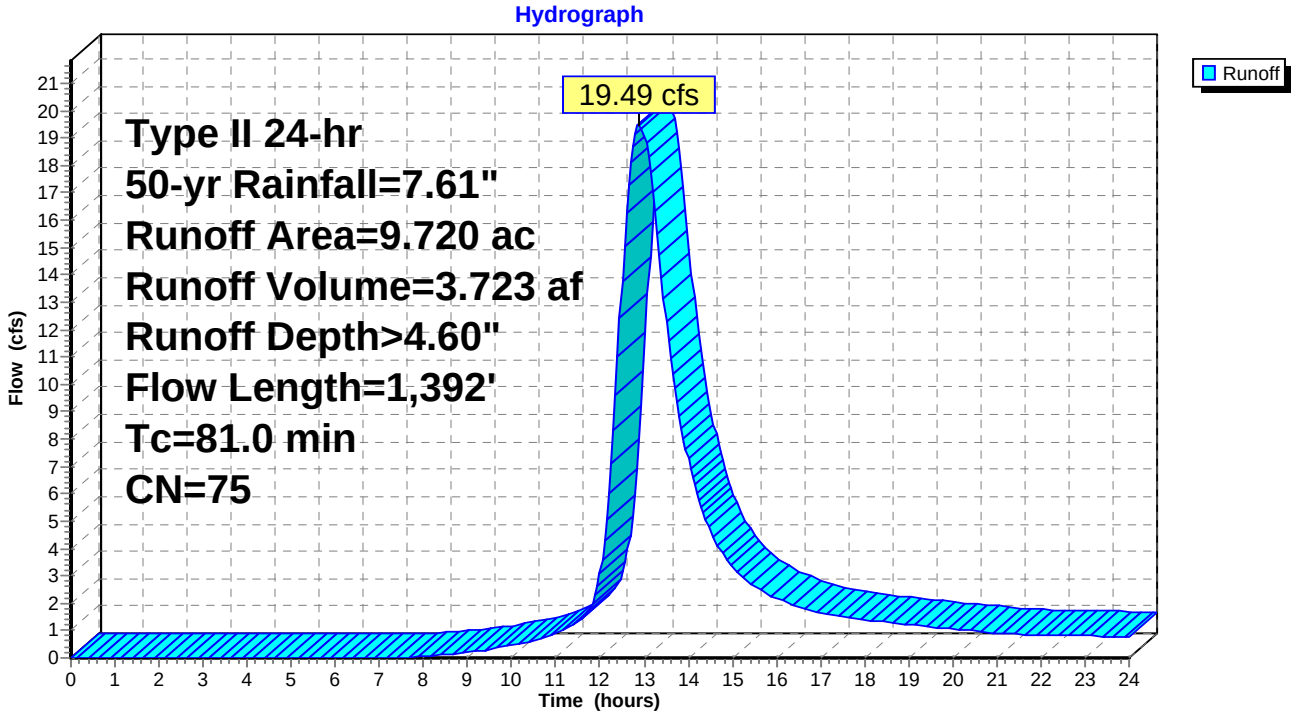
Runoff = 19.49 cfs @ 12.89 hrs, Volume= 3.723 af, Depth> 4.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

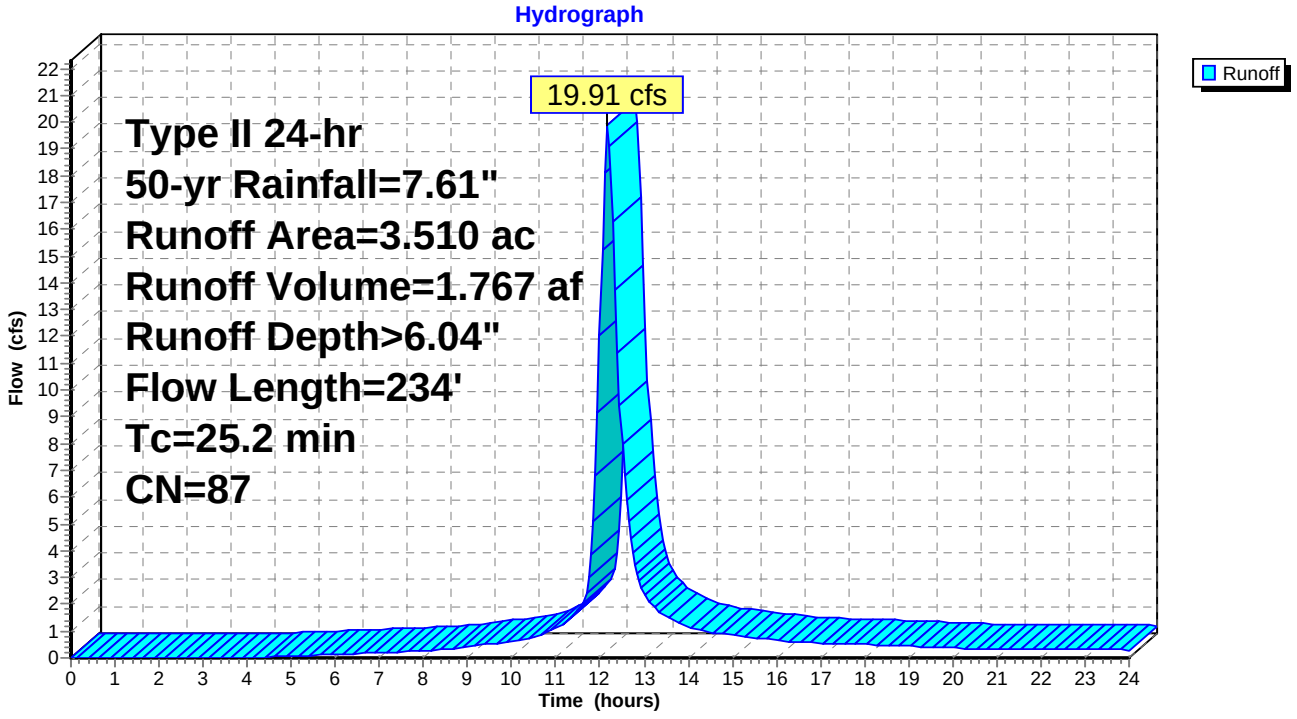
Runoff = 19.91 cfs @ 12.18 hrs, Volume= 1.767 af, Depth> 6.04"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

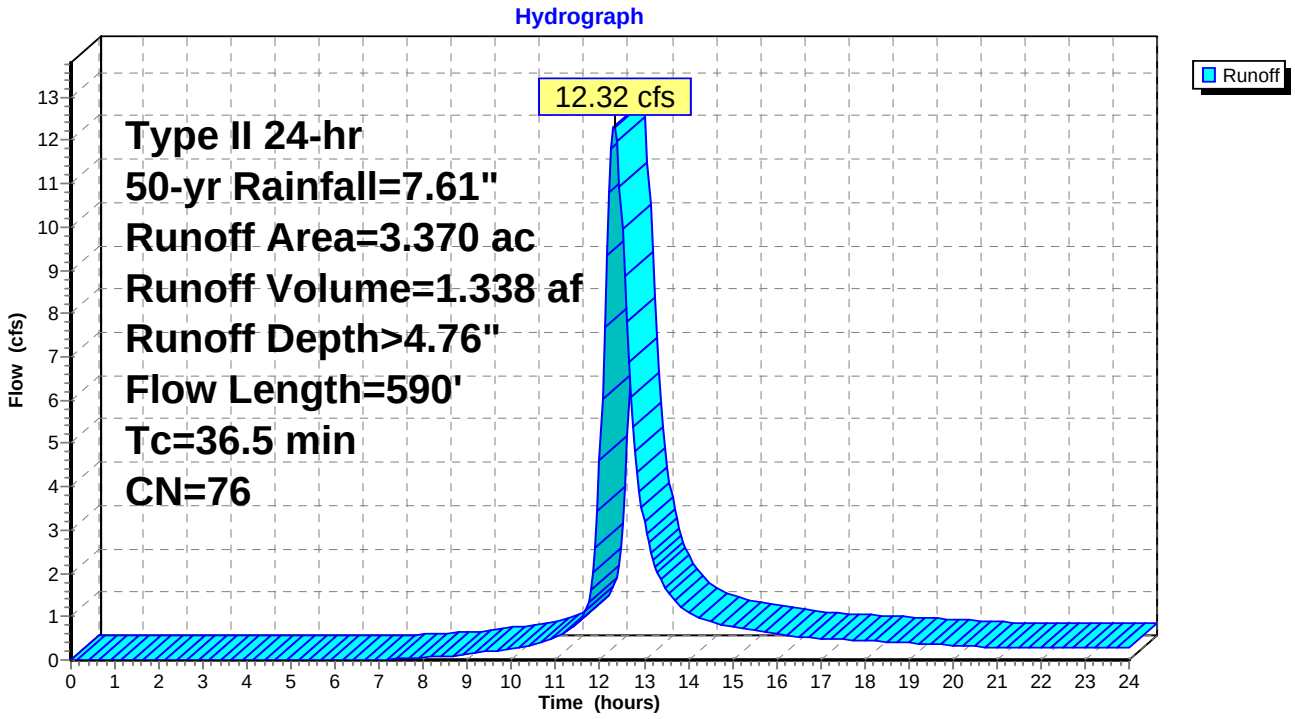
Runoff = 12.32 cfs @ 12.32 hrs, Volume= 1.338 af, Depth> 4.76"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 4.67" for 50-yr event
Inflow = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af
Outflow = 24.15 cfs @ 12.64 hrs, Volume= 6.256 af, Atten= 0%, Lag= 5.1 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.02 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 2.45 fps, Avg. Travel Time= 6.0 min

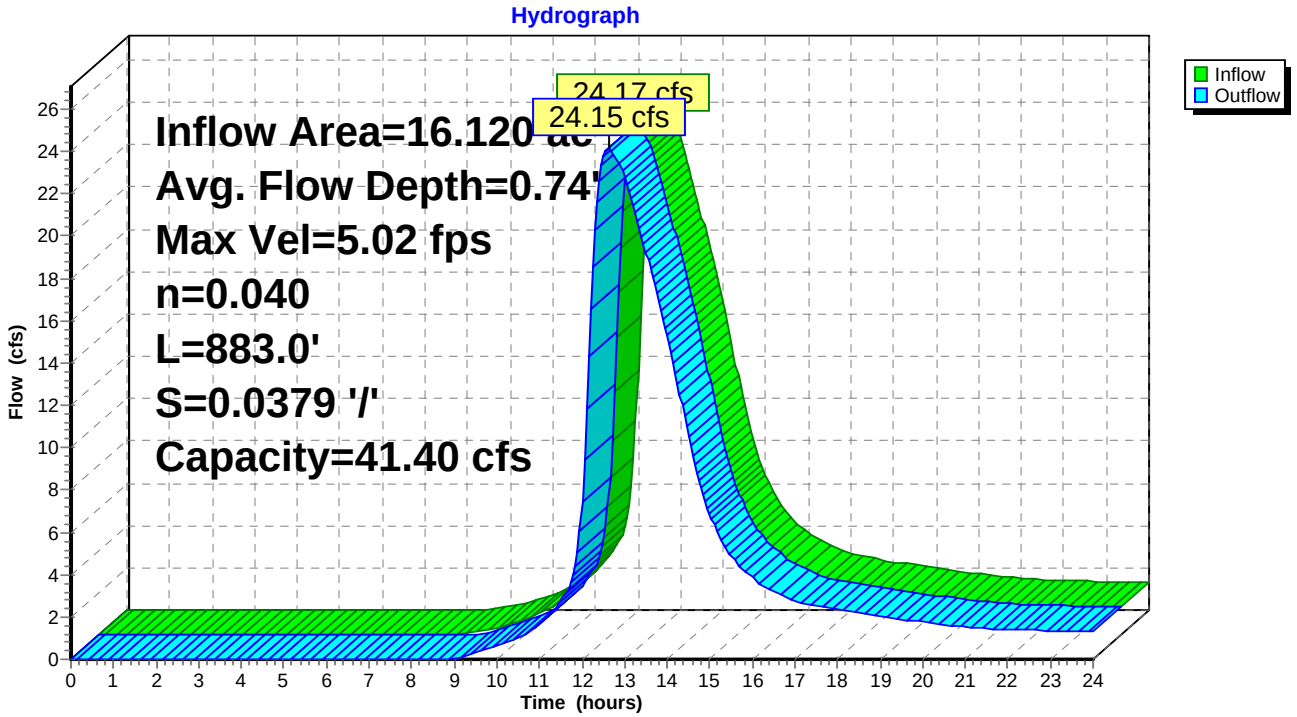
Peak Storage= 4,247 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.74' , Surface Width= 7.97'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

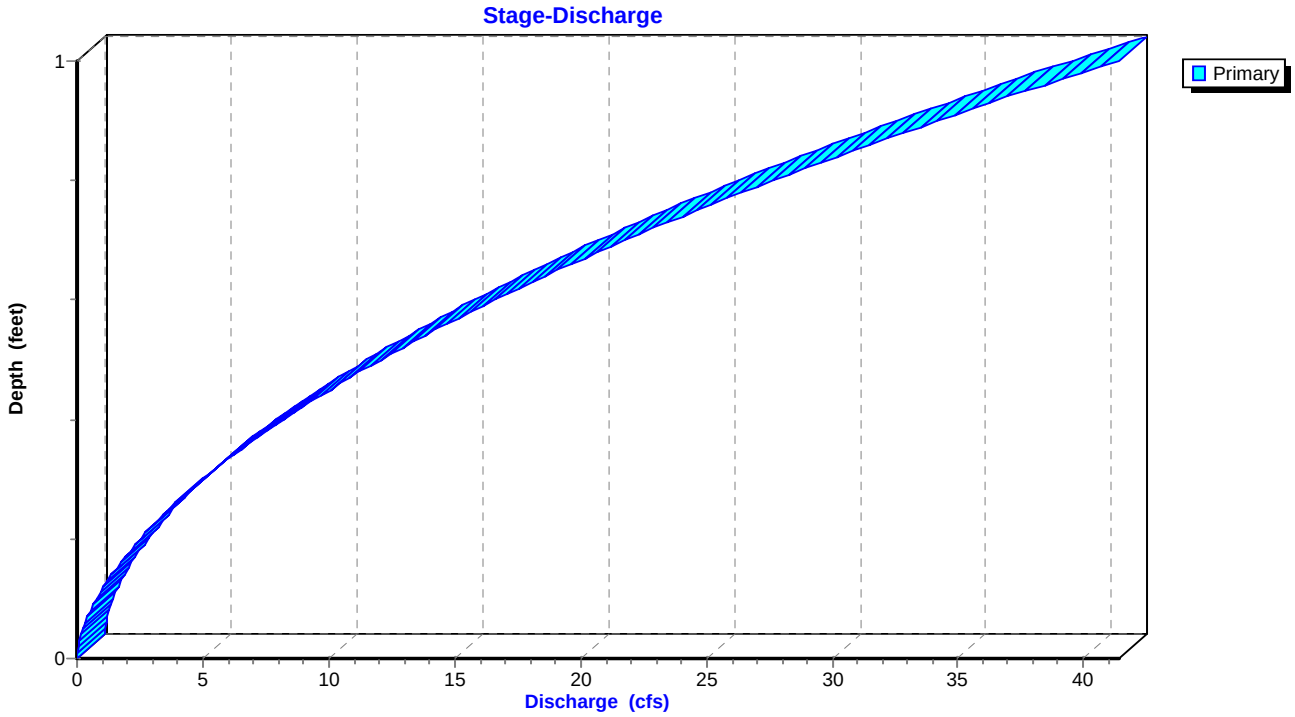


‡

Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Depth (feet)
Discharge (cfs)
Primary
0
1
0
5
10
15
20
25
30
35
40

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 4.50" for 50-yr event
Inflow = 98.06 cfs @ 12.37 hrs, Volume= 14.870 af
Outflow = 83.46 cfs @ 12.78 hrs, Volume= 14.667 af, Atten= 15%, Lag= 24.8 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.12 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 1.00 fps, Avg. Travel Time= 28.6 min

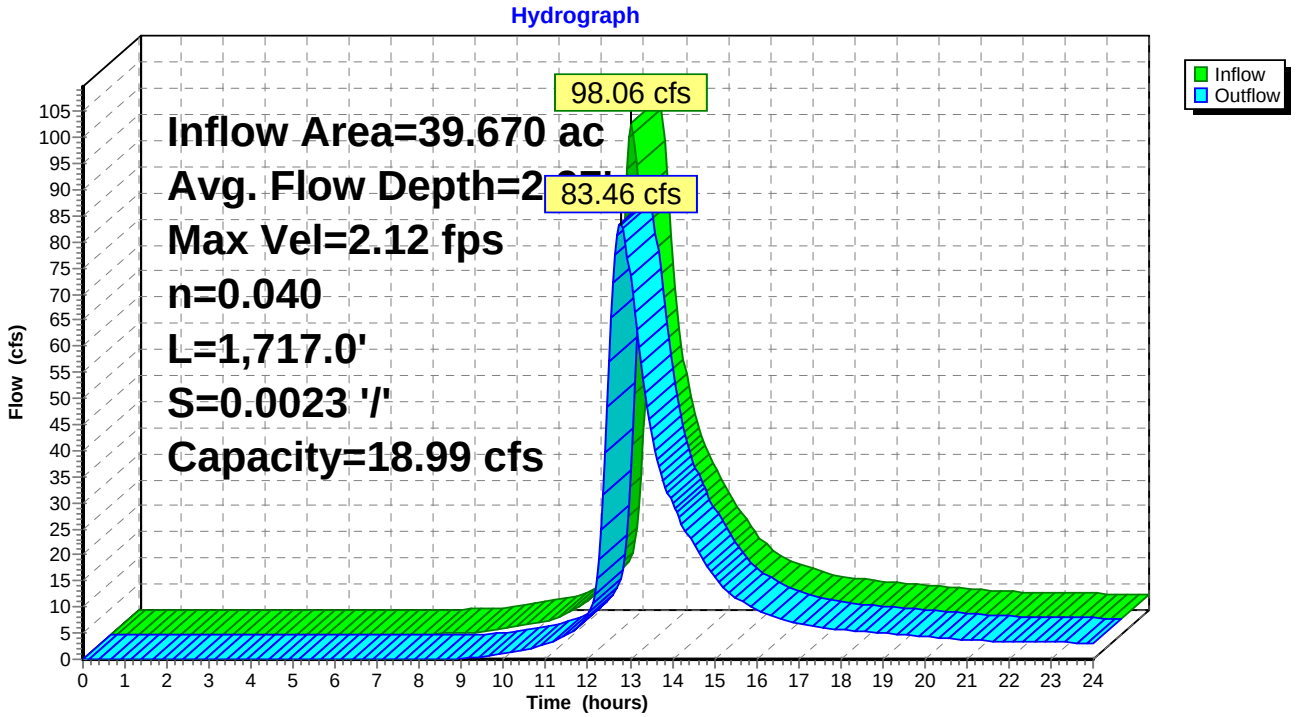
Peak Storage= 67,816 cf @ 12.56 hrs
Average Depth at Peak Storage= 2.97' , Surface Width= 21.87'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

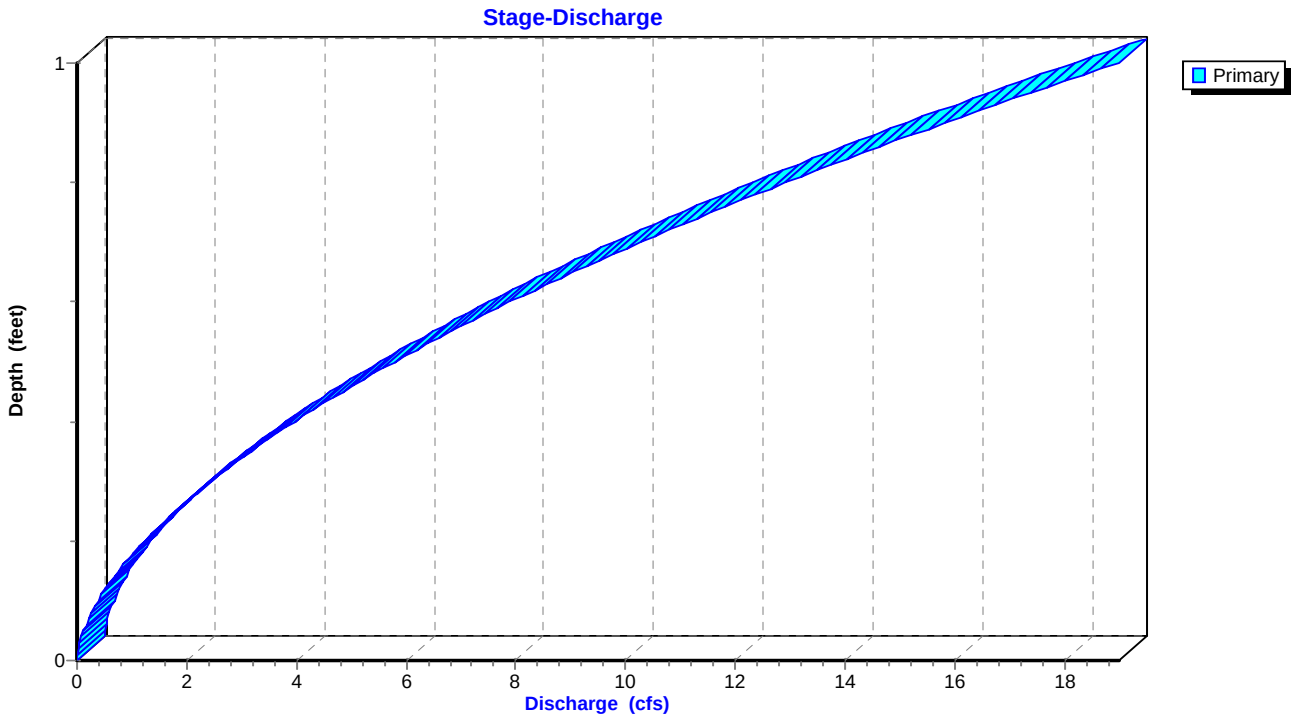


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Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 3.80" for 50-yr event
Inflow = 97.57 cfs @ 12.82 hrs, Volume= 20.211 af
Outflow = 96.79 cfs @ 12.92 hrs, Volume= 20.144 af, Atten= 1%, Lag= 6.1 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.50 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.86 fps, Avg. Travel Time= 5.4 min

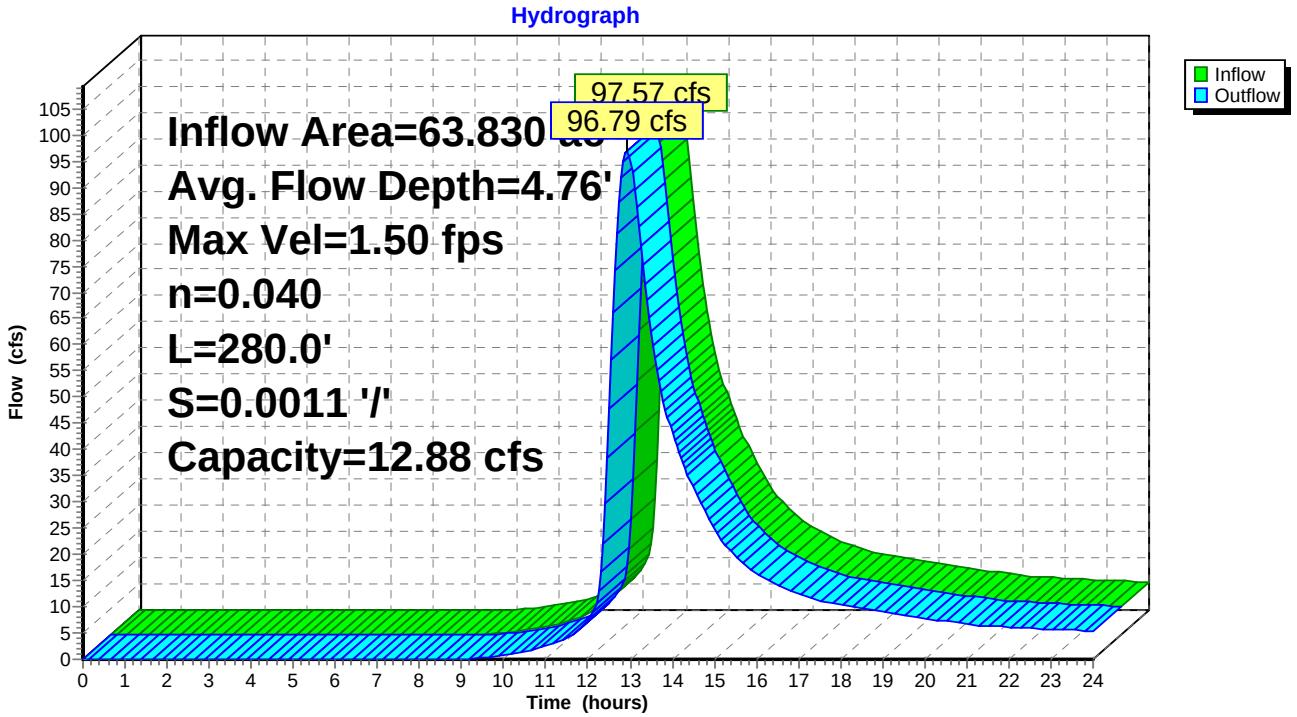
Peak Storage= 18,094 cf @ 12.87 hrs
Average Depth at Peak Storage= 4.76' , Surface Width= 29.06'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

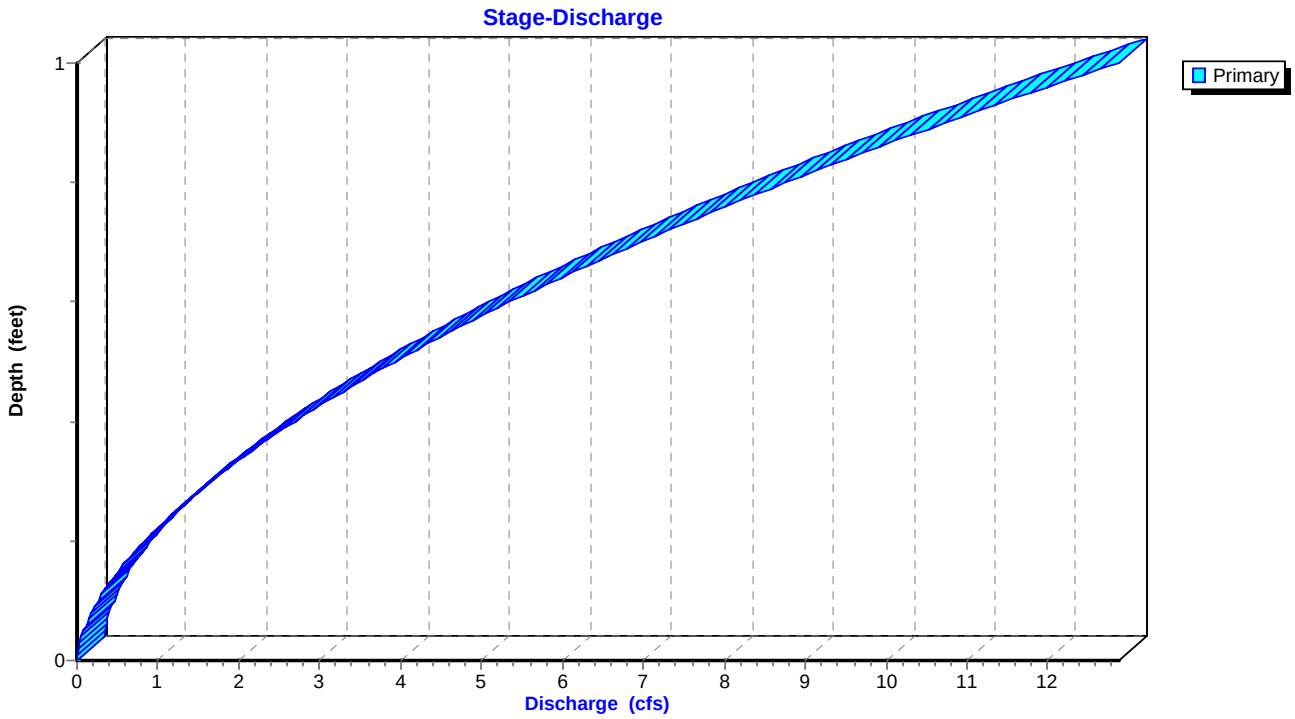


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Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 3.79" for 50-yr event
Inflow = 97.44 cfs @ 12.92 hrs, Volume= 20.513 af
Outflow = 96.85 cfs @ 13.01 hrs, Volume= 20.456 af, Atten= 1%, Lag= 5.3 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.39 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 4.4 min

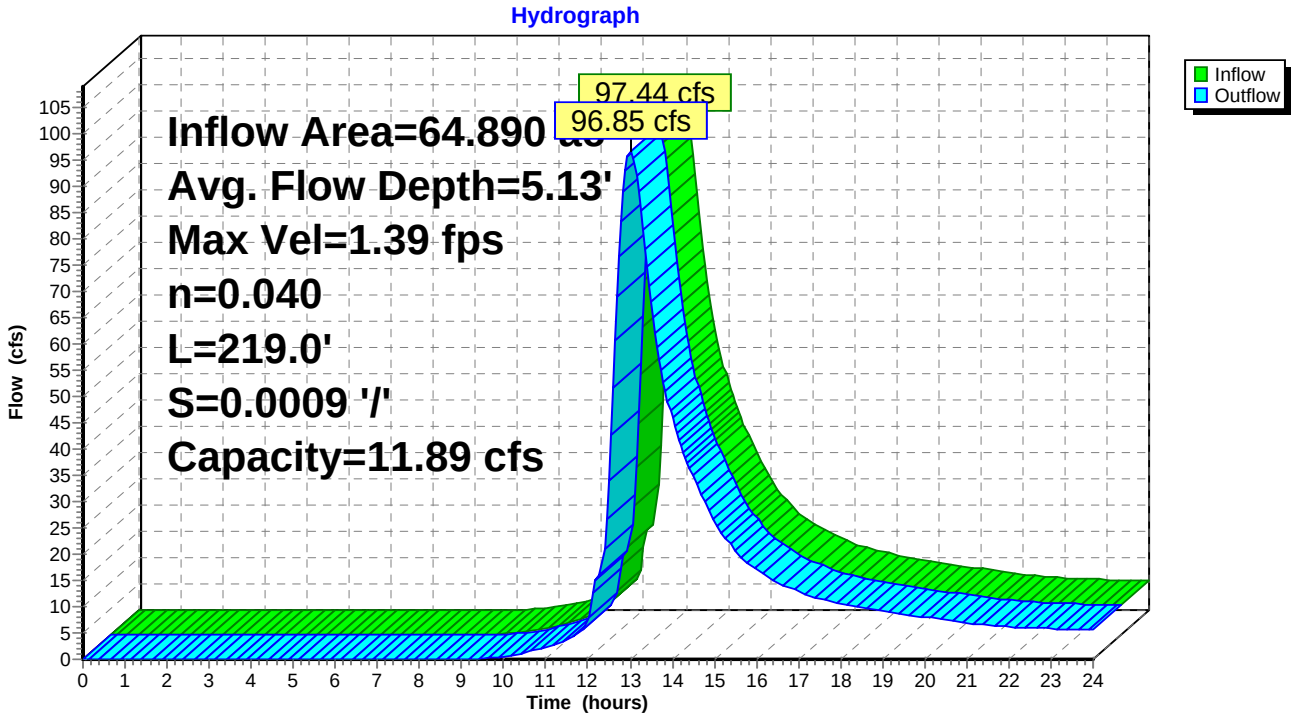
Peak Storage= 15,273 cf @ 12.97 hrs
Average Depth at Peak Storage= 5.13' , Surface Width= 30.52'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

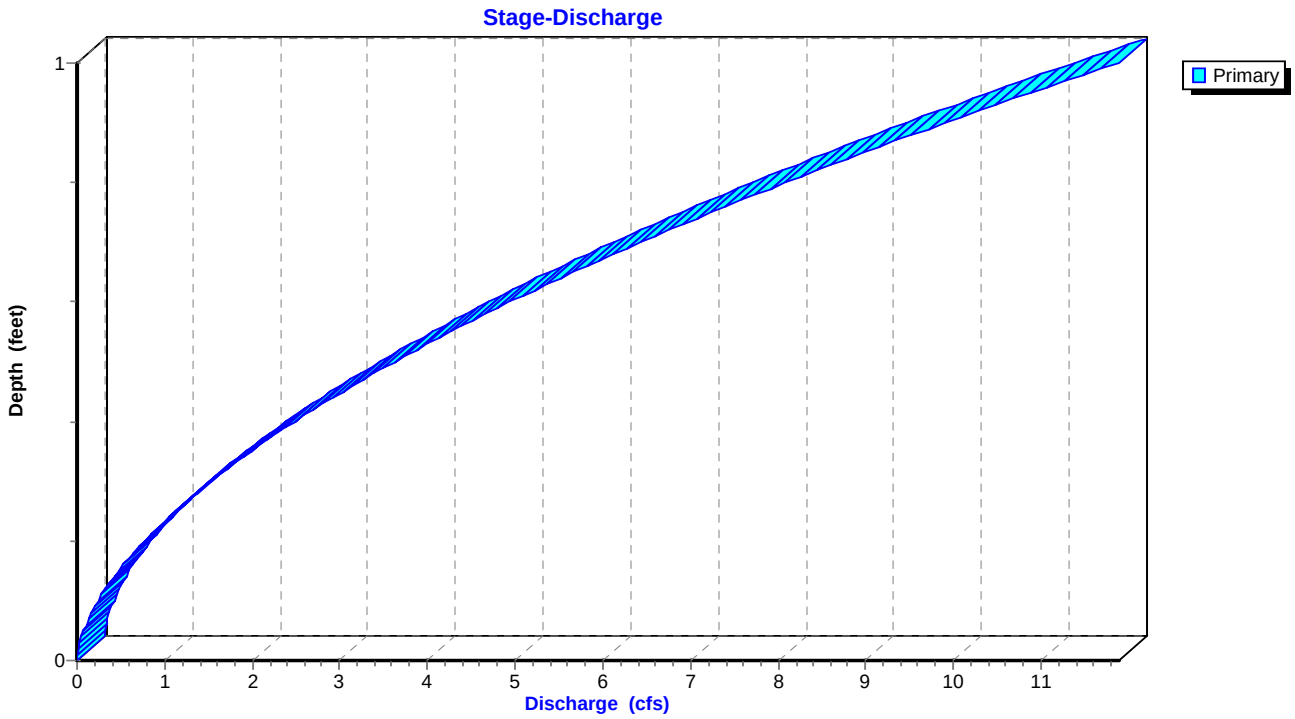


‡

Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 4.78" for 50-yr event
Inflow = 78.35 cfs @ 12.16 hrs, Volume= 6.419 af
Outflow = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af, Atten= 69%, Lag= 23.4 min
Primary = 24.17 cfs @ 12.55 hrs, Volume= 6.276 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 445.35' @ 12.55 hrs Surf.Area= 37,075 sf Storage= 97,217 cf

Plug-Flow detention time= 57.8 min calculated for 6.263 af (98% of inflow)
Center-of-Mass det. time= 44.8 min (868.4 - 823.6)

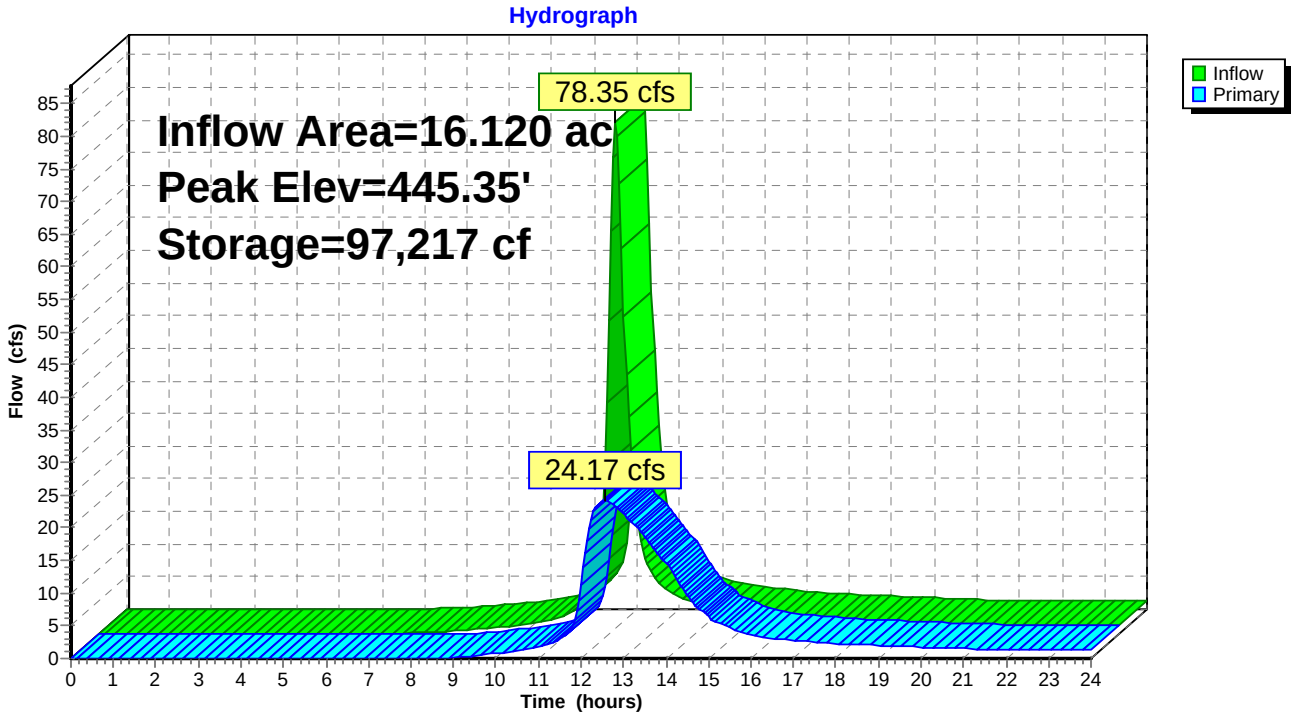
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

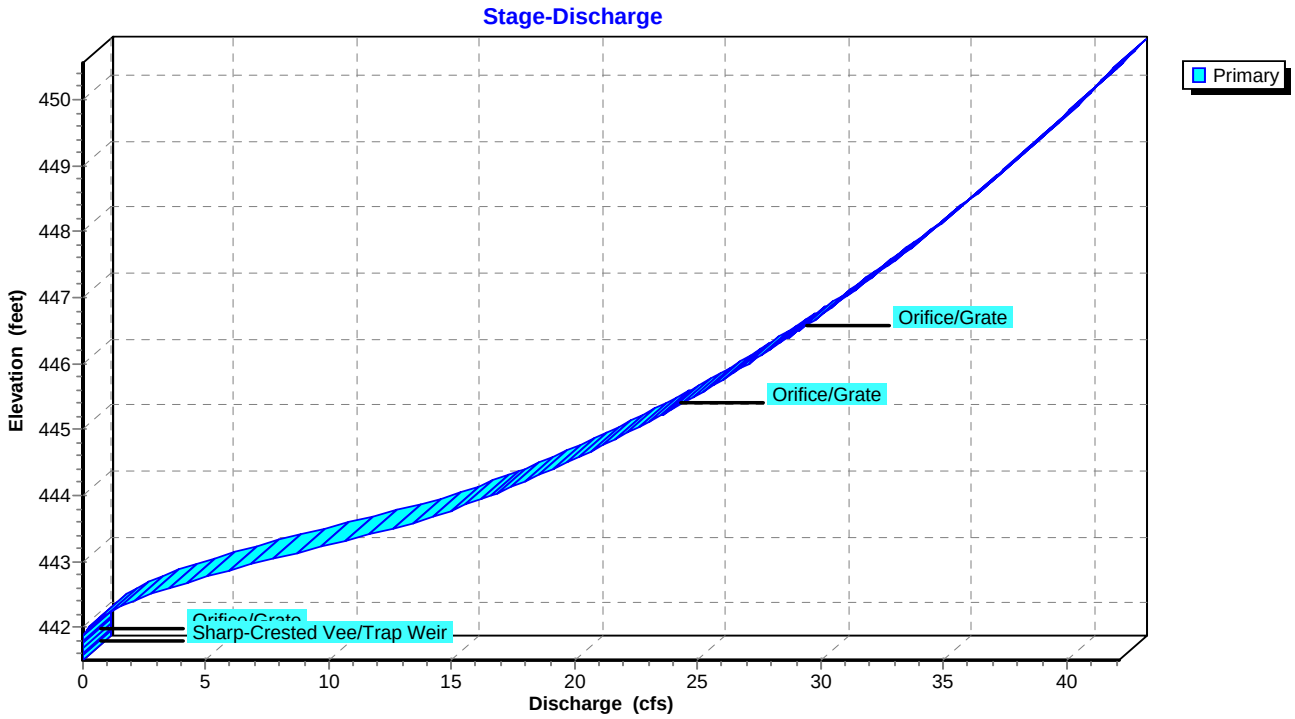
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=24.17 cfs @ 12.55 hrs HW=445.35' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 24.17 cfs @ 7.69 fps)
  └**2=Sharp-Crested Vee/Trap Weir** (Passes < 64.32 cfs potential flow)
  └**3=Orifice/Grate** (Passes < 0.61 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 6.01" for 50-yr event
Inflow = 25.63 cfs @ 12.44 hrs, Volume= 3.382 af
Outflow = 24.54 cfs @ 12.54 hrs, Volume= 2.623 af, Atten= 4%, Lag= 5.9 min
Discarded = 15.19 cfs @ 12.54 hrs, Volume= 0.660 af
Primary = 9.35 cfs @ 12.54 hrs, Volume= 1.963 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.43' @ 12.54 hrs Surf.Area= 11,662 sf Storage= 46,216 cf

Plug-Flow detention time= 144.3 min calculated for 2.623 af (78% of inflow)
Center-of-Mass det. time= 64.7 min (879.7 - 815.0)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

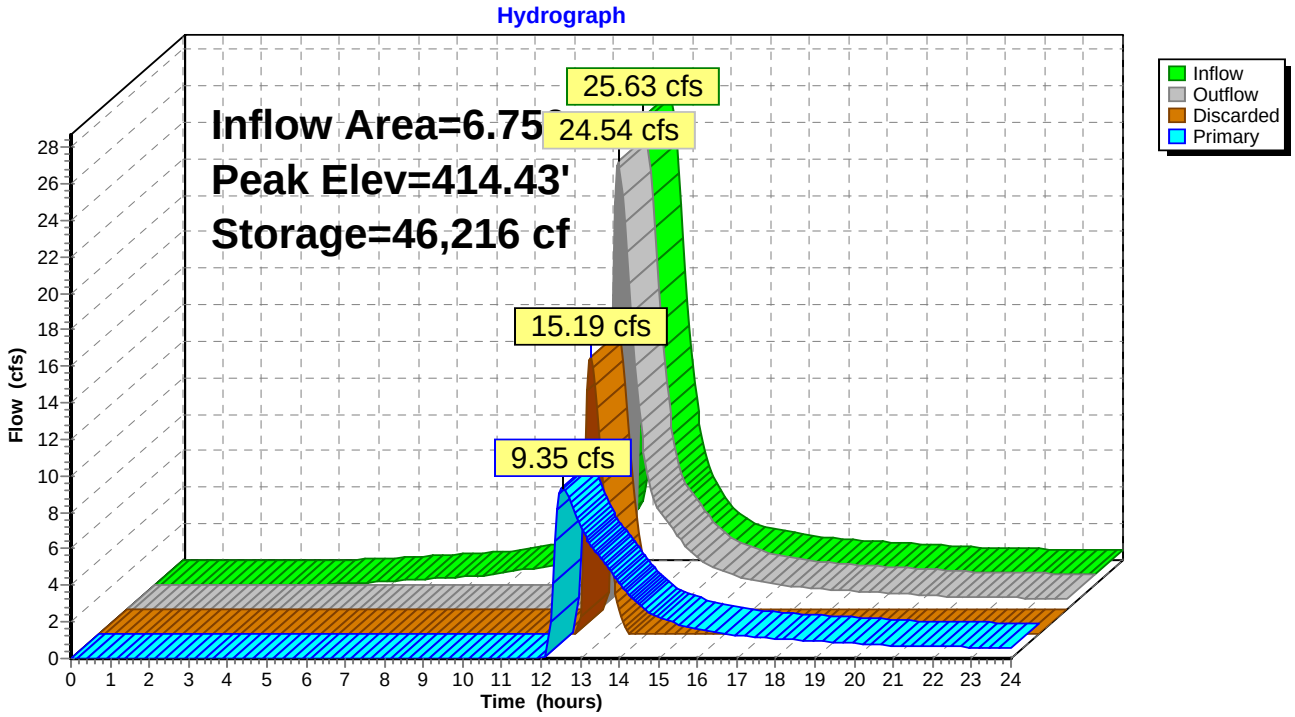
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

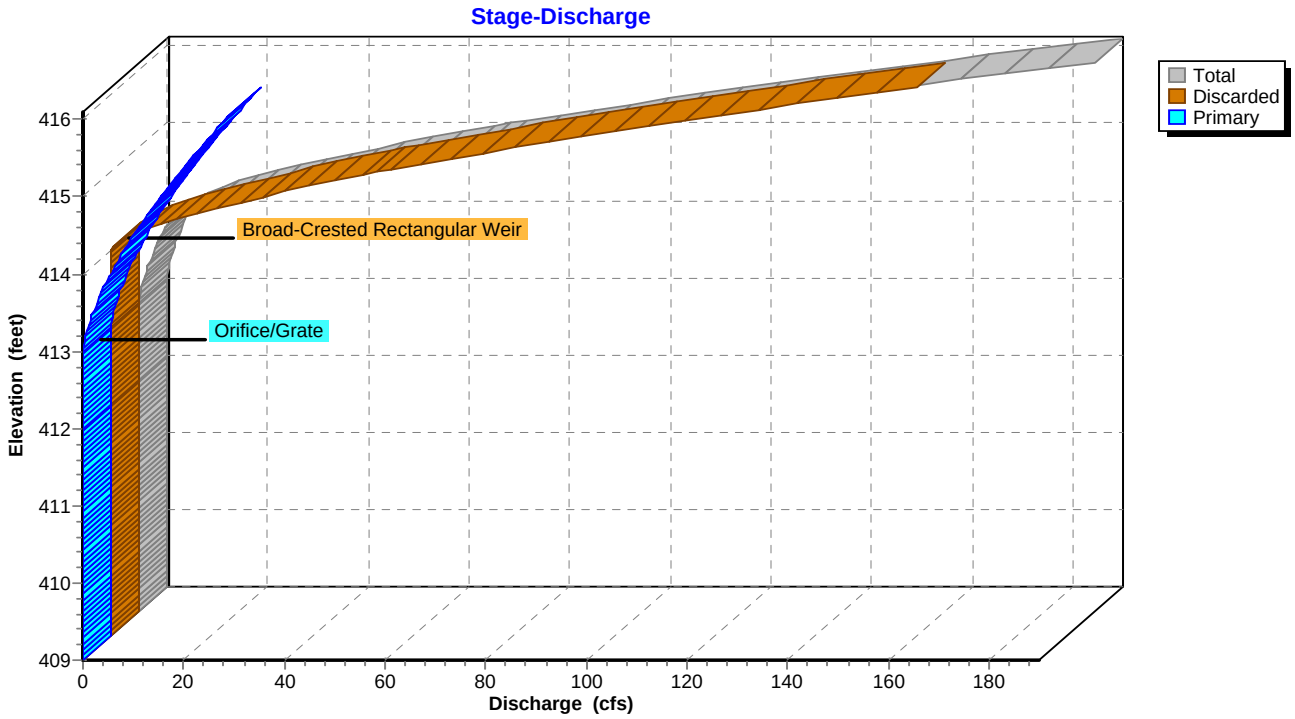
Discarded OutFlow Max=15.08 cfs @ 12.54 hrs HW=414.43' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 15.08 cfs @ 1.75 fps)

Primary OutFlow Max=9.33 cfs @ 12.54 hrs HW=414.43' (Free Discharge)
└**1=Culvert** (Passes 9.33 cfs of 35.25 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 9.33 cfs @ 3.84 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 6.00" for 50-yr event
Inflow = 58.26 cfs @ 12.55 hrs, Volume= 8.706 af
Outflow = 32.05 cfs @ 13.05 hrs, Volume= 5.047 af, Atten= 45%, Lag= 29.9 min
Discarded = 23.03 cfs @ 13.05 hrs, Volume= 1.467 af
Primary = 9.01 cfs @ 13.05 hrs, Volume= 3.581 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 416.40' @ 13.05 hrs Surf.Area= 40,855 sf Storage= 196,241 cf

Plug-Flow detention time= 229.7 min calculated for 5.037 af (58% of inflow)
Center-of-Mass det. time= 126.9 min (948.9 - 822.0)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

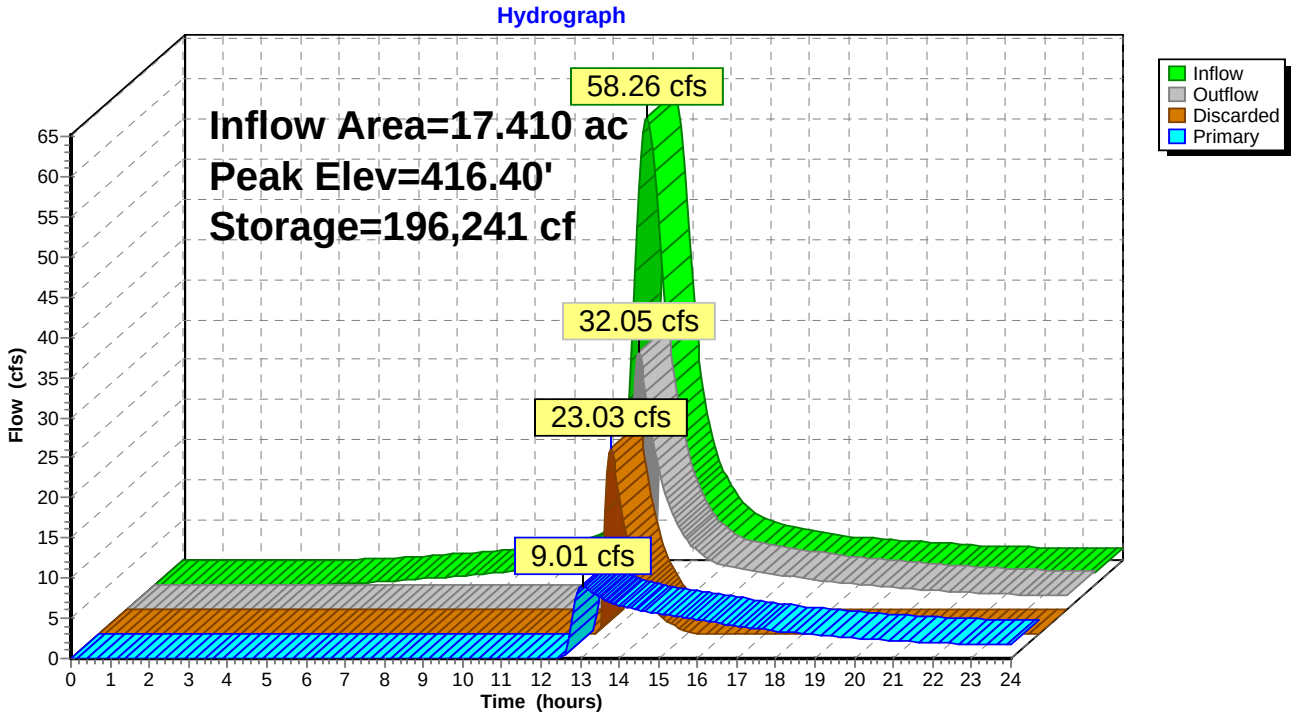
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

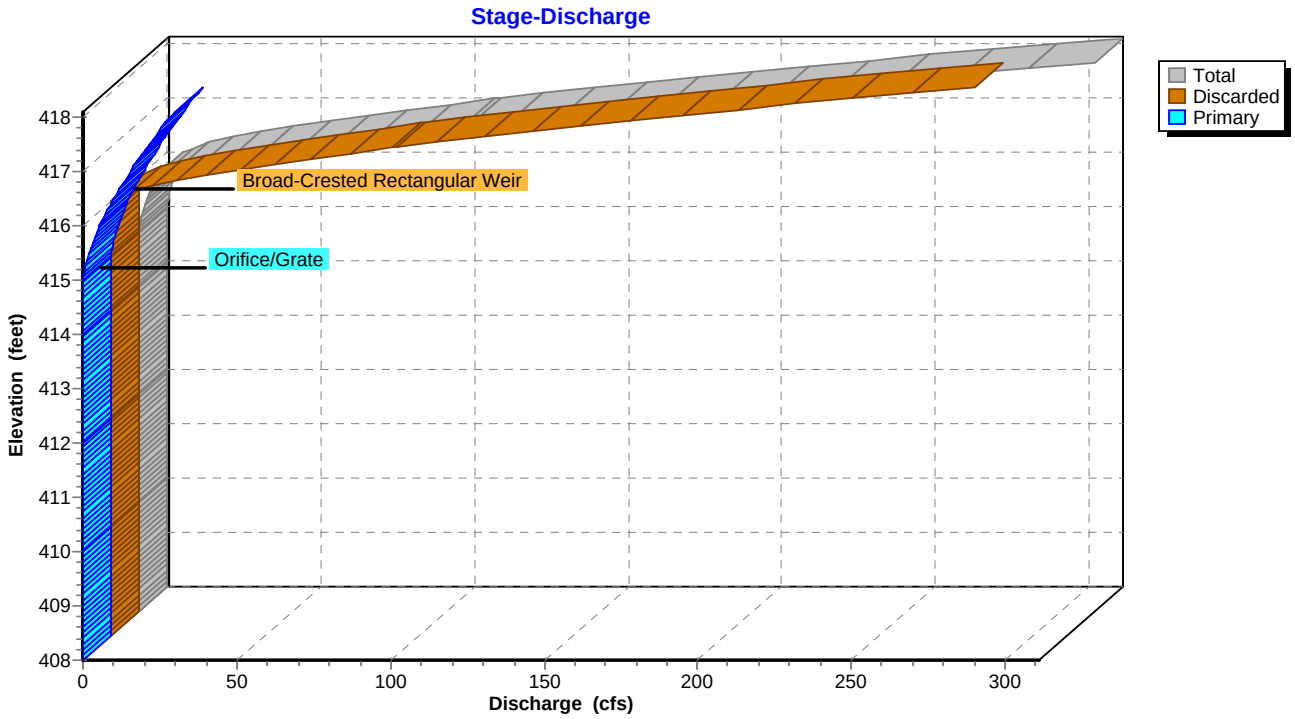
Discarded OutFlow Max=22.92 cfs @ 13.05 hrs HW=416.40' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 22.92 cfs @ 1.65 fps)

Primary OutFlow Max=9.01 cfs @ 13.05 hrs HW=416.40' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 9.01 cfs @ 3.79 fps)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 6.65" for 50-yr event
Inflow = 9.94 cfs @ 12.00 hrs, Volume= 0.587 af
Outflow = 7.73 cfs @ 12.07 hrs, Volume= 0.368 af, Atten= 22%, Lag= 4.4 min
Primary = 7.73 cfs @ 12.07 hrs, Volume= 0.368 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.64' @ 12.07 hrs Surf.Area= 8,242 sf Storage= 11,728 cf

Plug-Flow detention time= 190.3 min calculated for 0.368 af (63% of inflow)
Center-of-Mass det. time= 89.4 min (858.3 - 768.8)

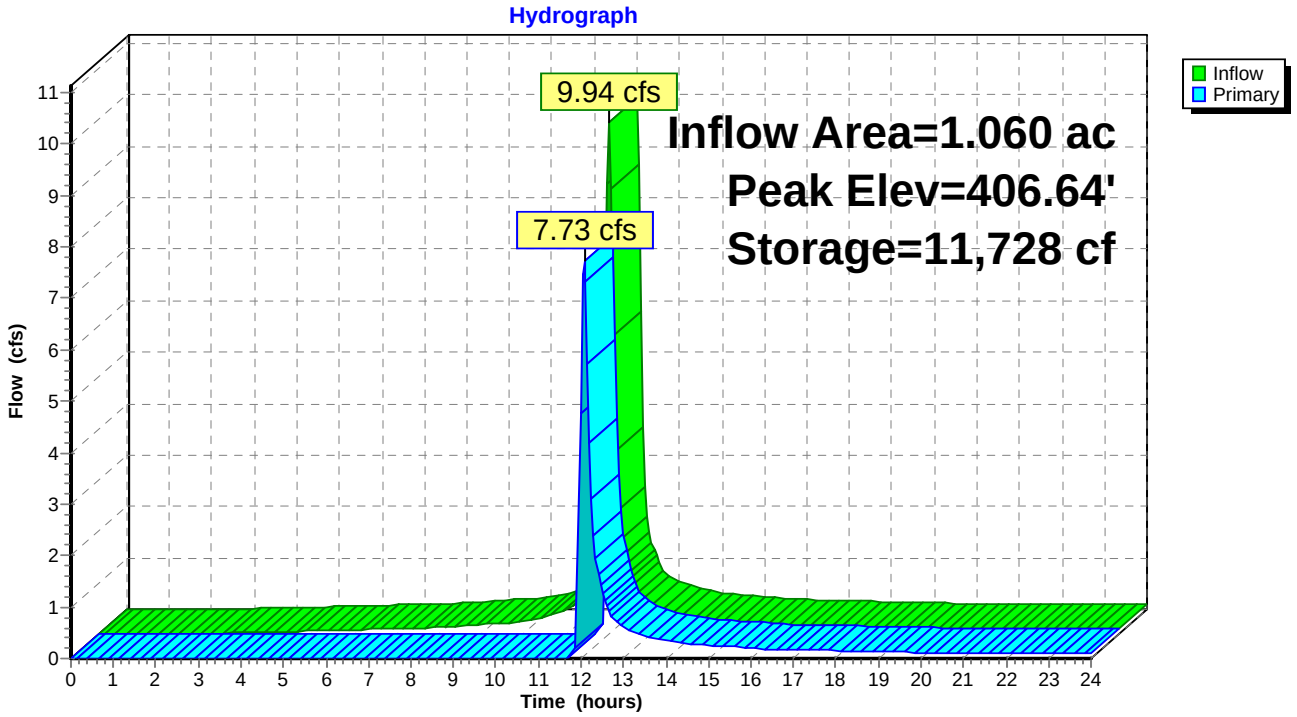
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

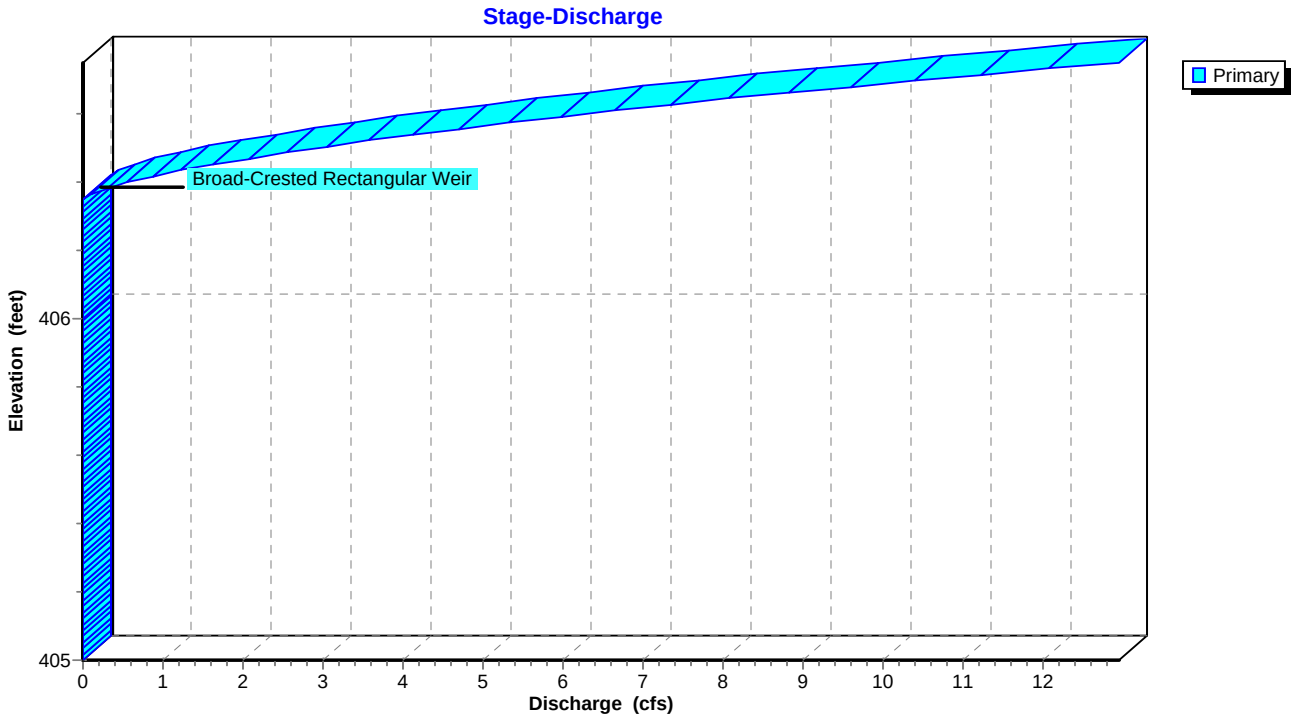
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=7.38 cfs @ 12.07 hrs HW=406.63' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 7.38 cfs @ 1.33 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 6.04" for 50-yr event
Inflow = 19.91 cfs @ 12.18 hrs, Volume= 1.767 af
Outflow = 13.65 cfs @ 12.35 hrs, Volume= 1.738 af, Atten= 31%, Lag= 10.6 min
Primary = 13.65 cfs @ 12.35 hrs, Volume= 1.738 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 426.32' @ 12.35 hrs Surf.Area= 7,226 sf Storage= 18,736 cf

Plug-Flow detention time= 43.4 min calculated for 1.735 af (98% of inflow)
Center-of-Mass det. time= 33.5 min (831.4 - 797.9)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

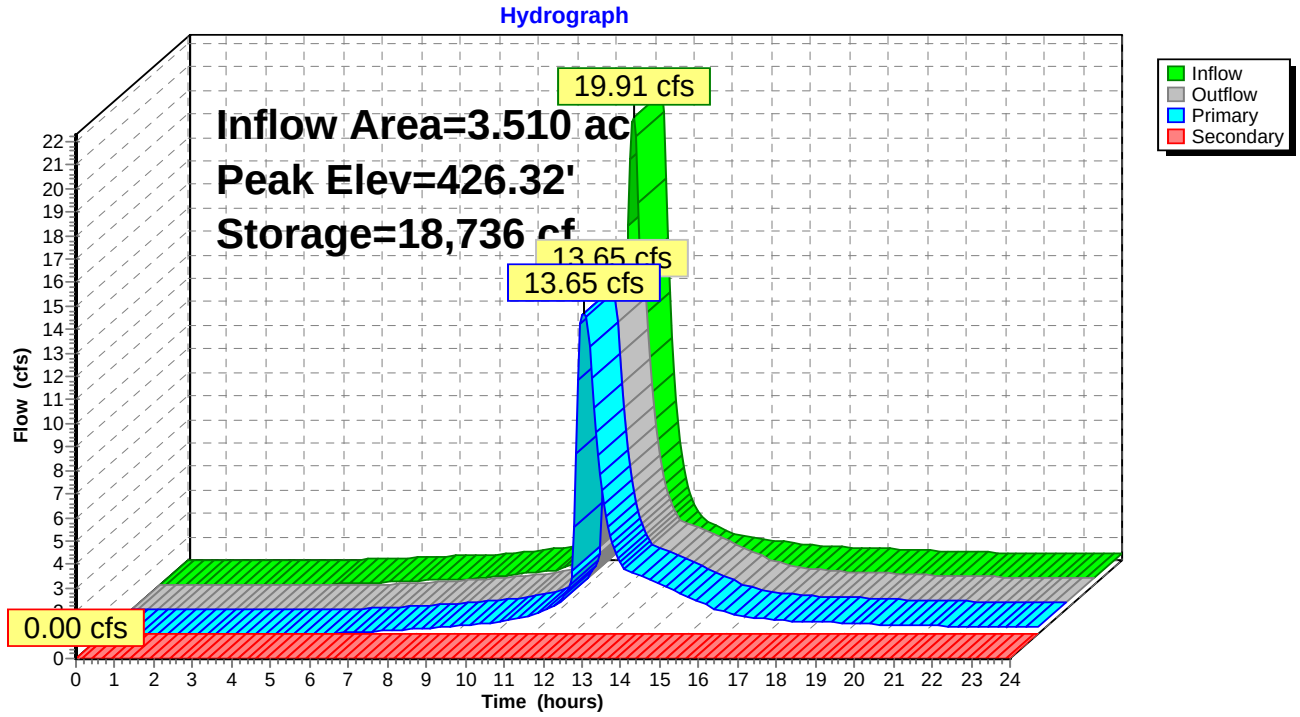
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

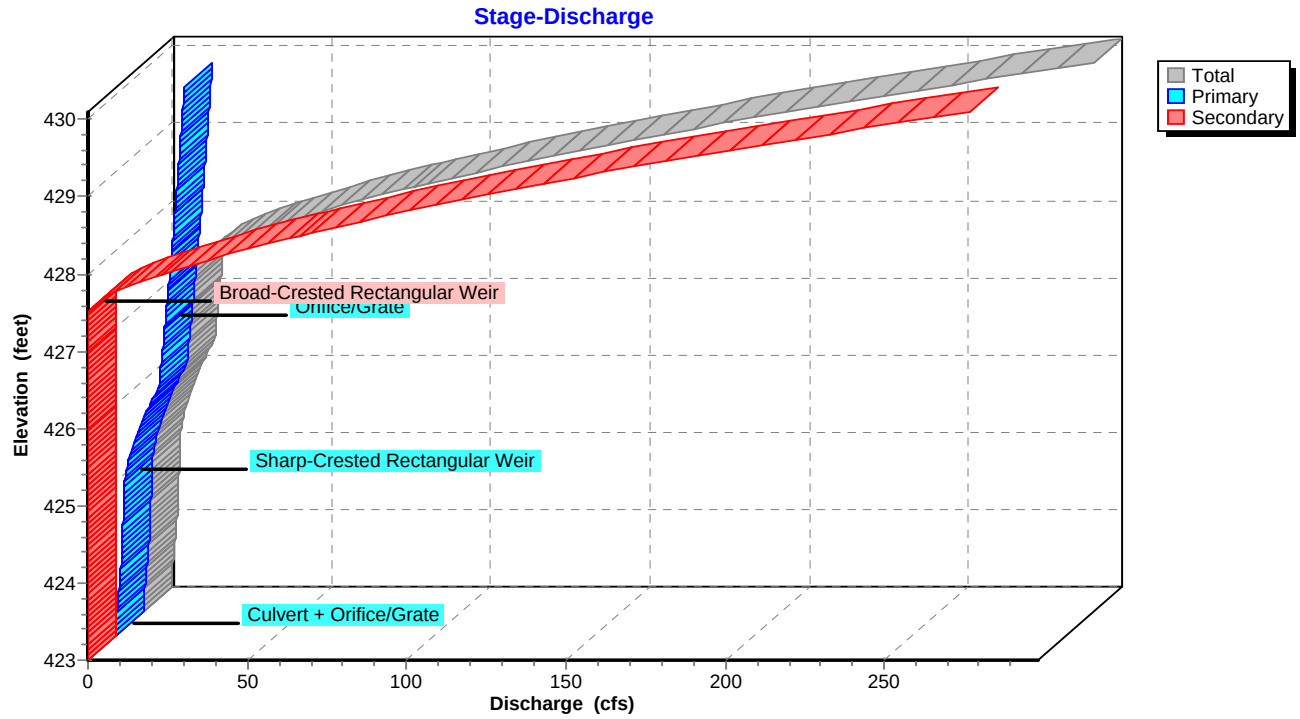
Primary OutFlow Max=13.64 cfs @ 12.35 hrs HW=426.32' (Free Discharge)
└**1=Culvert** (Inlet Controls 13.64 cfs @ 7.72 fps)
  ├**2=Orifice/Grate** (Passes < 3.65 cfs potential flow)
  ├**3=Sharp-Crested Rectangular Weir** (Passes < 11.38 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 5.24" for 50-yr event
Inflow = 4.95 cfs @ 12.07 hrs, Volume= 0.332 af
Outflow = 4.81 cfs @ 12.11 hrs, Volume= 0.275 af, Atten= 3%, Lag= 2.0 min
Discarded = 4.81 cfs @ 12.11 hrs, Volume= 0.275 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 408.00' @ 12.11 hrs Surf.Area= 2,563 sf Storage= 3,246 cf

Plug-Flow detention time= 109.6 min calculated for 0.275 af (83% of inflow)
Center-of-Mass det. time= 37.0 min (845.5 - 808.5)

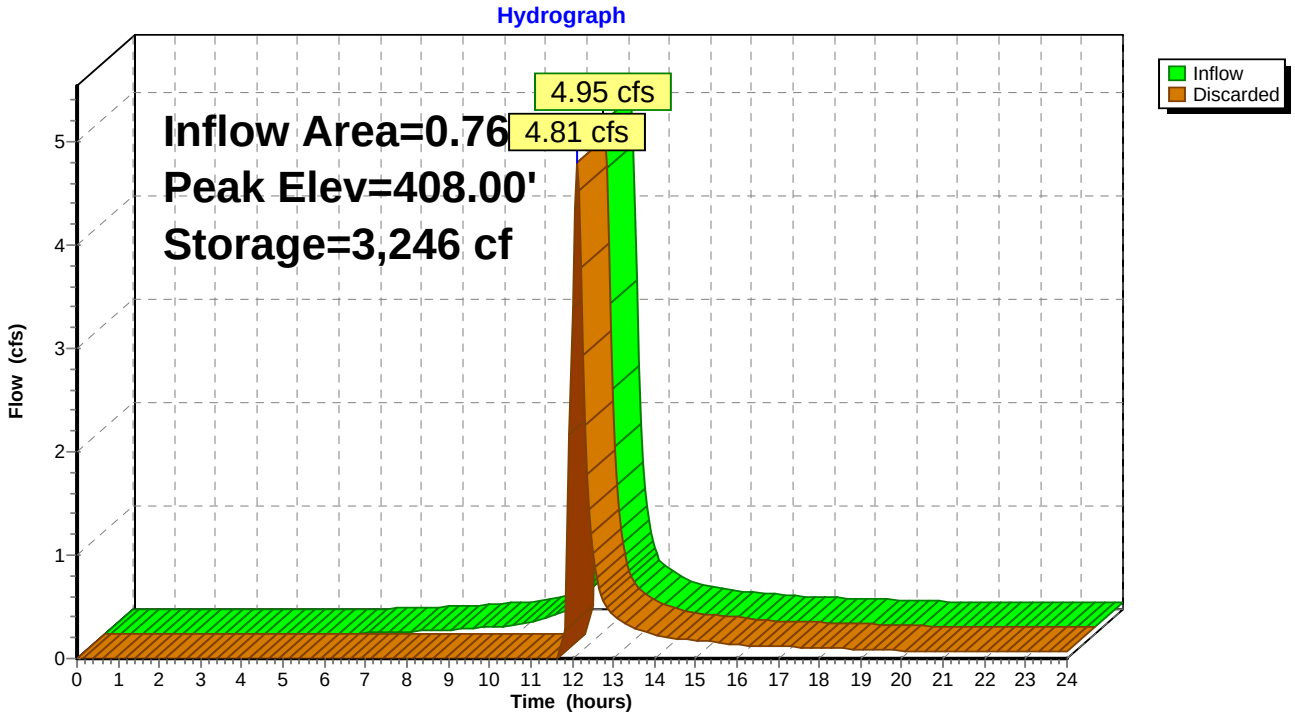
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

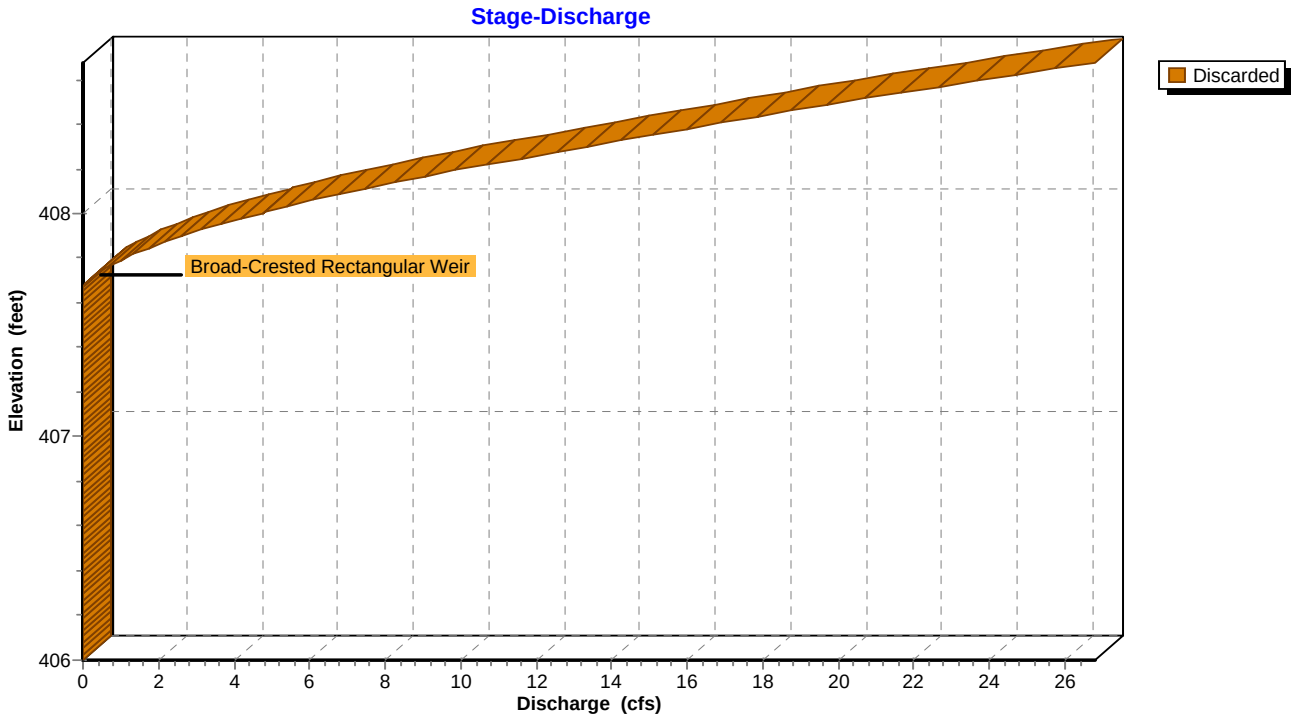
Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=4.77 cfs @ 12.11 hrs HW=408.00' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 4.77 cfs @ 1.44 fps)

Pond Sed-2: Sed Trap 2



Pond Sed-2: Sed Trap 2



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1a: P-1a Runoff Area=22.790 ac 0.00% Impervious Runoff Depth>5.40"
Flow Length=777' Tc=38.6 min CN=74 Runoff=90.70 cfs 10.252 af

Subcatchment P-1b: P-1b Runoff Area=16.120 ac 27.61% Impervious Runoff Depth>5.66"
Flow Length=209' Tc=23.3 min CN=76 Runoff=92.48 cfs 7.602 af

Subcatchment P-1c: P-1c Runoff Area=6.750 ac 0.00% Impervious Runoff Depth>6.95"
Flow Length=1,482' Tc=46.9 min CN=87 Runoff=29.44 cfs 3.909 af

Subcatchment P-1d: P-1d Runoff Area=17.410 ac 0.00% Impervious Runoff Depth>6.94"
Flow Length=1,530' Tc=55.8 min CN=87 Runoff=66.94 cfs 10.063 af

Subcatchment P-1e: P-1e Runoff Area=1.060 ac 65.09% Impervious Runoff Depth>7.61"
Tc=9.2 min CN=92 Runoff=11.29 cfs 0.672 af

Subcatchment P-1f: P-1f Runoff Area=0.760 ac 0.00% Impervious Runoff Depth>6.15"
Tc=15.6 min CN=80 Runoff=5.77 cfs 0.390 af

Subcatchment P-2: P-2 Runoff Area=9.720 ac 0.00% Impervious Runoff Depth>5.46"
Flow Length=1,392' Tc=81.0 min CN=75 Runoff=23.14 cfs 4.422 af

Subcatchment P-3: P-3 Runoff Area=3.510 ac 0.00% Impervious Runoff Depth>6.98"
Flow Length=234' Tc=25.2 min CN=87 Runoff=22.85 cfs 2.042 af

Subcatchment P-4: P-4 Runoff Area=3.370 ac 0.00% Impervious Runoff Depth>5.64"
Flow Length=590' Tc=36.5 min CN=76 Runoff=14.56 cfs 1.584 af

Reach R-1: R-1 Avg. Flow Depth=0.78' Max Vel=5.18 fps Inflow=26.68 cfs 7.447 af
n=0.040 L=883.0' S=0.0379 '/' Capacity=41.40 cfs Outflow=26.65 cfs 7.426 af

Reach R-2: R-2 Avg. Flow Depth=3.40' Max Vel=2.15 fps Inflow=114.68 cfs 17.677 af
n=0.040 L=1,717.0' S=0.0023 '/' Capacity=18.99 cfs Outflow=97.71 cfs 17.453 af

Reach R-3: R-3 Avg. Flow Depth=5.58' Max Vel=1.51 fps Inflow=116.15 cfs 23.636 af
n=0.040 L=280.0' S=0.0011 '/' Capacity=12.88 cfs Outflow=115.05 cfs 23.562 af

Reach R-4: R-4 Avg. Flow Depth=6.01' Max Vel=1.40 fps Inflow=115.80 cfs 24.015 af
n=0.040 L=219.0' S=0.0009 '/' Capacity=11.89 cfs Outflow=114.96 cfs 23.953 af

Pond Pond 1b: Pond 1b Peak Elev=445.91' Storage=118,084 cf Inflow=92.48 cfs 7.602 af
Outflow=26.68 cfs 7.447 af

Pond Pond 1c: Pond 1c Peak Elev=414.50' Storage=46,995 cf Inflow=29.44 cfs 3.909 af
Discarded=18.90 cfs 0.939 af Primary=10.00 cfs 2.207 af Outflow=28.90 cfs 3.146 af

Pond Pond 1d: Pond 1d Peak Elev=416.54' Storage=202,162 cf Inflow=66.94 cfs 10.063 af
Discarded=37.46 cfs 2.398 af Primary=10.45 cfs 3.975 af Outflow=47.91 cfs 6.373 af

Pond Pond 1e: Pond 1e Peak Elev=406.68' Storage=12,102 cf Inflow=11.29 cfs 0.672 af
Outflow=9.72 cfs 0.453 af

Pond Pond 3: Pond 3 Peak Elev=426.67' Storage=21,341 cf Inflow=22.85 cfs 2.042 af
Primary=14.55 cfs 2.011 af Secondary=0.00 cfs 0.000 af Outflow=14.55 cfs 2.011 af

Pond Sed-2: Sed Trap 2 Peak Elev=408.04' Storage=3,336 cf Inflow=5.77 cfs 0.390 af
Outflow=5.62 cfs 0.332 af

Summary for Subcatchment P-1a: P-1a

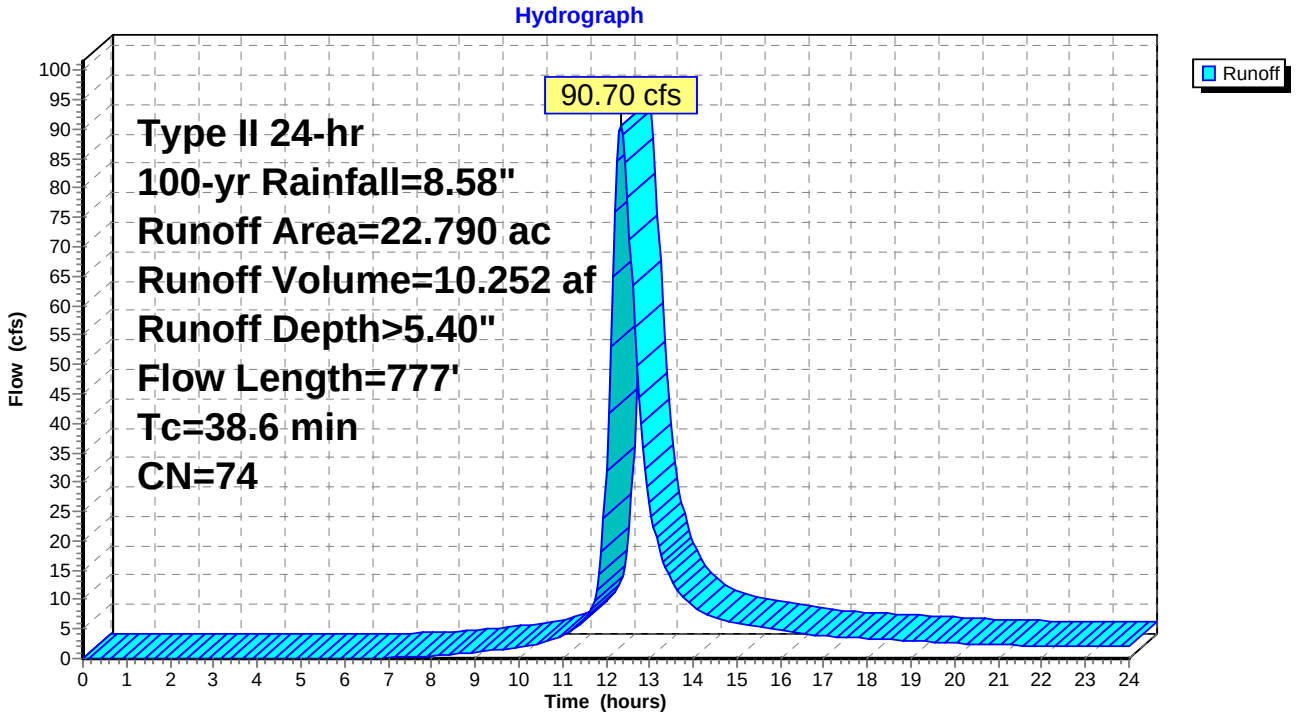
Runoff = 90.70 cfs @ 12.34 hrs, Volume= 10.252 af, Depth> 5.40"
Routed to Reach R-2 : R-2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
1.940	80	>75% Grass cover, Good, HSG D
14.130	77	Woods, Poor, HSG C
6.720	66	Woods, Poor, HSG B
22.790	74	Weighted Average
22.790		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.9	100	0.0100	0.09		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.9	50	0.1200	0.08		**Sheet Flow, BC** Woods: Dense underbrush n= 0.800 P2= 3.56"
1.6	171	0.1300	1.80		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
2.1	169	0.0700	1.32		**Shallow Concentrated Flow, DE** Woodland Kv= 5.0 fps
2.9	145	0.0280	0.84		**Shallow Concentrated Flow, EF** Woodland Kv= 5.0 fps
1.5	74	0.0270	0.82		**Shallow Concentrated Flow, FG** Woodland Kv= 5.0 fps
2.7	68	0.0070	0.42		**Shallow Concentrated Flow, GH** Woodland Kv= 5.0 fps
38.6	777	Total			

Subcatchment P-1a: P-1a



Summary for Subcatchment P-1b: P-1b

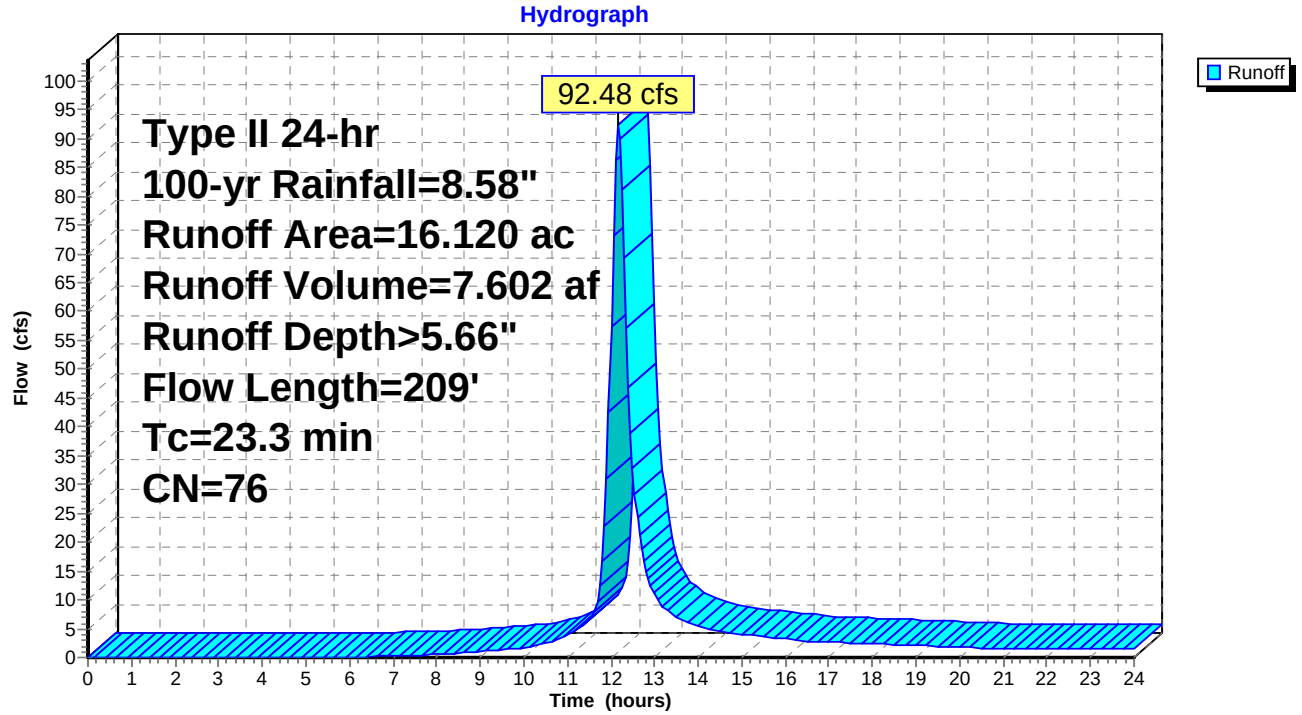
Runoff = 92.48 cfs @ 12.16 hrs, Volume= 7.602 af, Depth> 5.66"
Routed to Pond Pond 1b : Pond 1b

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
3.910	61	>75% Grass cover, Good, HSG B
4.450	98	Paved parking, HSG B
2.910	55	Woods, Good, HSG B
4.850	80	>75% Grass cover, Good, HSG D
16.120	76	Weighted Average
11.670		72.39% Pervious Area
4.450		27.61% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.0	93	0.0190	0.12		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
9.2	57	0.0170	0.10		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
1.1	59	0.0170	0.91		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
23.3	209	Total			

Subcatchment P-1b: P-1b



Summary for Subcatchment P-1c: P-1c

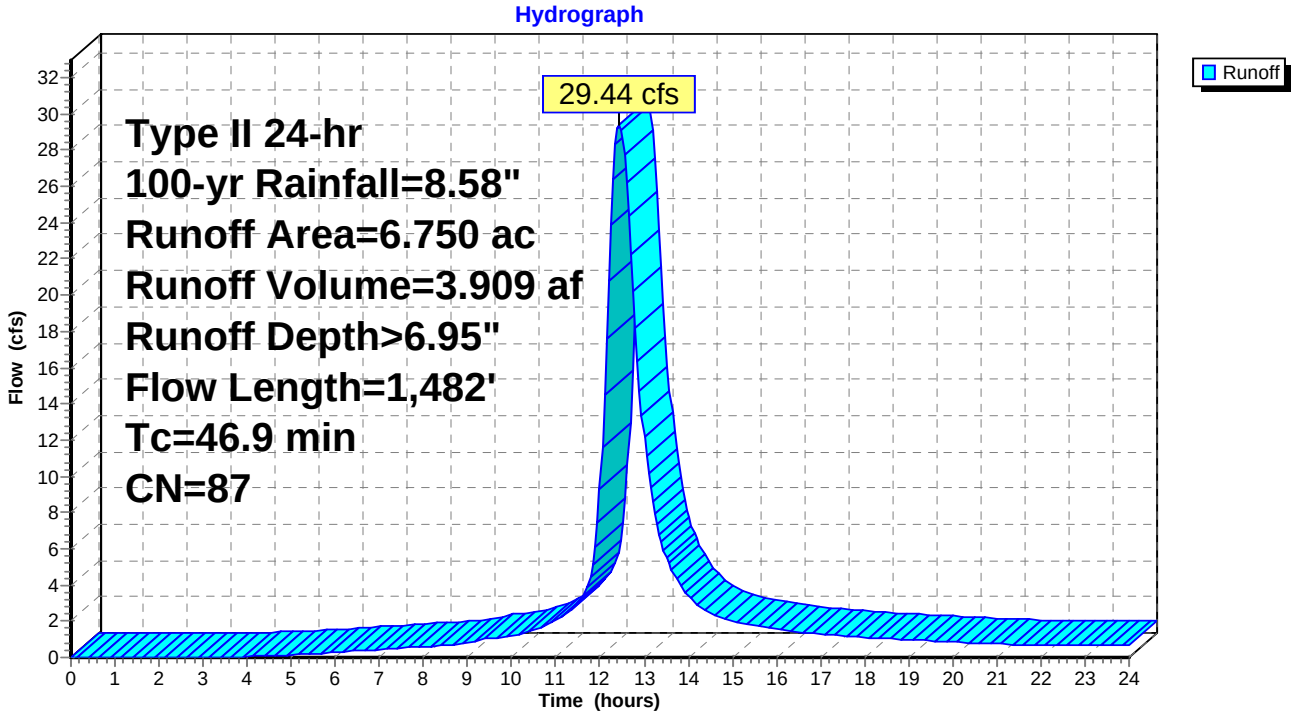
Runoff = 29.44 cfs @ 12.44 hrs, Volume= 3.909 af, Depth> 6.95"
Routed to Pond Pond 1c : Pond 1c

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
1.570	80	>75% Grass cover, Good, HSG D
5.180	89	Dirt roads, HSG D
6.750	87	Weighted Average
6.750		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
21.6	907	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.6	425	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
46.9	1,482	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

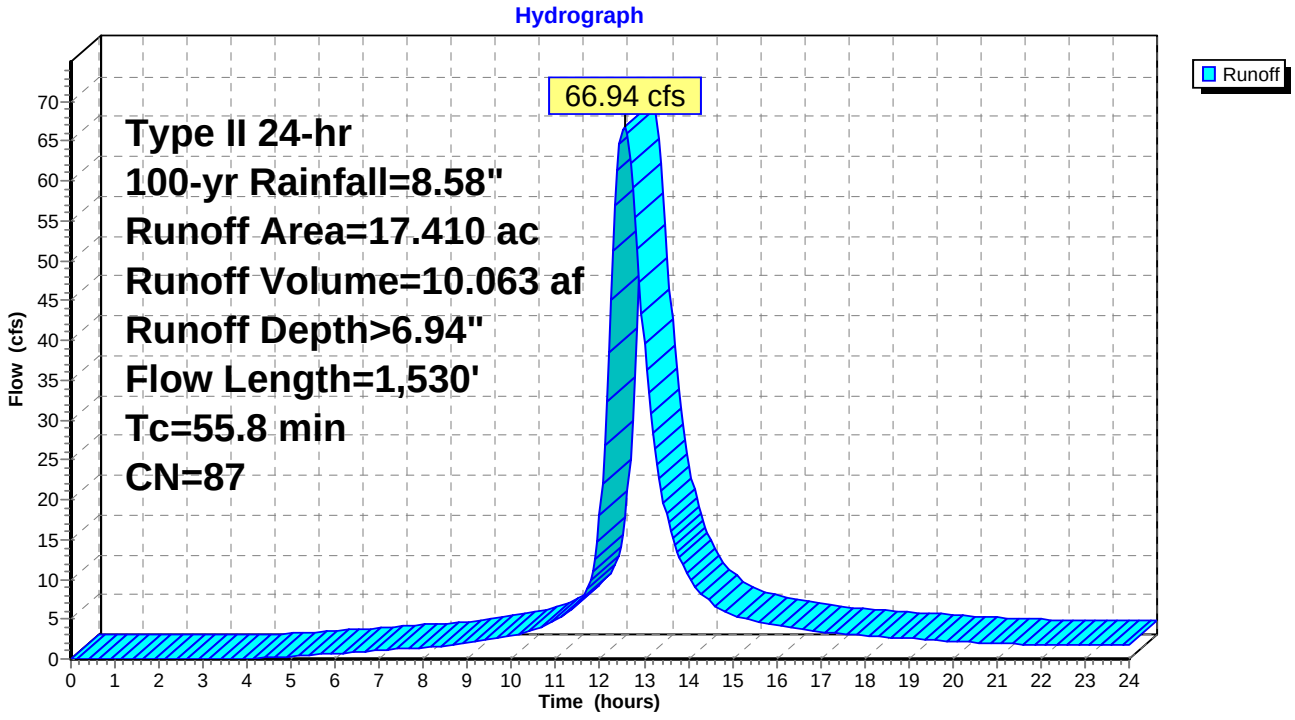
Runoff = 66.94 cfs @ 12.55 hrs, Volume= 10.063 af, Depth> 6.94"
Routed to Pond Pond 1d : Pond 1d

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
2.920	80	>75% Grass cover, Good, HSG D
14.490	89	Dirt roads, HSG D
17.410	87	Weighted Average
17.410		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	75	0.0260	0.13		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
14.2	75	0.0100	0.09		**Sheet Flow, BC** Grass: Dense n= 0.240 P2= 3.56"
31.1	1,306	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
55.8	1,530	Total			

Subcatchment P-1d: P-1d



Summary for Subcatchment P-1e: P-1e

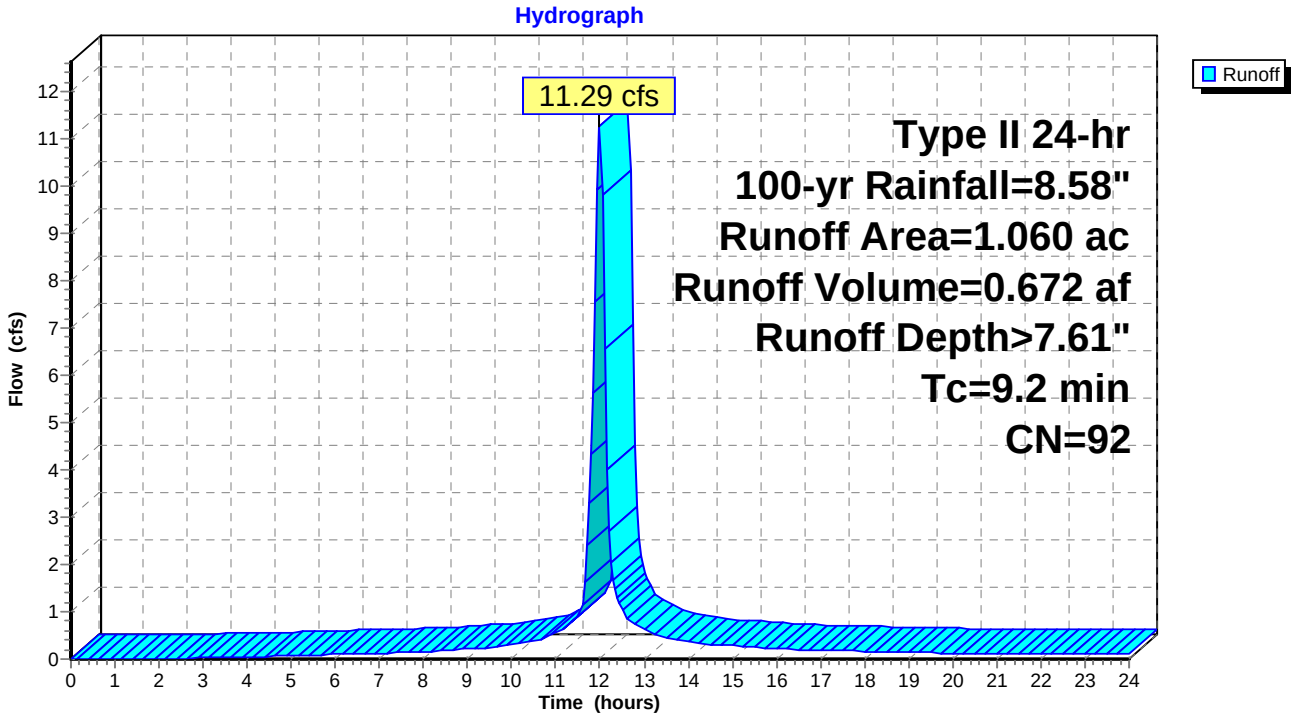
Runoff = 11.29 cfs @ 12.00 hrs, Volume= 0.672 af, Depth> 7.61"
Routed to Pond Pond 1e : Pond 1e

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
0.690	98	Paved parking, HSG B
0.370	80	>75% Grass cover, Good, HSG D
1.060	92	Weighted Average
0.370		34.91% Pervious Area
0.690		65.09% Impervious Area

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

Subcatchment P-1e: P-1e



Summary for Subcatchment P-1f: P-1f

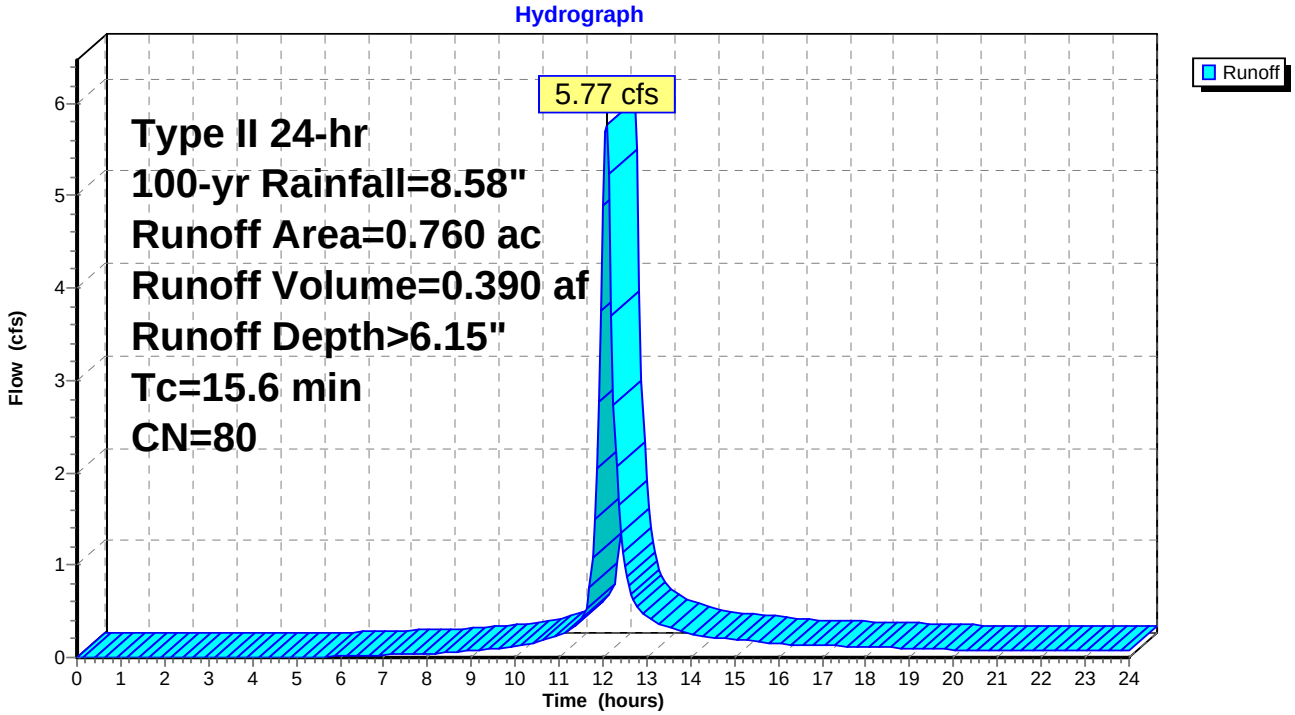
Runoff = 5.77 cfs @ 12.07 hrs, Volume= 0.390 af, Depth> 6.15"
Routed to Pond Sed-2 : Sed Trap 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
0.760	80	>75% Grass cover, Good, HSG D
0.760		100.00% Pervious Area

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

Subcatchment P-1f: P-1f



Summary for Subcatchment P-2: P-2

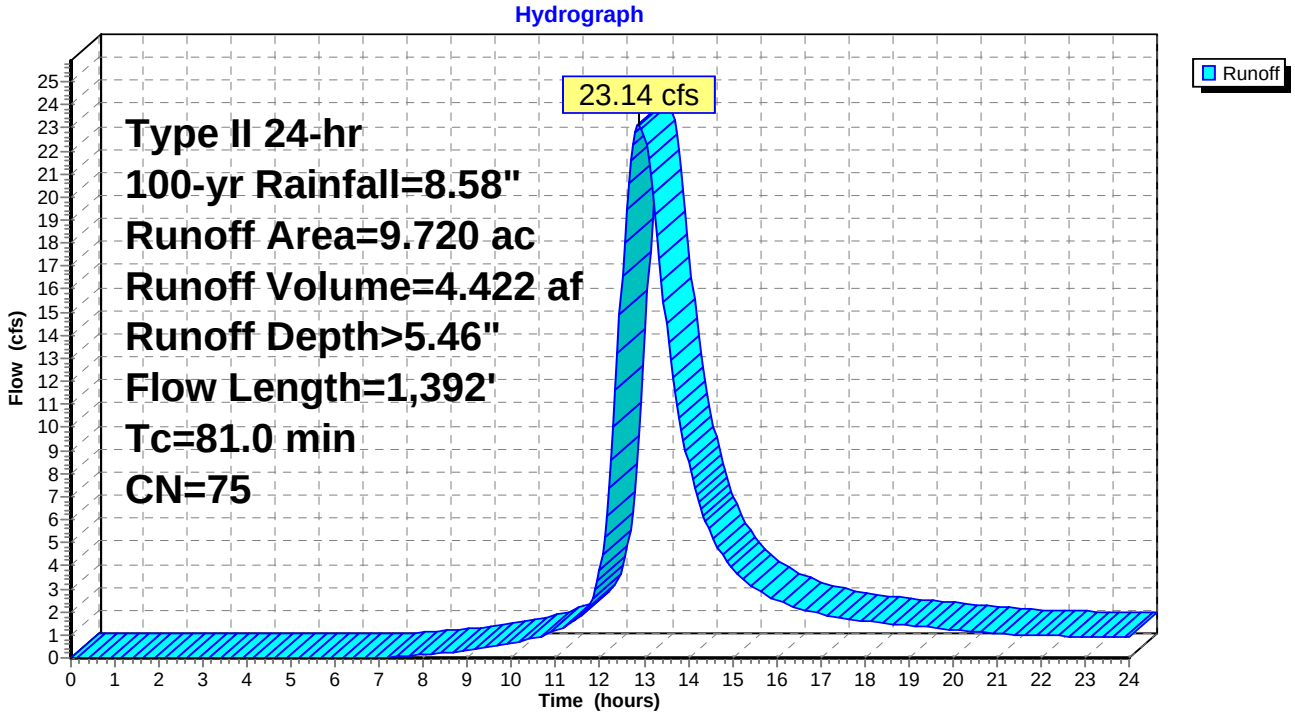
Runoff = 23.14 cfs @ 12.88 hrs, Volume= 4.422 af, Depth> 5.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
2.390	66	Woods, Poor, HSG B
3.450	77	Woods, Poor, HSG C
3.880	80	>75% Grass cover, Good, HSG D
9.720	75	Weighted Average
9.720		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.5	150	0.0660	0.14		**Sheet Flow, AB** Woods: Light underbrush n= 0.400 P2= 3.56"
59.0	1,048	0.0035	0.30		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
4.5	194	0.0210	0.72		**Shallow Concentrated Flow, CD** Woodland Kv= 5.0 fps
81.0	1,392	Total			

Subcatchment P-2: P-2



Summary for Subcatchment P-3: P-3

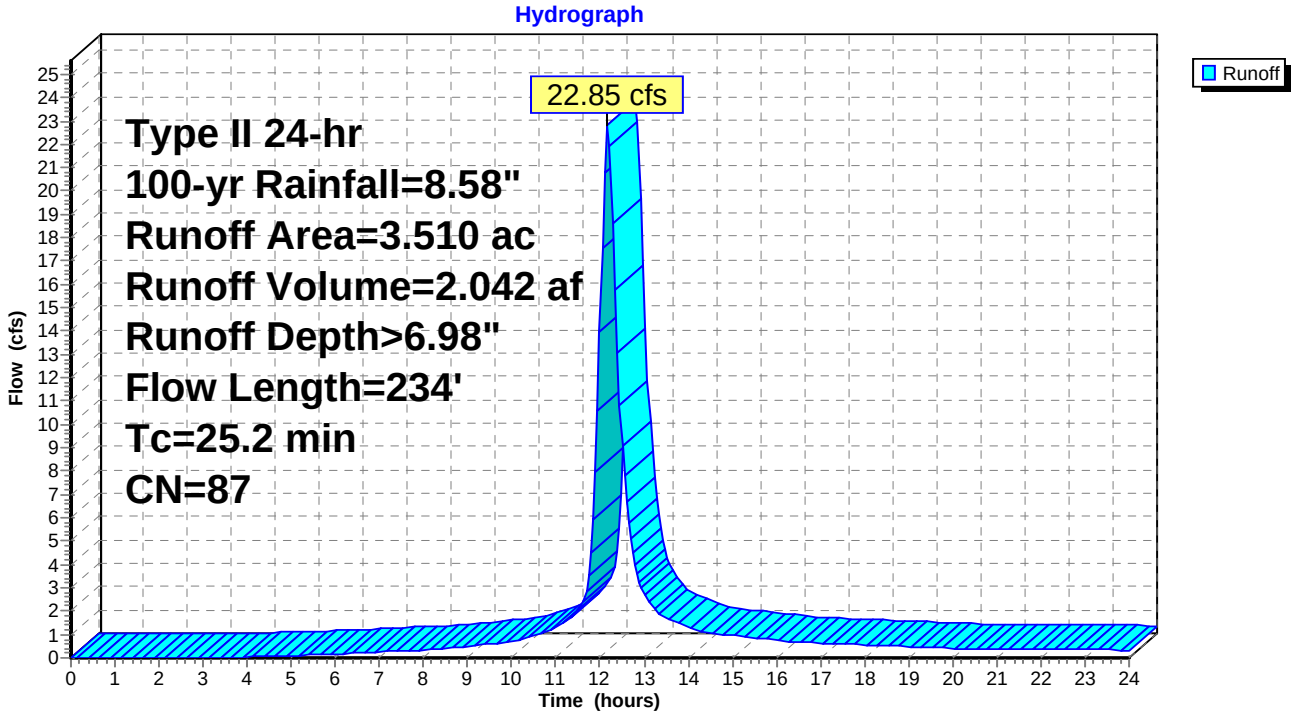
Runoff = 22.85 cfs @ 12.18 hrs, Volume= 2.042 af, Depth> 6.98"
Routed to Pond Pond 3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
0.790	80	>75% Grass cover, Good, HSG D
2.720	89	Dirt roads, HSG D
3.510	87	Weighted Average
3.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
23.8	150	0.0110	0.11		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
1.4	84	0.0210	1.01		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
25.2	234	Total			

Subcatchment P-3: P-3



Summary for Subcatchment P-4: P-4

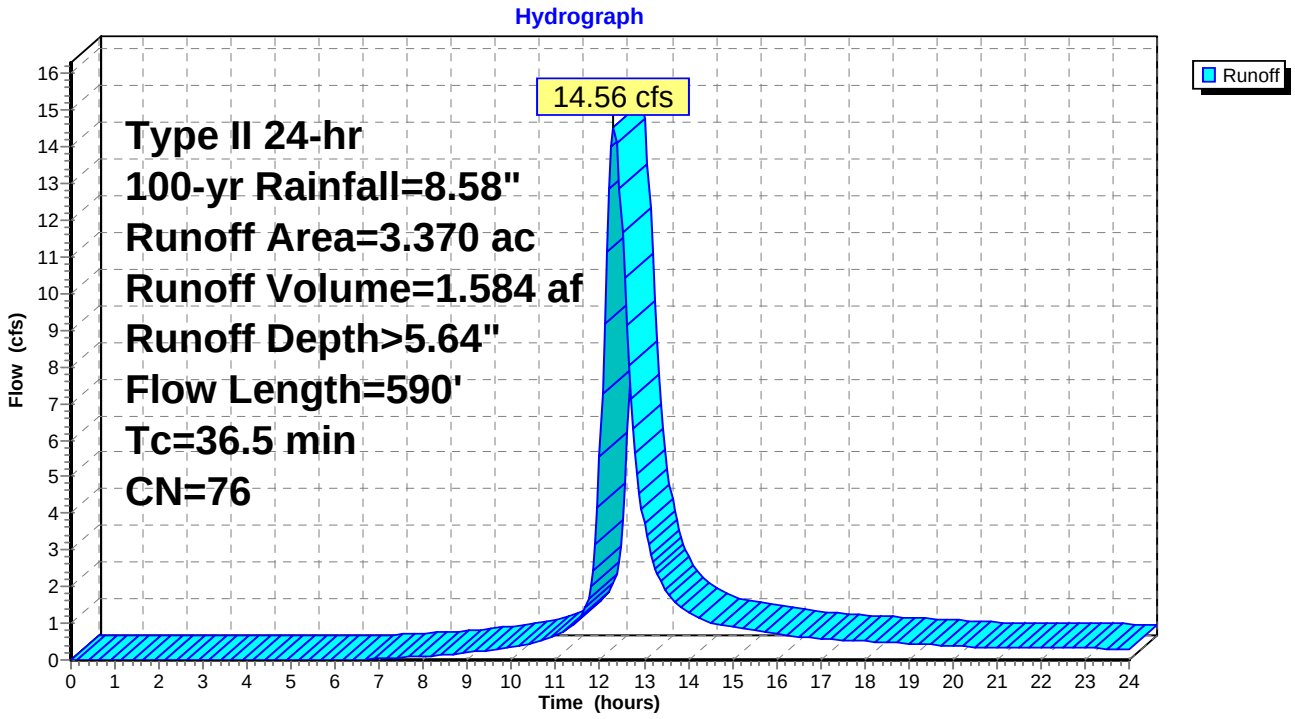
Runoff = 14.56 cfs @ 12.32 hrs, Volume= 1.584 af, Depth> 5.64"
Routed to nonexistent node 19L

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
1.830	83	Woods, Poor, HSG D
1.140	66	Woods, Poor, HSG B
0.290	80	>75% Grass cover, Good, HSG D
0.110	61	>75% Grass cover, Good, HSG B
3.370	76	Weighted Average
3.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
31.6	150	0.0600	0.08		**Sheet Flow, AB** Woods: Dense underbrush n= 0.800 P2= 3.56"
4.9	440	0.0890	1.49		**Shallow Concentrated Flow, BC** Woodland Kv= 5.0 fps
36.5	590	Total			

Subcatchment P-4: P-4



Summary for Reach R-1: R-1

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 5.54" for 100-yr event
Inflow = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af
Outflow = 26.65 cfs @ 12.65 hrs, Volume= 7.426 af, Atten= 0%, Lag= 5.0 min
Routed to Reach R-2 : R-2

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 5.18 fps, Min. Travel Time= 2.8 min
Avg. Velocity = 2.56 fps, Avg. Travel Time= 5.8 min

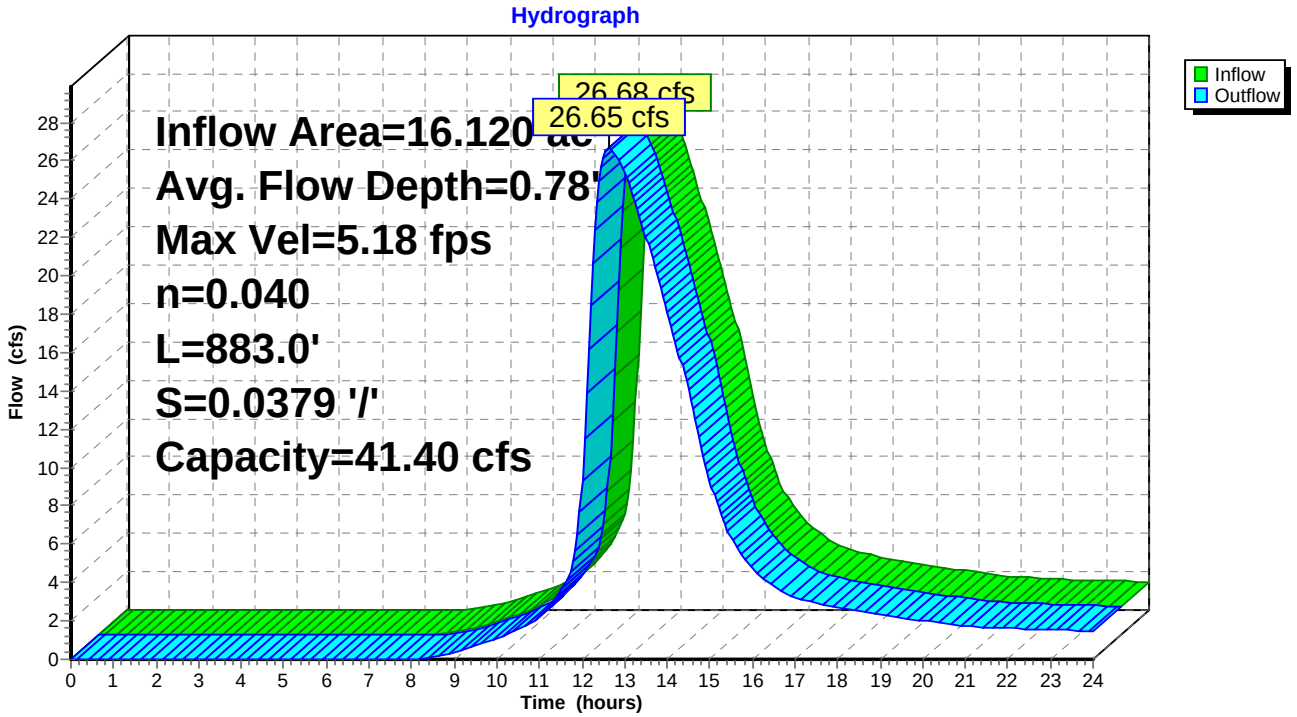
Peak Storage= 4,546 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.78' , Surface Width= 8.14'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 41.40 cfs

5.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 883.0' Slope= 0.0379 '/'
Inlet Invert= 441.00', Outlet Invert= 407.50'

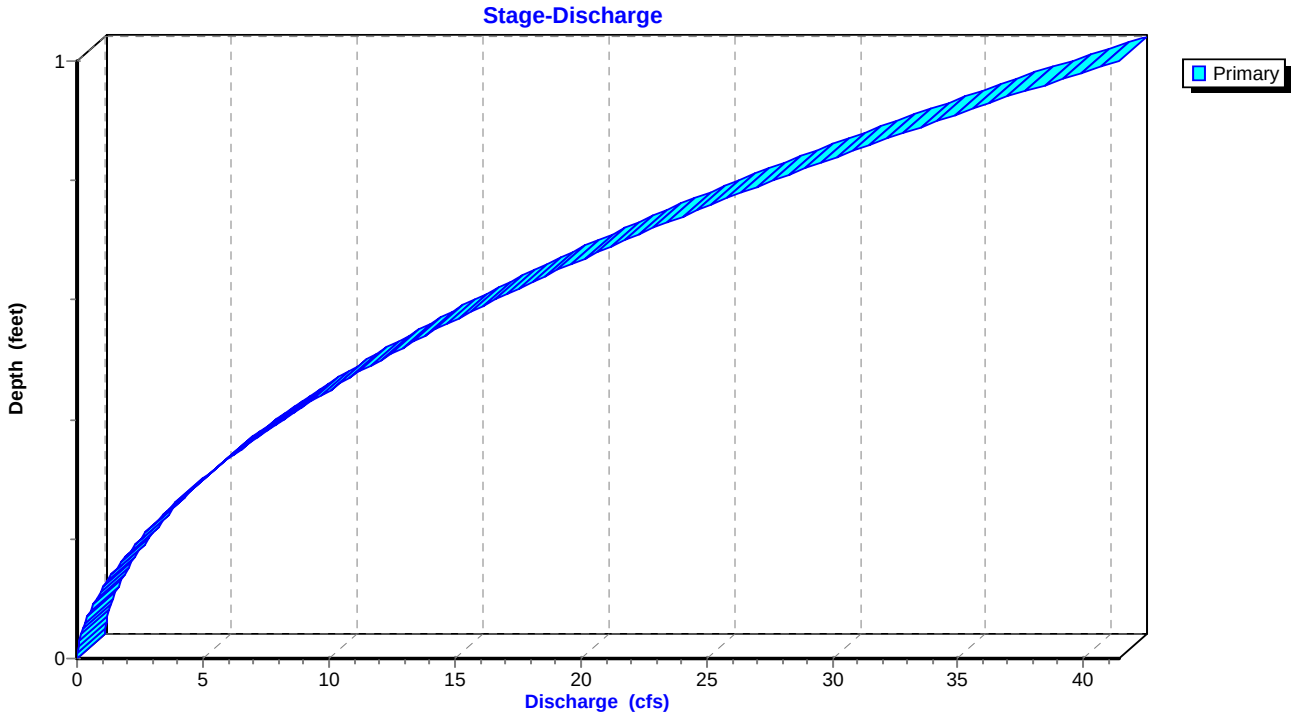


‡

Reach R-1: R-1



Reach R-1: R-1


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
5
10
15
20
25
30
35
40

Summary for Reach R-2: R-2

Inflow Area = 39.670 ac, 11.22% Impervious, Inflow Depth > 5.35" for 100-yr event
Inflow = 114.68 cfs @ 12.36 hrs, Volume= 17.677 af
Outflow = 97.71 cfs @ 12.77 hrs, Volume= 17.453 af, Atten= 15%, Lag= 24.5 min
Routed to Reach R-3 : R-3

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.15 fps, Min. Travel Time= 13.3 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 27.5 min

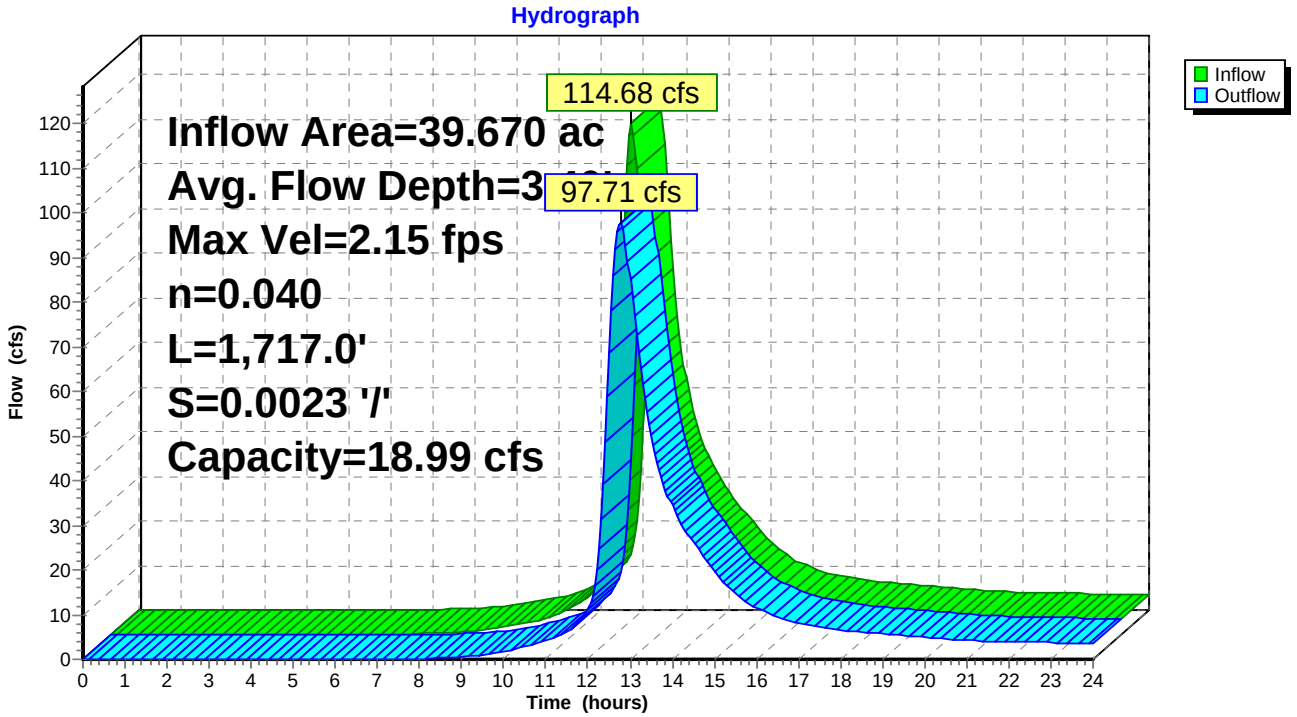
Peak Storage= 78,218 cf @ 12.55 hrs
Average Depth at Peak Storage= 3.40' , Surface Width= 23.60'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 18.99 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 1,717.0' Slope= 0.0023 '/'
Inlet Invert= 407.50', Outlet Invert= 403.50'

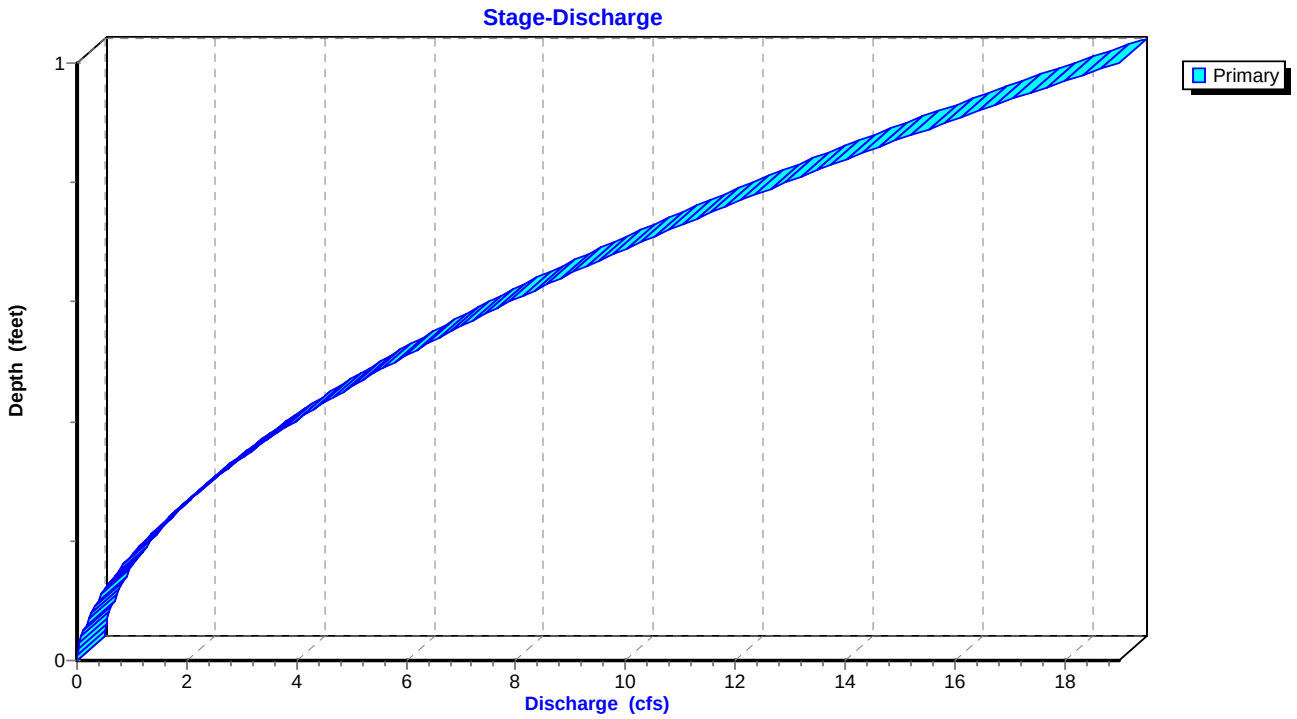


‡

Reach R-2: R-2



Reach R-2: R-2


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
2
4
6
8
10
12
14
16
18

Summary for Reach R-3: R-3

Inflow Area = 63.830 ac, 6.97% Impervious, Inflow Depth > 4.44" for 100-yr event
Inflow = 116.15 cfs @ 12.79 hrs, Volume= 23.636 af
Outflow = 115.05 cfs @ 12.89 hrs, Volume= 23.562 af, Atten= 1%, Lag= 6.3 min
Routed to Reach R-4 : R-4

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.51 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.89 fps, Avg. Travel Time= 5.3 min

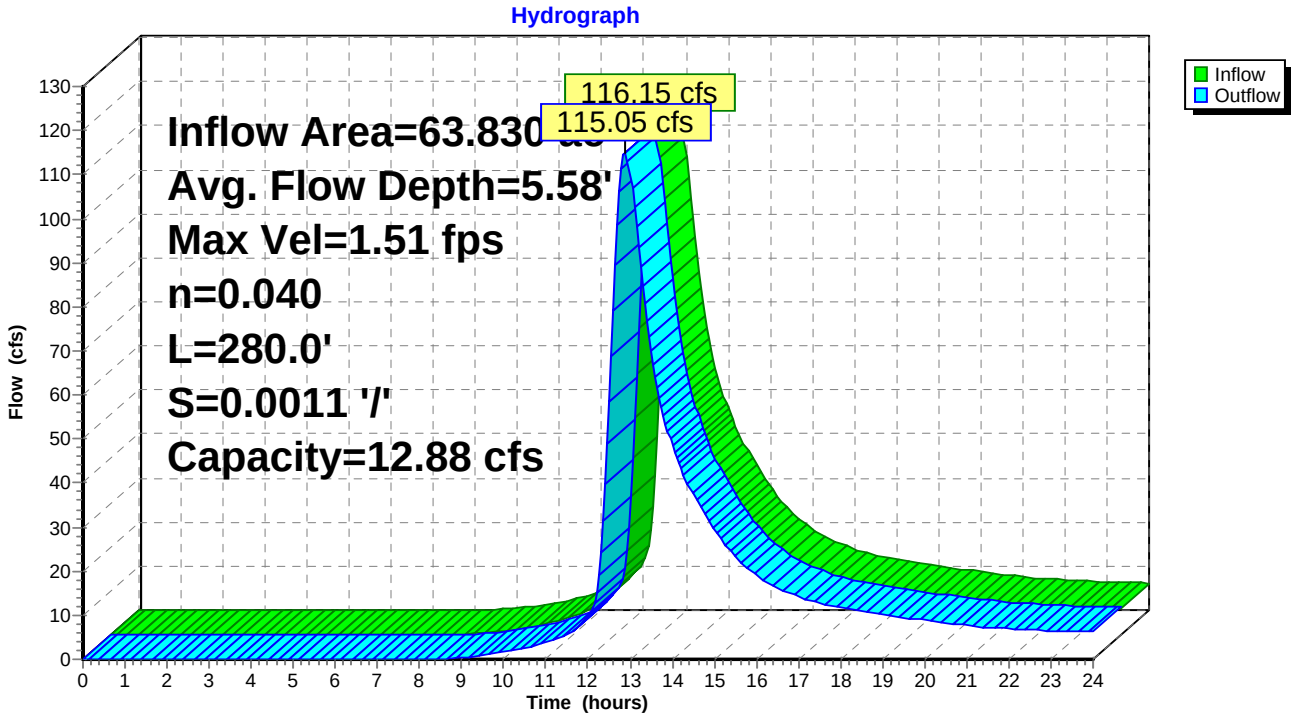
Peak Storage= 21,298 cf @ 12.84 hrs
Average Depth at Peak Storage= 5.58' , Surface Width= 32.33'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 12.88 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 280.0' Slope= 0.0011 '/'
Inlet Invert= 403.50', Outlet Invert= 403.20'

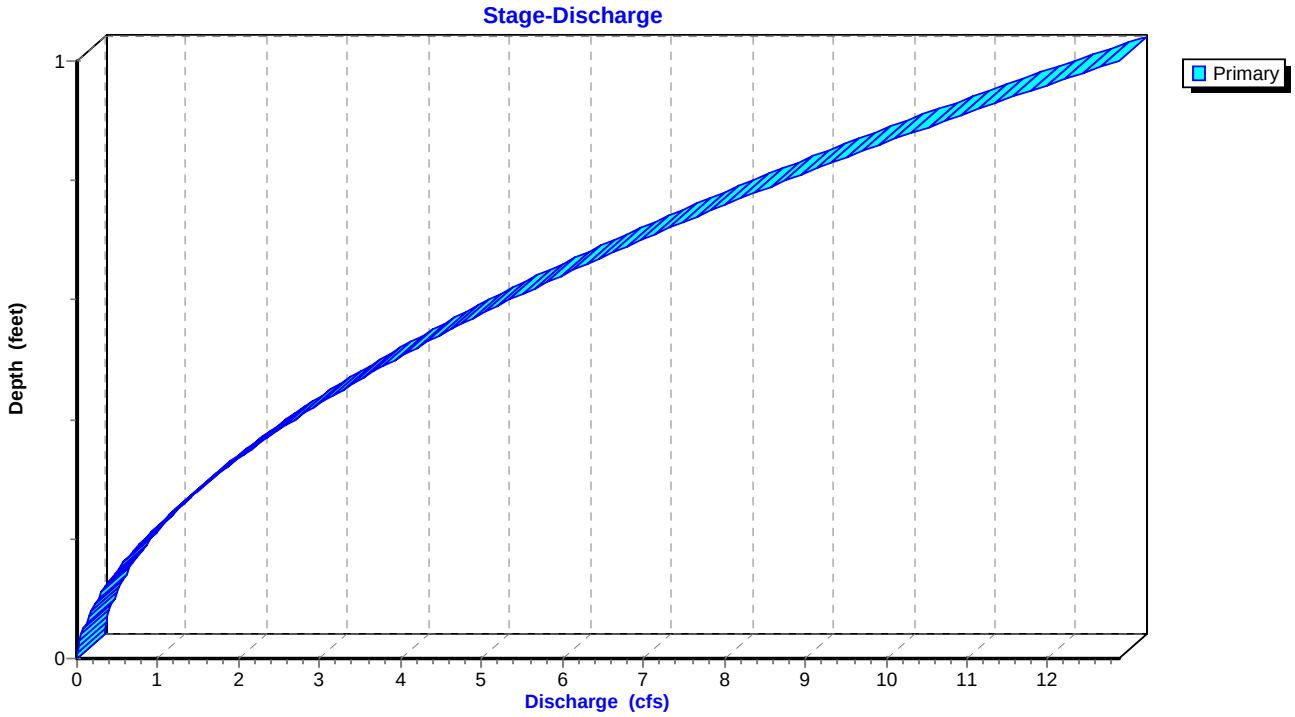


‡

Reach R-3: R-3



Reach R-3: R-3


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11
12

Summary for Reach R-4: R-4

Inflow Area = 64.890 ac, 7.92% Impervious, Inflow Depth > 4.44" for 100-yr event
Inflow = 115.80 cfs @ 12.89 hrs, Volume= 24.015 af
Outflow = 114.96 cfs @ 12.98 hrs, Volume= 23.953 af, Atten= 1%, Lag= 5.2 min
Routed to nonexistent node 25L

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.40 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 0.85 fps, Avg. Travel Time= 4.3 min

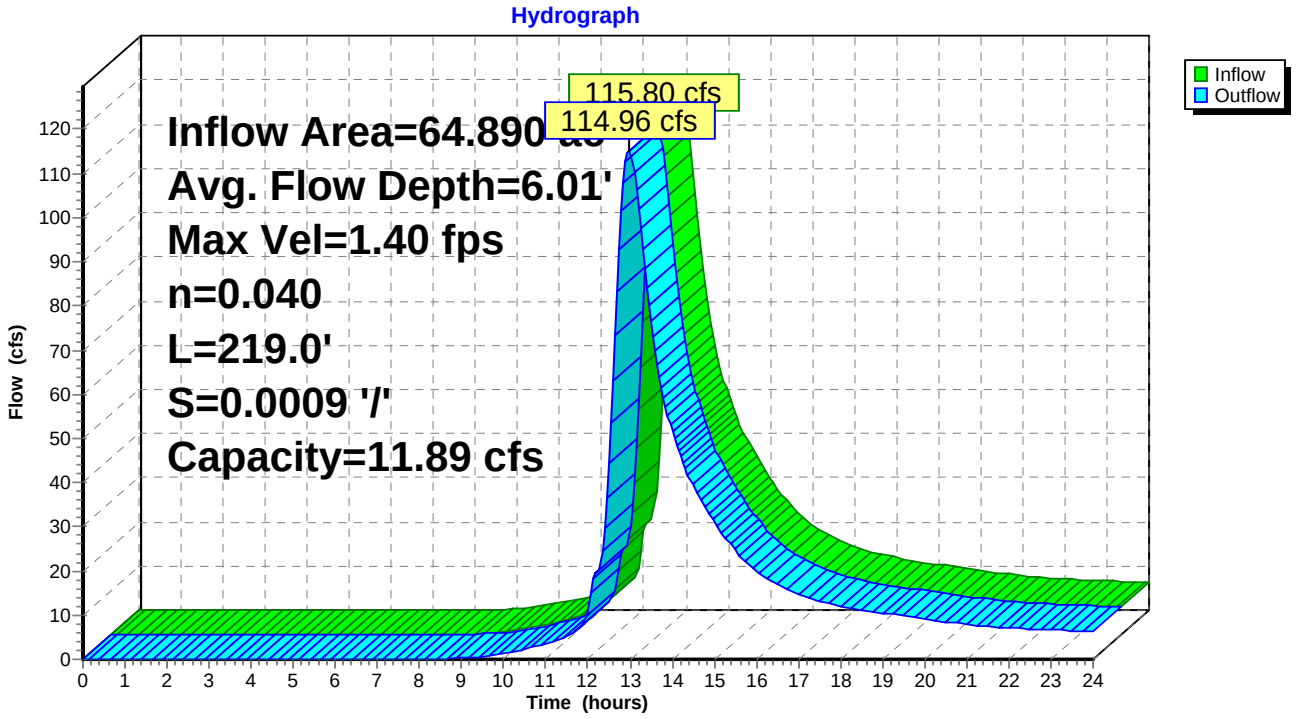
Peak Storage= 17,971 cf @ 12.93 hrs
Average Depth at Peak Storage= 6.01' , Surface Width= 34.05'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 11.89 cfs

10.00' x 1.00' deep channel, n= 0.040
Side Slope Z-value= 2.0 '/' Top Width= 14.00'
Length= 219.0' Slope= 0.0009 '/'
Inlet Invert= 403.20', Outlet Invert= 403.00'

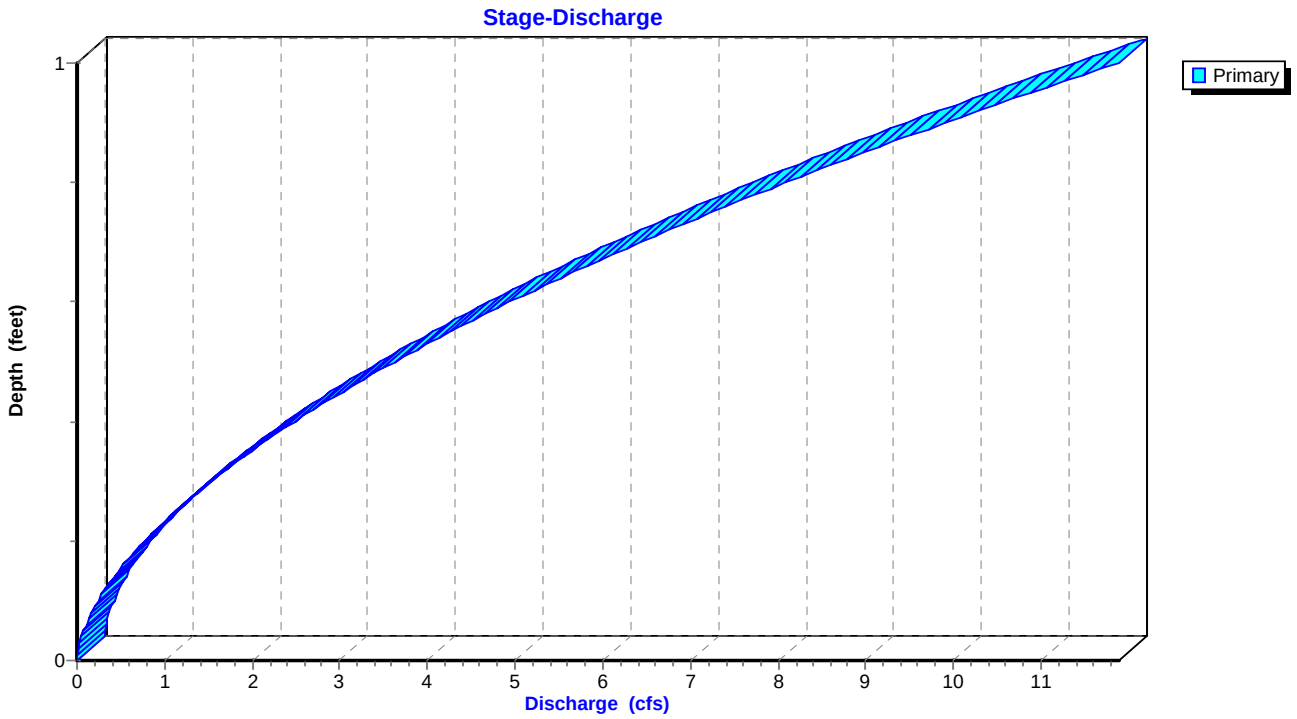


‡

Reach R-4: R-4



Reach R-4: R-4


Stage-Discharge
Primary
Depth (feet)
Discharge (cfs)
0
1
0
1
2
3
4
5
6
7
8
9
10
11

Summary for Pond Pond 1b: Pond 1b

Inflow Area = 16.120 ac, 27.61% Impervious, Inflow Depth > 5.66" for 100-yr event
Inflow = 92.48 cfs @ 12.16 hrs, Volume= 7.602 af
Outflow = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af, Atten= 71%, Lag= 24.6 min
Primary = 26.68 cfs @ 12.57 hrs, Volume= 7.447 af
Routed to Reach R-1 : R-1

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 445.91' @ 12.57 hrs Surf.Area= 38,011 sf Storage= 118,084 cf

Plug-Flow detention time= 59.8 min calculated for 7.432 af (98% of inflow)
Center-of-Mass det. time= 47.8 min (866.7 - 818.9)

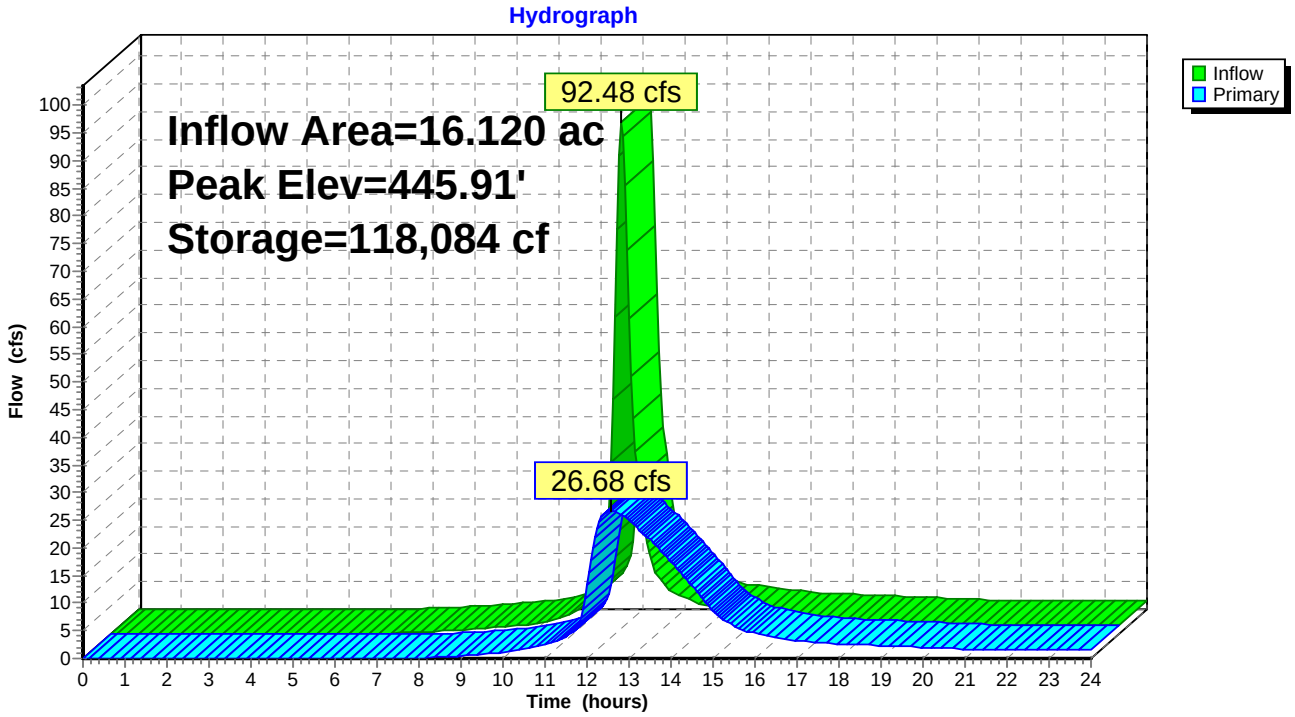
Volume	Invert	Avail.Storage	Storage Description
#1	441.50'	141,234 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
441.50	1,192	0	0
442.00	10,772	2,991	2,991
444.00	34,794	45,566	48,557
446.00	38,163	72,957	121,514
446.50	40,718	19,720	141,234

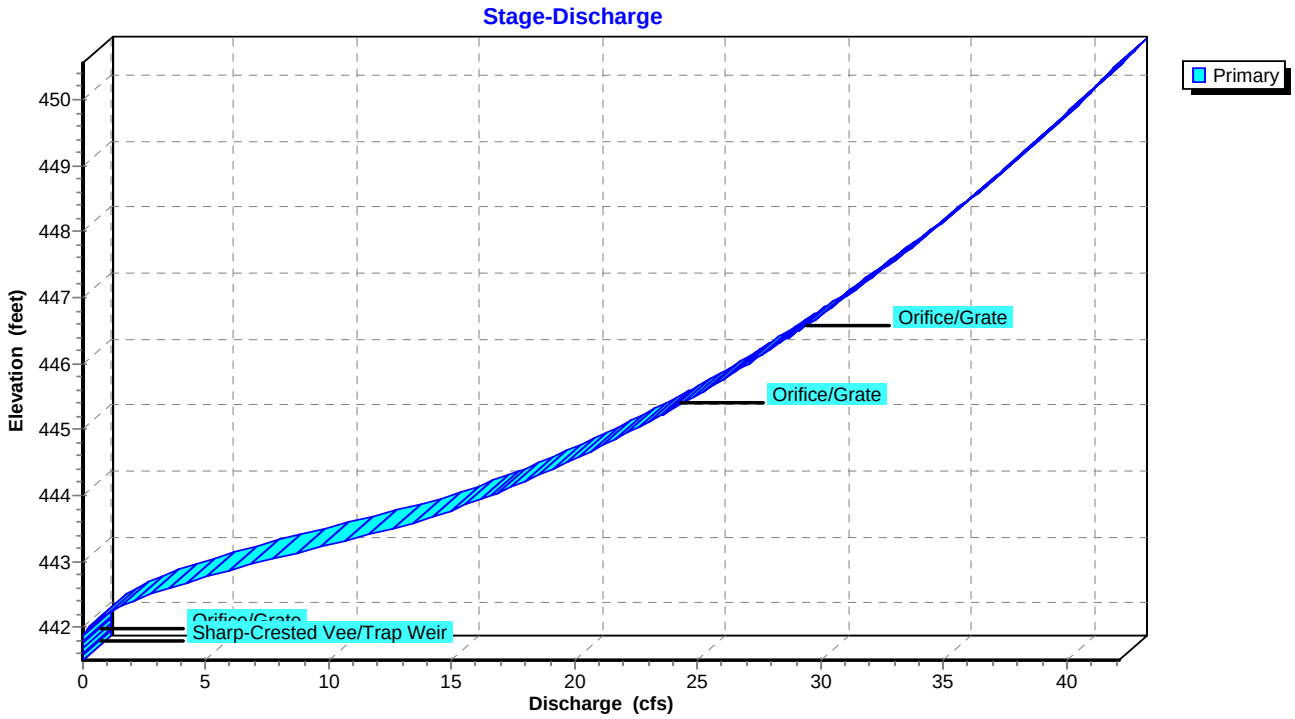
Device	Routing	Invert	Outlet Devices
#1	Primary	441.80'	**24.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 1	441.60'	**25.6 deg x 2.0' long x 4.00' rise Sharp-Crested Vee/Trap Weir** Cv= 2.64 (C= 3.30)
#3	Device 1	445.23'	**52.0" W x 64.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	446.40'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=26.67 cfs @ 12.57 hrs HW=445.91' (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 26.67 cfs @ 8.49 fps)
└**2=Sharp-Crested Vee/Trap Weir** (Passes < 79.87 cfs potential flow)
└**3=Orifice/Grate** (Passes < 7.76 cfs potential flow)
└**4=Orifice/Grate** (Controls 0.00 cfs)

Pond Pond 1b: Pond 1b



Pond Pond 1b: Pond 1b



Summary for Pond Pond 1c: Pond 1c

Inflow Area = 6.750 ac, 0.00% Impervious, Inflow Depth > 6.95" for 100-yr event
Inflow = 29.44 cfs @ 12.44 hrs, Volume= 3.909 af
Outflow = 28.90 cfs @ 12.50 hrs, Volume= 3.146 af, Atten= 2%, Lag= 3.7 min
Discarded = 18.90 cfs @ 12.50 hrs, Volume= 0.939 af
Primary = 10.00 cfs @ 12.50 hrs, Volume= 2.207 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 414.50' @ 12.50 hrs Surf.Area= 11,746 sf Storage= 46,995 cf

Plug-Flow detention time= 133.2 min calculated for 3.139 af (80% of inflow)
Center-of-Mass det. time= 60.0 min (871.2 - 811.2)

Volume	Invert	Avail.Storage	Storage Description
#1	409.00'	53,054 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

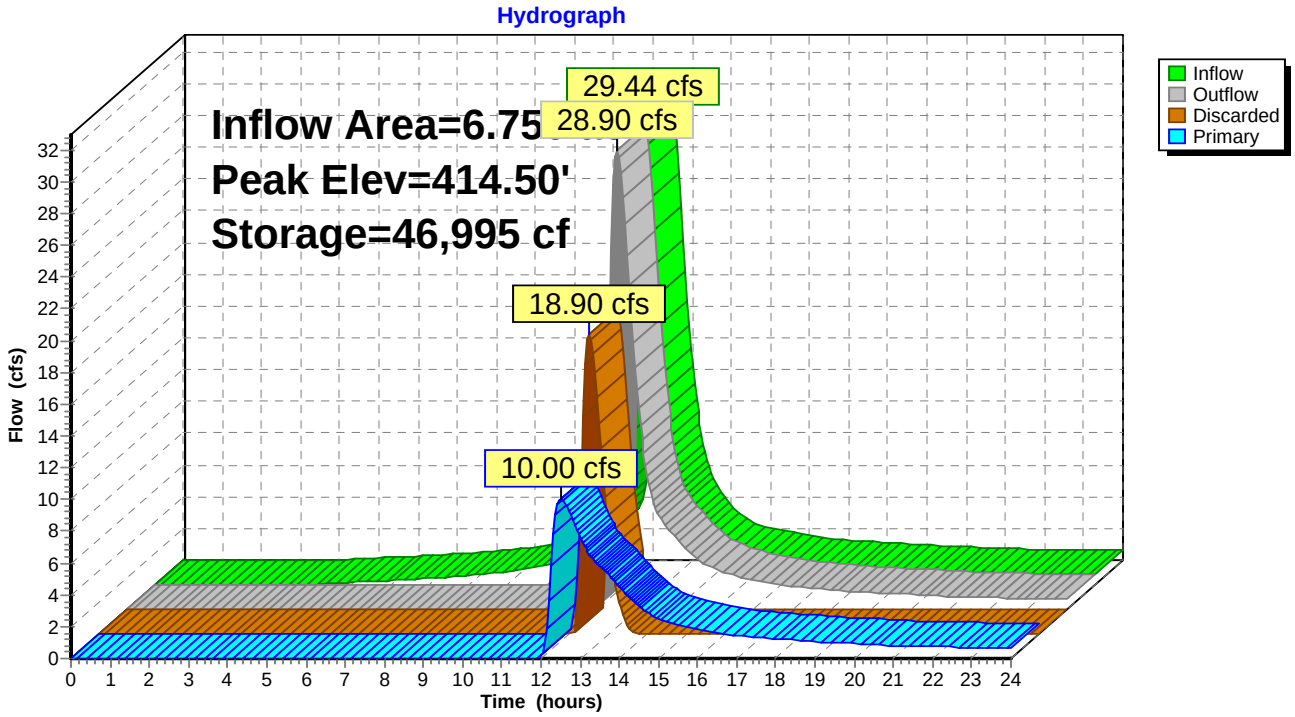
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
409.00	5,642	0	0
410.00	6,603	6,123	6,123
412.00	8,732	15,335	21,458
414.00	11,115	19,847	41,305
415.00	12,383	11,749	53,054

Device	Routing	Invert	Outlet Devices
#1	Primary	408.00'	**24.0" Round Culvert** L= 62.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 408.00' / 407.30' S= 0.0113 '/' Cc= 0.900 n= 0.012 Corrugated PP, smooth interior, Flow Area= 3.14 sf
#2	Device 1	413.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Discarded	414.00'	**20.0' long x 14.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.64 2.67 2.70 2.65 2.64 2.65 2.65 2.63

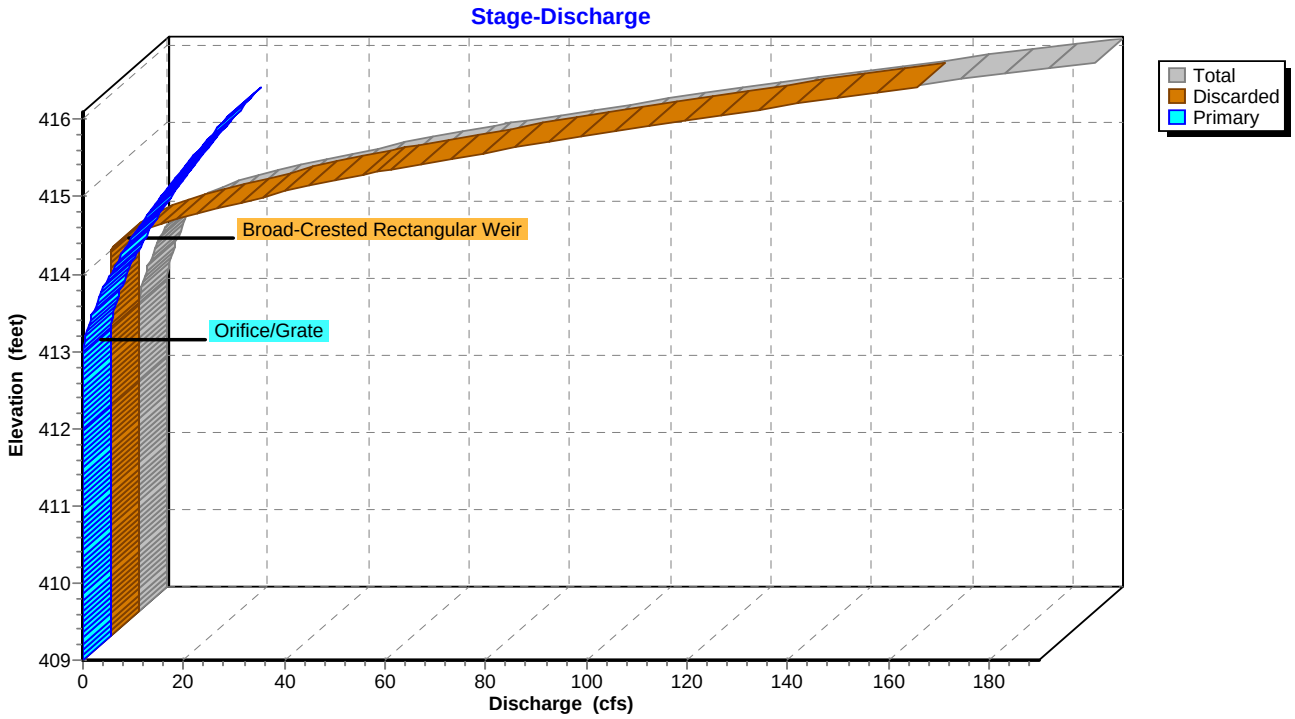
Discarded OutFlow Max=18.85 cfs @ 12.50 hrs HW=414.50' (Free Discharge)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 18.85 cfs @ 1.89 fps)

Primary OutFlow Max=10.00 cfs @ 12.50 hrs HW=414.50' (Free Discharge)
└**1=Culvert** (Passes 10.00 cfs of 35.47 cfs potential flow)
└**2=Orifice/Grate** (Orifice Controls 10.00 cfs @ 3.93 fps)

Pond Pond 1c: Pond 1c



Pond Pond 1c: Pond 1c



Summary for Pond Pond 1d: Pond 1d

Inflow Area = 17.410 ac, 0.00% Impervious, Inflow Depth > 6.94" for 100-yr event
Inflow = 66.94 cfs @ 12.55 hrs, Volume= 10.063 af
Outflow = 47.91 cfs @ 12.90 hrs, Volume= 6.373 af, Atten= 28%, Lag= 21.0 min
Discarded = 37.46 cfs @ 12.90 hrs, Volume= 2.398 af
Primary = 10.45 cfs @ 12.90 hrs, Volume= 3.975 af
Routed to Reach R-3 : R-3

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 416.54' @ 12.90 hrs Surf.Area= 41,263 sf Storage= 202,162 cf

Plug-Flow detention time= 207.0 min calculated for 6.373 af (63% of inflow)
Center-of-Mass det. time= 109.2 min (927.4 - 818.2)

Volume	Invert	Avail.Storage	Storage Description
#1	408.00'	221,389 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

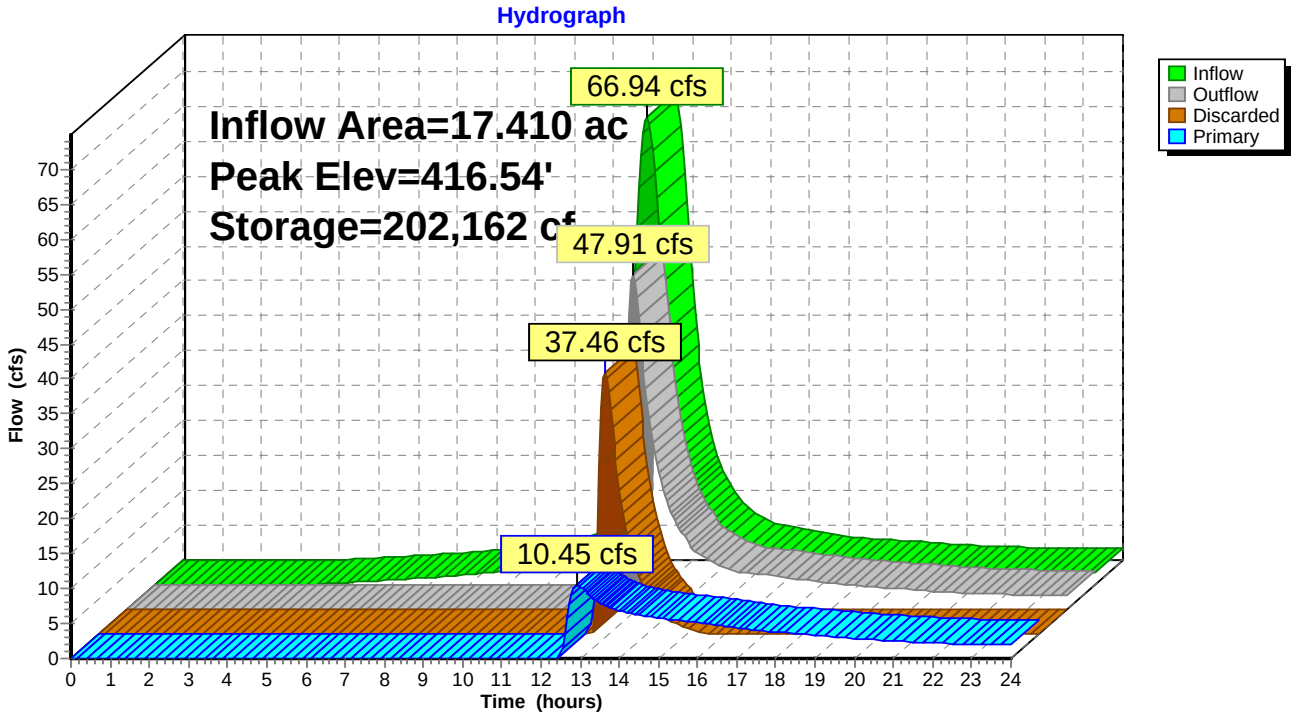
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
408.00	800	0	0
410.00	16,607	17,407	17,407
412.00	24,332	40,939	58,346
414.00	28,916	53,248	111,594
416.00	39,732	68,648	180,242
417.00	42,561	41,147	221,389

Device	Routing	Invert	Outlet Devices
#1	Primary	415.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	416.00'	**35.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

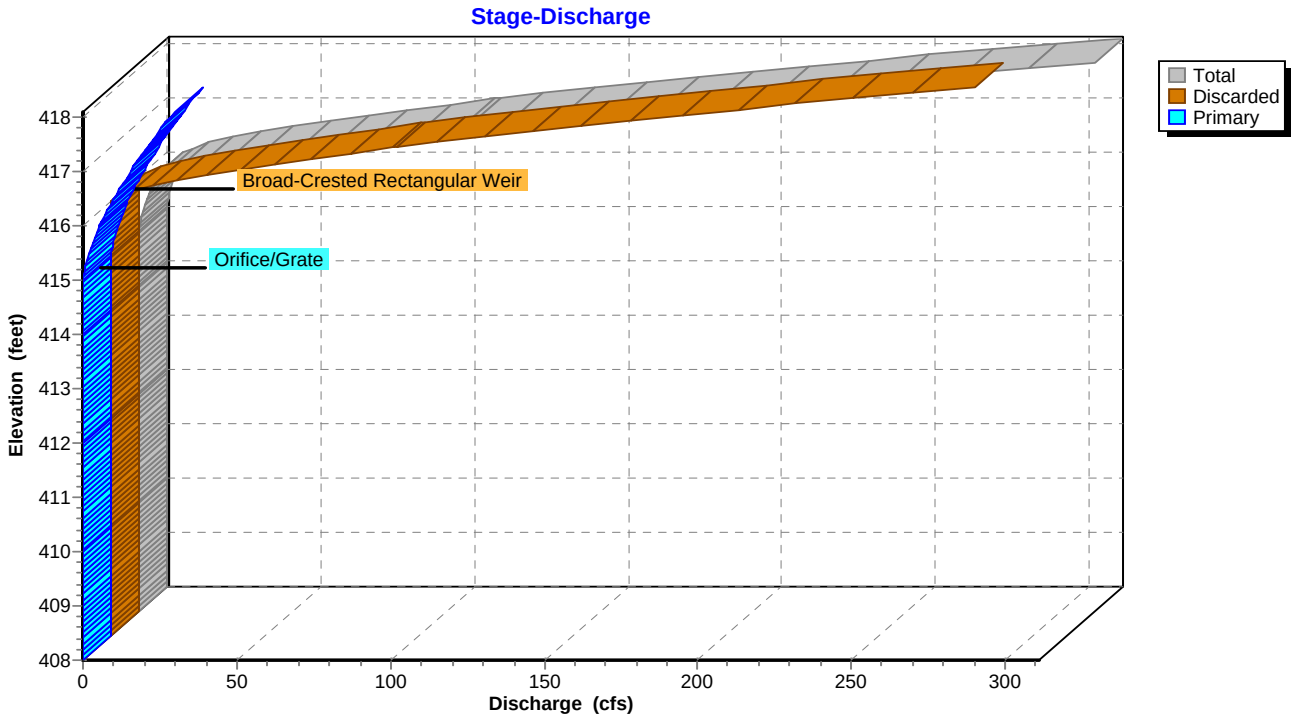
Discarded OutFlow Max=37.30 cfs @ 12.90 hrs HW=416.54' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 37.30 cfs @ 1.97 fps)

Primary OutFlow Max=10.44 cfs @ 12.90 hrs HW=416.54' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 10.44 cfs @ 3.99 fps)

Pond Pond 1d: Pond 1d



Pond Pond 1d: Pond 1d



Summary for Pond Pond 1e: Pond 1e

Inflow Area = 1.060 ac, 65.09% Impervious, Inflow Depth > 7.61" for 100-yr event
Inflow = 11.29 cfs @ 12.00 hrs, Volume= 0.672 af
Outflow = 9.72 cfs @ 12.06 hrs, Volume= 0.453 af, Atten= 14%, Lag= 3.4 min
Primary = 9.72 cfs @ 12.06 hrs, Volume= 0.453 af
Routed to Reach R-4 : R-4

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 406.68' @ 12.06 hrs Surf.Area= 8,303 sf Storage= 12,102 cf

Plug-Flow detention time= 178.4 min calculated for 0.453 af (67% of inflow)
Center-of-Mass det. time= 81.3 min (846.9 - 765.6)

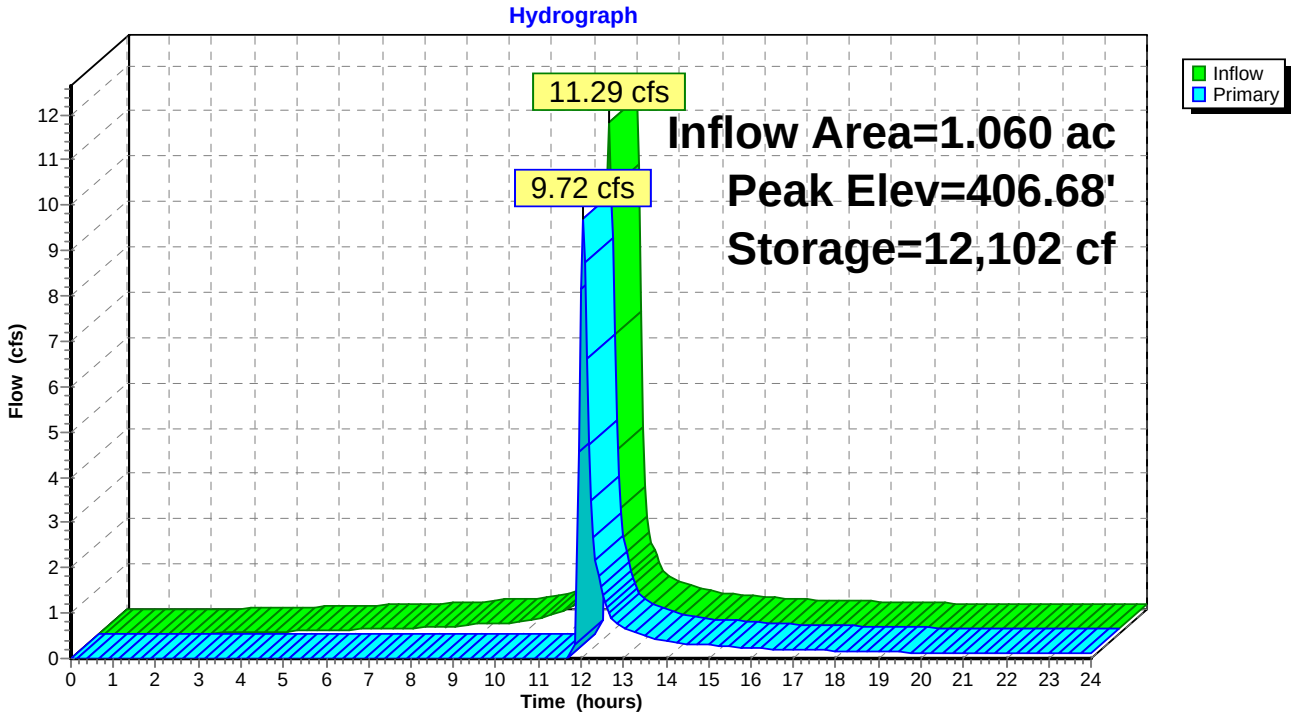
Volume	Invert	Avail.Storage	Storage Description
#1	405.00'	12,667 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
405.00	6,101	0	0
406.00	7,395	6,748	6,748
406.35	7,857	2,669	9,417
406.75	8,394	3,250	12,667

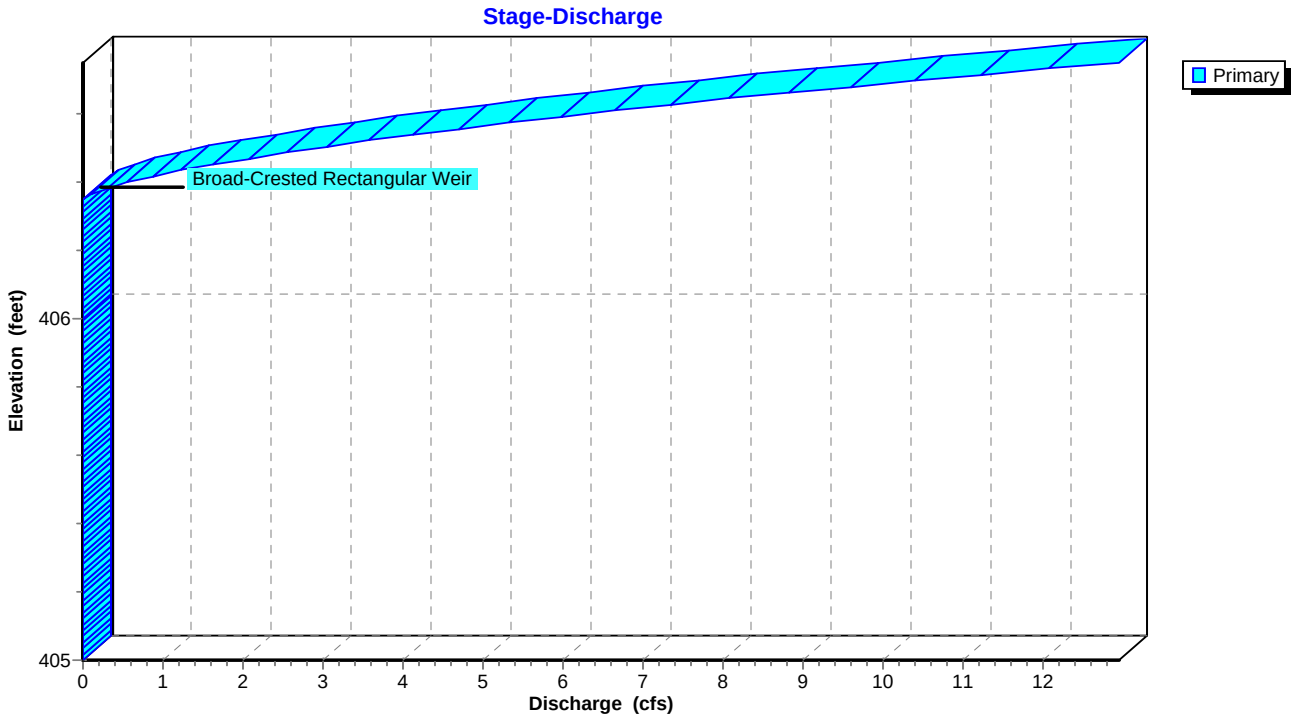
Device	Routing	Invert	Outlet Devices
#1	Primary	406.35'	**20.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=9.58 cfs @ 12.06 hrs HW=406.68' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 9.58 cfs @ 1.45 fps)

Pond Pond 1e: Pond 1e



Pond Pond 1e: Pond 1e



Summary for Pond Pond 3: Pond 3

Inflow Area = 3.510 ac, 0.00% Impervious, Inflow Depth > 6.98" for 100-yr event
Inflow = 22.85 cfs @ 12.18 hrs, Volume= 2.042 af
Outflow = 14.55 cfs @ 12.37 hrs, Volume= 2.011 af, Atten= 36%, Lag= 11.8 min
Primary = 14.55 cfs @ 12.37 hrs, Volume= 2.011 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 426.67' @ 12.37 hrs Surf.Area= 7,599 sf Storage= 21,341 cf

Plug-Flow detention time= 41.7 min calculated for 2.007 af (98% of inflow)
Center-of-Mass det. time= 32.4 min (826.5 - 794.0)

Volume	Invert	Avail.Storage	Storage Description
#1	423.00'	37,002 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

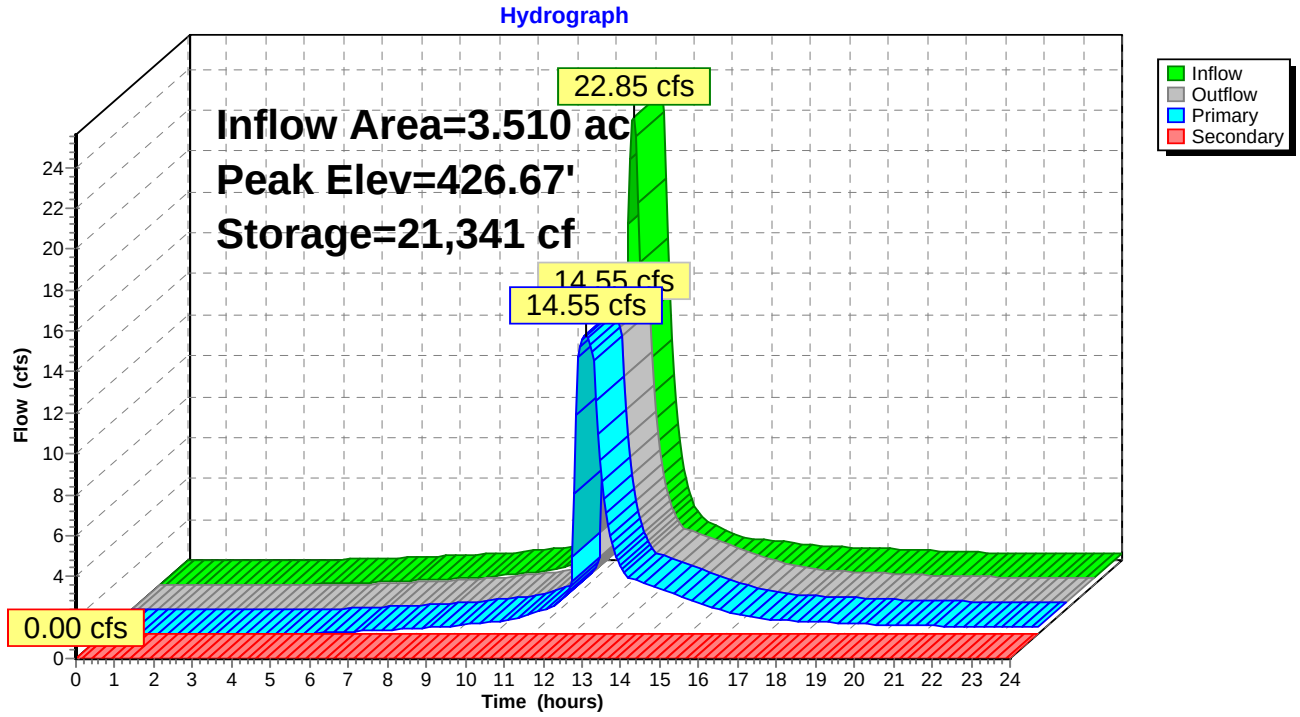
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
423.00	4,085	0	0
424.00	5,026	4,556	4,556
426.00	6,884	11,910	16,466
428.00	9,007	15,891	32,357
428.50	9,575	4,646	37,002

Device	Routing	Invert	Outlet Devices
#1	Primary	423.00'	**18.0" Round Culvert** L= 46.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 423.00' / 422.00' S= 0.0217 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 1.77 sf
#2	Device 1	423.00'	**9.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	425.00'	**2.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 0.5' Crest Height
#4	Device 1	427.00'	**20.4" W x 37.2" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	427.50'	**25.0' long x 12.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.57 2.62 2.70 2.67 2.66 2.67 2.66 2.64

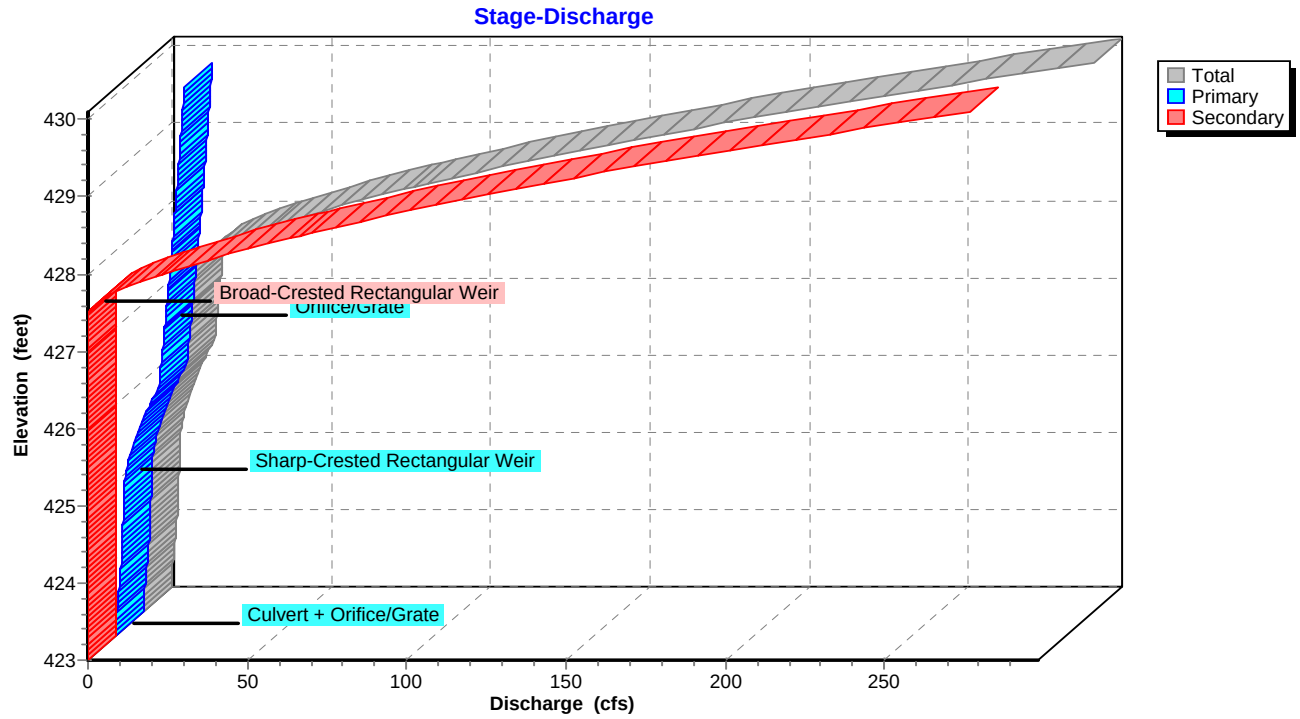
Primary OutFlow Max=14.53 cfs @ 12.37 hrs HW=426.66' (Free Discharge)
└**1=Culvert** (Inlet Controls 14.53 cfs @ 8.22 fps)
  ├**2=Orifice/Grate** (Passes < 3.86 cfs potential flow)
  ├**3=Sharp-Crested Rectangular Weir** (Passes < 16.48 cfs potential flow)
  └**4=Orifice/Grate** (Controls 0.00 cfs)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=423.00' (Free Discharge)
└**5=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond Pond 3: Pond 3



Pond Pond 3: Pond 3



Summary for Pond Sed-2: Sed Trap 2

Inflow Area = 0.760 ac, 0.00% Impervious, Inflow Depth > 6.15" for 100-yr event
Inflow = 5.77 cfs @ 12.07 hrs, Volume= 0.390 af
Outflow = 5.62 cfs @ 12.10 hrs, Volume= 0.332 af, Atten= 3%, Lag= 1.9 min
Discarded = 5.62 cfs @ 12.10 hrs, Volume= 0.332 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 408.04' @ 12.10 hrs Surf.Area= 2,613 sf Storage= 3,336 cf

Plug-Flow detention time= 99.1 min calculated for 0.332 af (85% of inflow)
Center-of-Mass det. time= 34.4 min (838.4 - 804.0)

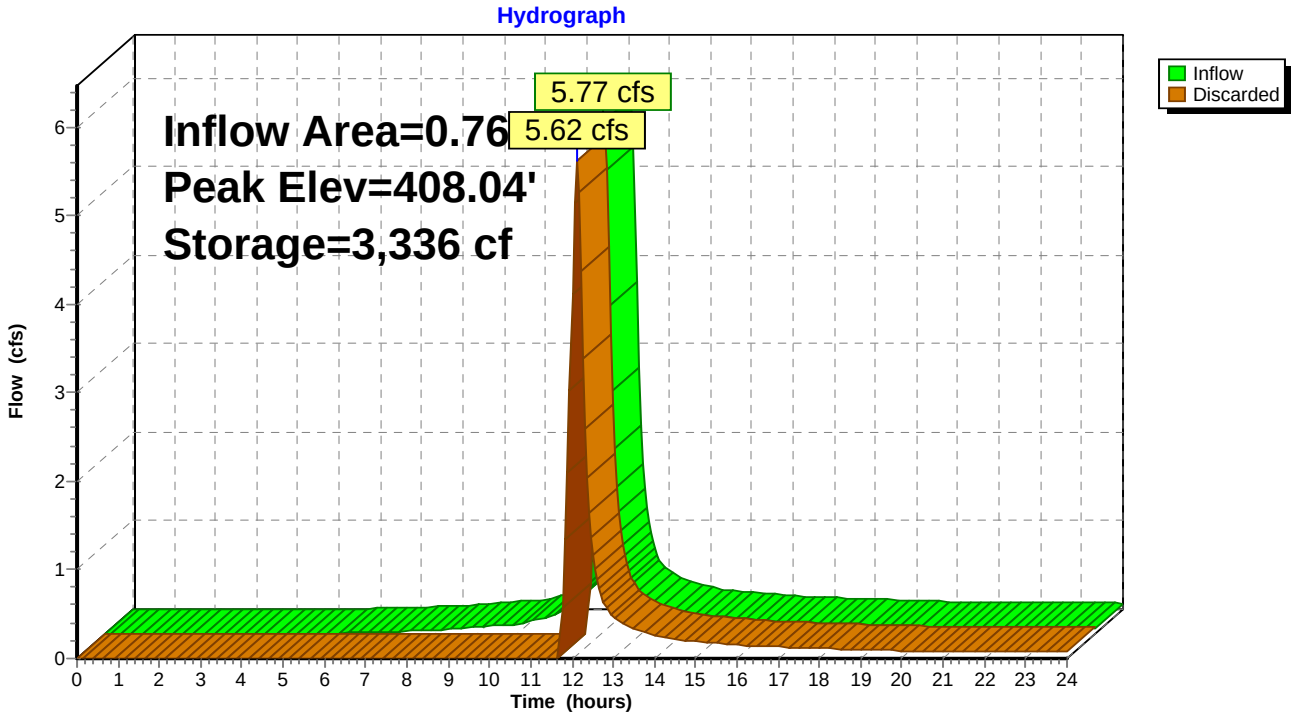
Volume	Invert	Avail.Storage	Storage Description
#1	406.00'	5,278 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
406.00	680	0	0
408.00	2,559	3,239	3,239
408.67	3,529	2,039	5,278

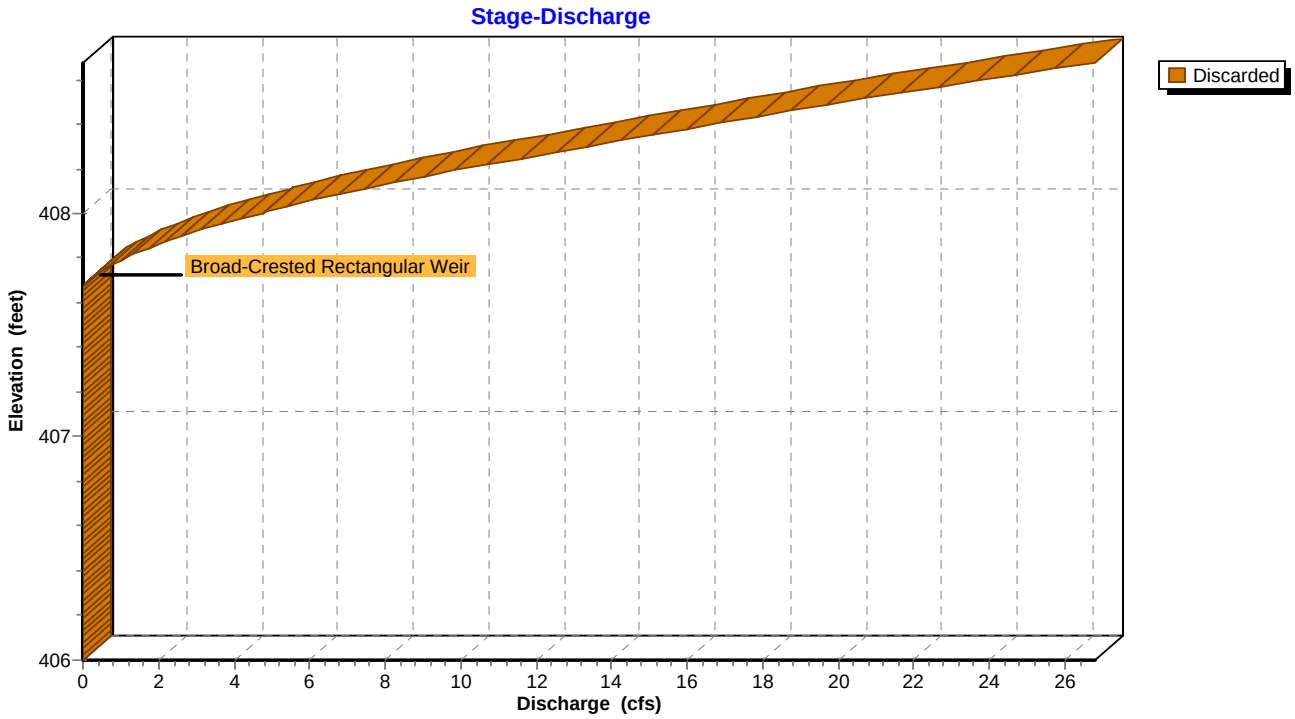
Device	Routing	Invert	Outlet Devices
#1	Discarded	407.67'	**10.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Discarded OutFlow Max=5.59 cfs @ 12.10 hrs HW=408.04' (Free Discharge)
↑**1=Broad-Crested Rectangular Weir** (Weir Controls 5.59 cfs @ 1.53 fps)

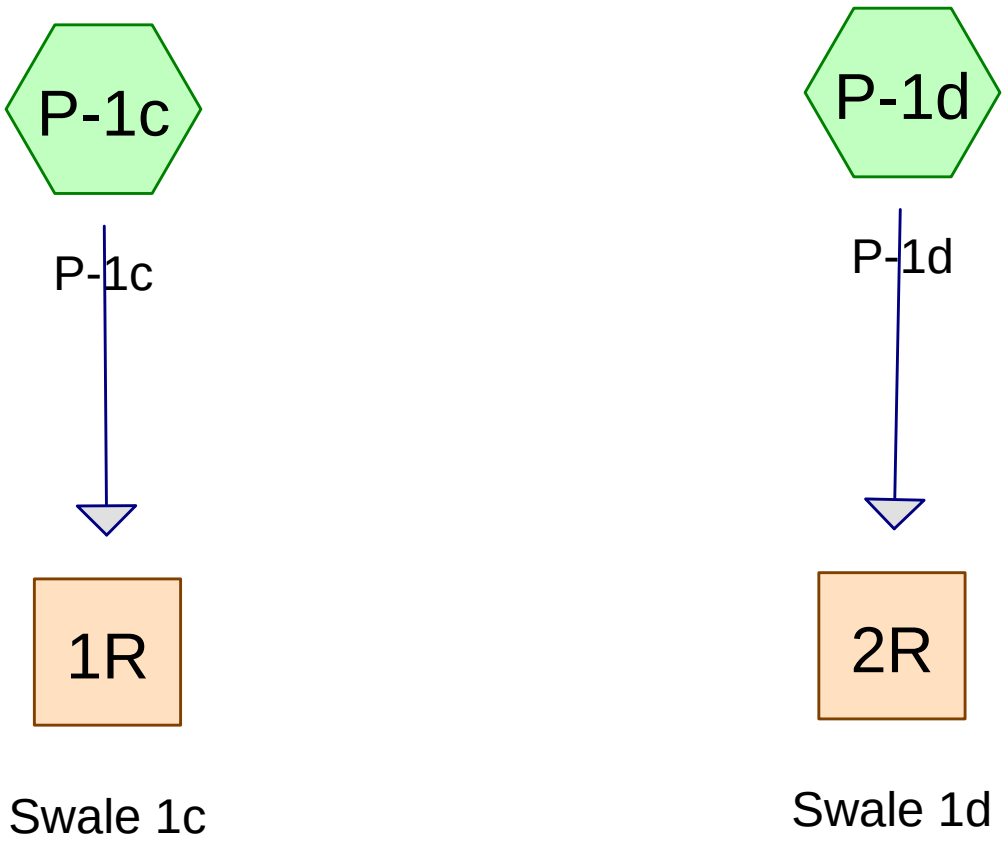
Pond Sed-2: Sed Trap 2



Pond Sed-2: Sed Trap 2



Grass-Lined Swale HydroCAD Report



Subcat Reach Pond Link

Routing Diagram for 1903601 - Swales
Prepared by Microsoft, Printed 5/5/2021
HydroCAD® 10.00-22 s/n 10621 © 2018 HydroCAD Software Solutions LLC

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>1.66"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=11.12 cfs 1.437 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>1.66"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=13.69 cfs 2.002 af

Reach 1R: Swale 1c Avg. Flow Depth=0.45' Max Vel=2.80 fps Inflow=11.12 cfs 1.437 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=11.01 cfs 1.429 af

Reach 2R: Swale 1d Avg. Flow Depth=0.51' Max Vel=2.98 fps Inflow=13.69 cfs 2.002 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=13.63 cfs 1.995 af

Summary for Subcatchment P-1c: P-1c

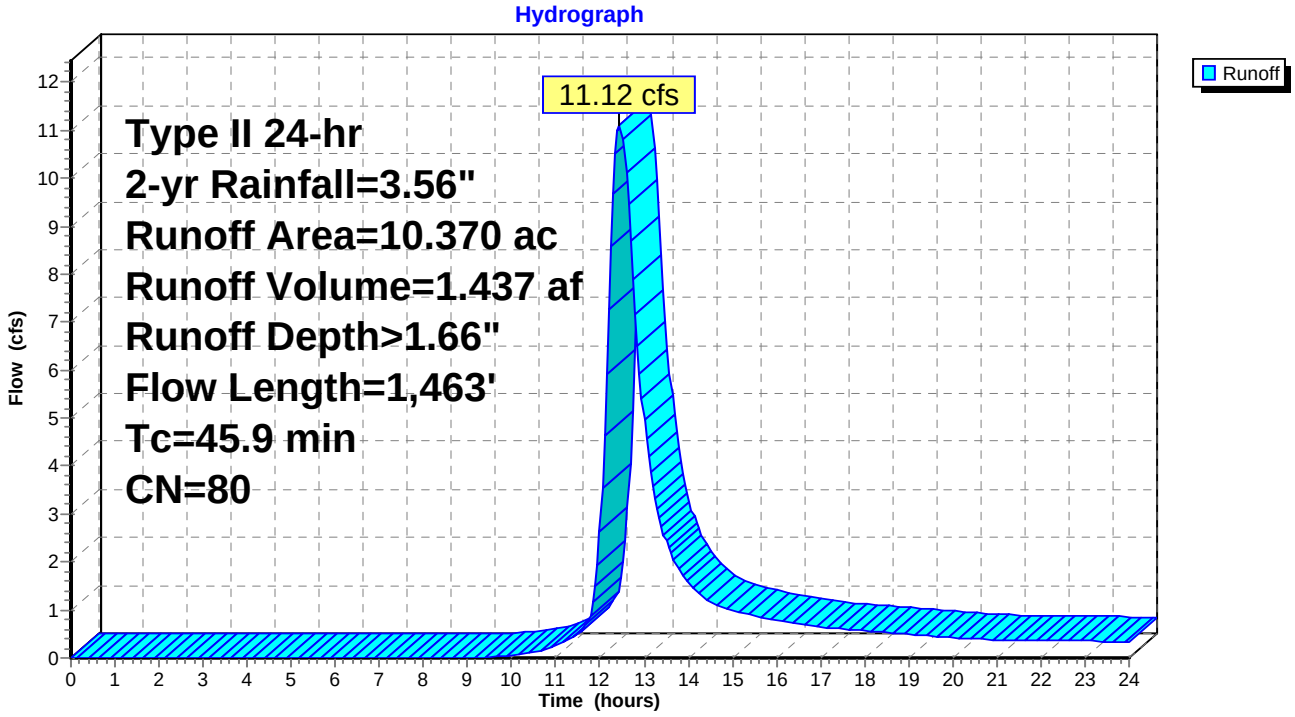
Runoff = 11.12 cfs @ 12.45 hrs, Volume= 1.437 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

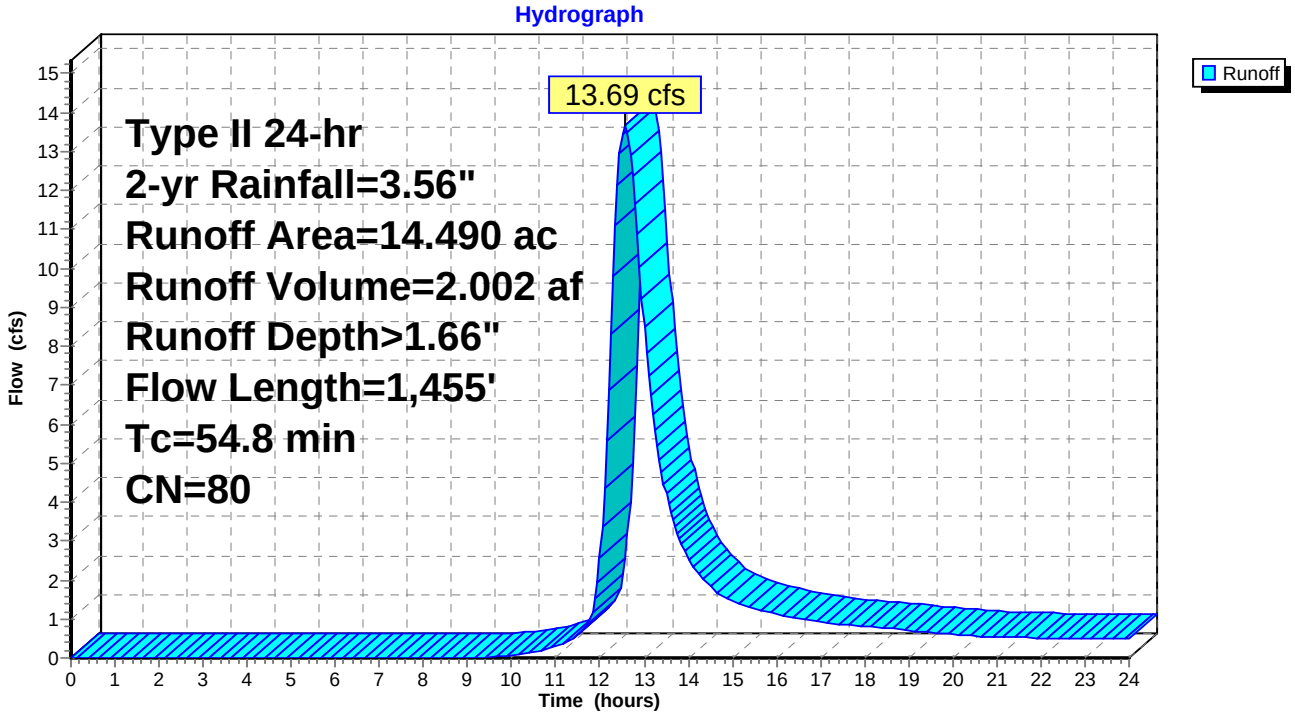
Runoff = 13.69 cfs @ 12.58 hrs, Volume= 2.002 af, Depth> 1.66"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.56"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 1.66" for 2-yr event
Inflow = 11.12 cfs @ 12.45 hrs, Volume= 1.437 af
Outflow = 11.01 cfs @ 12.56 hrs, Volume= 1.429 af, Atten= 1%, Lag= 6.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.80 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 1.11 fps, Avg. Travel Time= 9.0 min

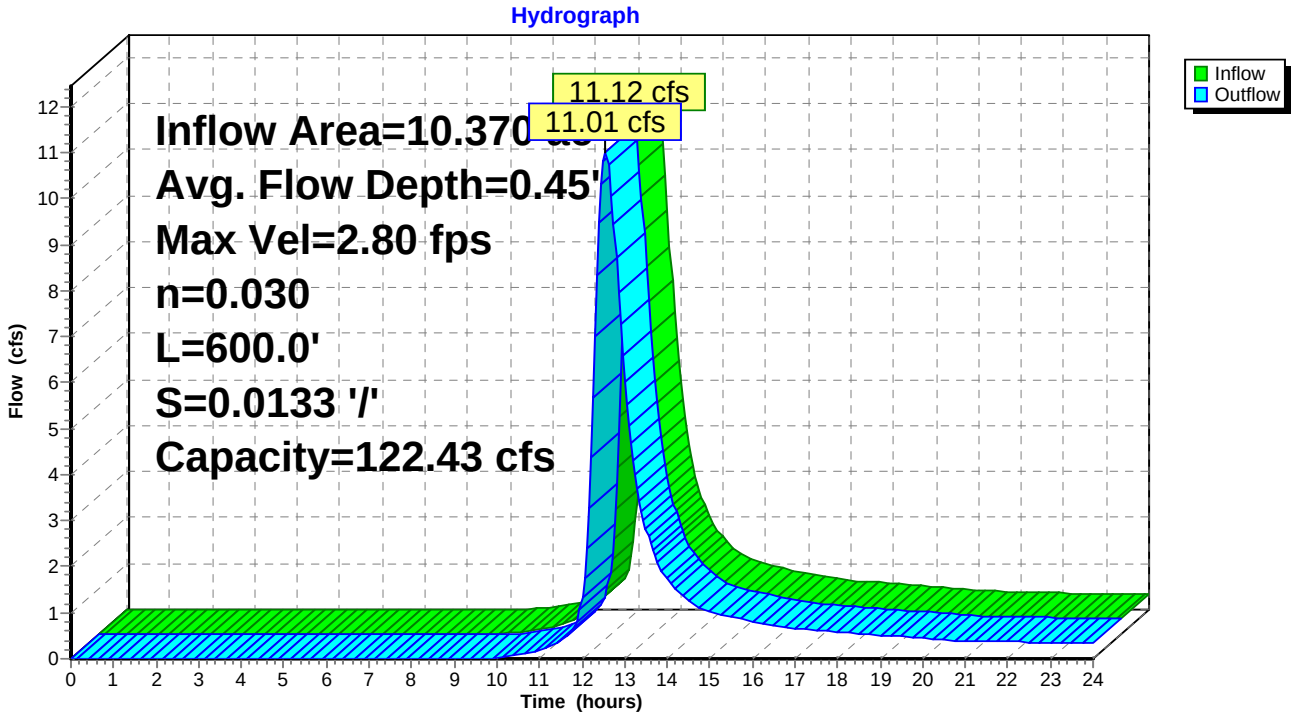
Peak Storage= 2,363 cf @ 12.50 hrs
Average Depth at Peak Storage= 0.45'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

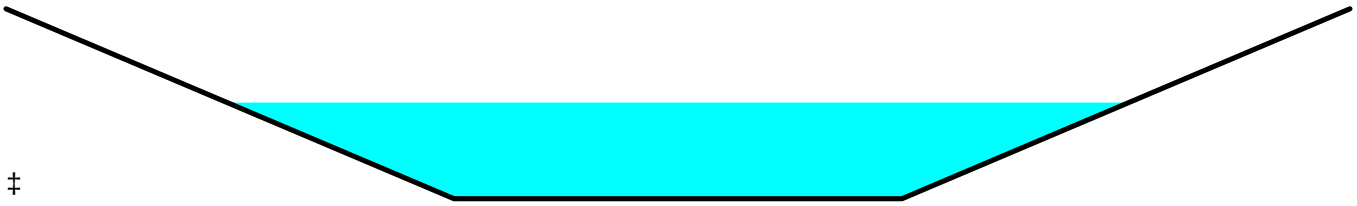
Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 1.66" for 2-yr event
Inflow = 13.69 cfs @ 12.58 hrs, Volume= 2.002 af
Outflow = 13.63 cfs @ 12.64 hrs, Volume= 1.995 af, Atten= 0%, Lag= 4.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.98 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.24 fps, Avg. Travel Time= 6.0 min

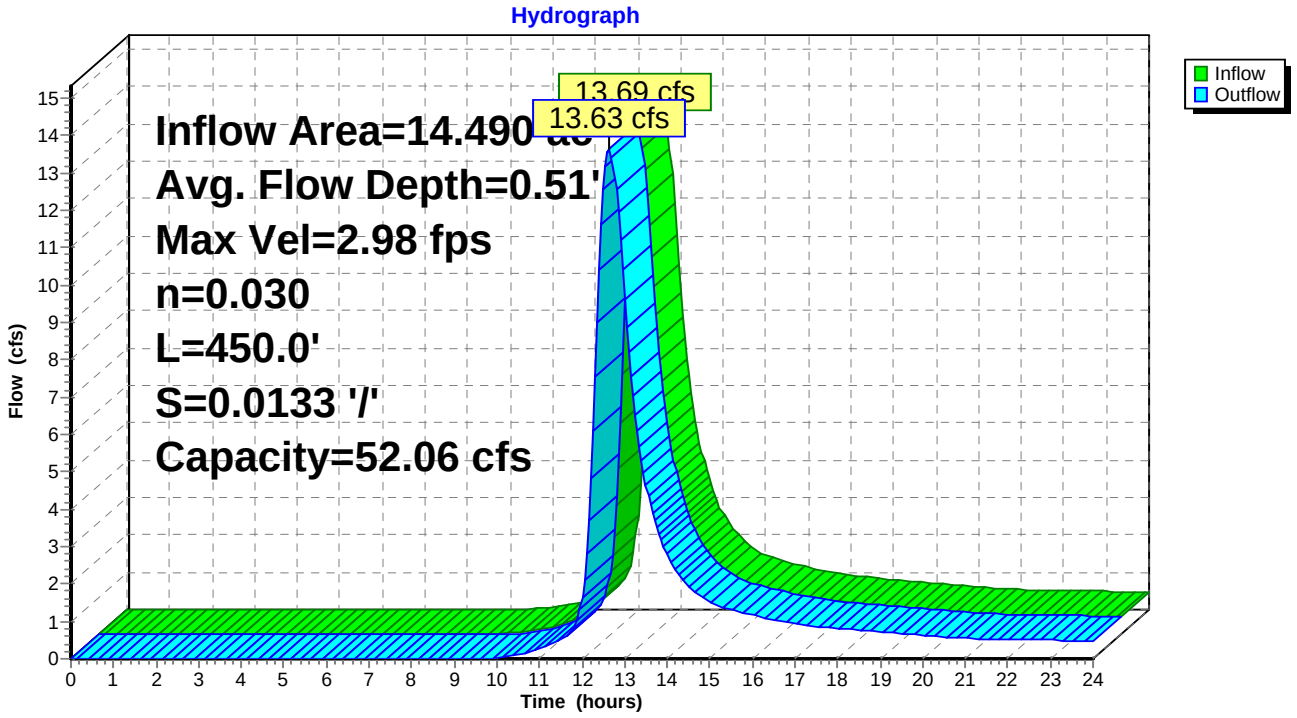
Peak Storage= 2,059 cf @ 12.60 hrs
Average Depth at Peak Storage= 0.51'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>2.53"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=17.16 cfs 2.190 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>2.53"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=21.11 cfs 3.052 af

Reach 1R: Swale 1c Avg. Flow Depth=0.57' Max Vel=3.18 fps Inflow=17.16 cfs 2.190 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=17.04 cfs 2.181 af

Reach 2R: Swale 1d Avg. Flow Depth=0.64' Max Vel=3.38 fps Inflow=21.11 cfs 3.052 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=21.05 cfs 3.044 af

Summary for Subcatchment P-1c: P-1c

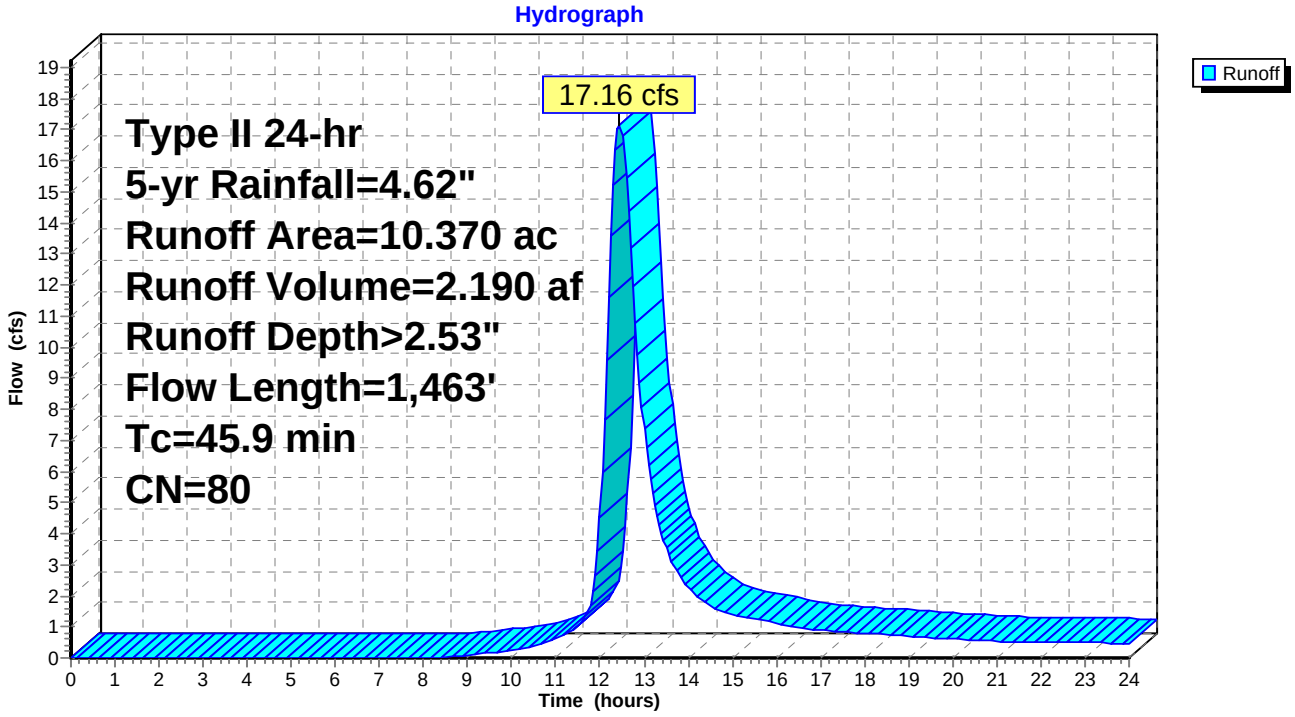
Runoff = 17.16 cfs @ 12.44 hrs, Volume= 2.190 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

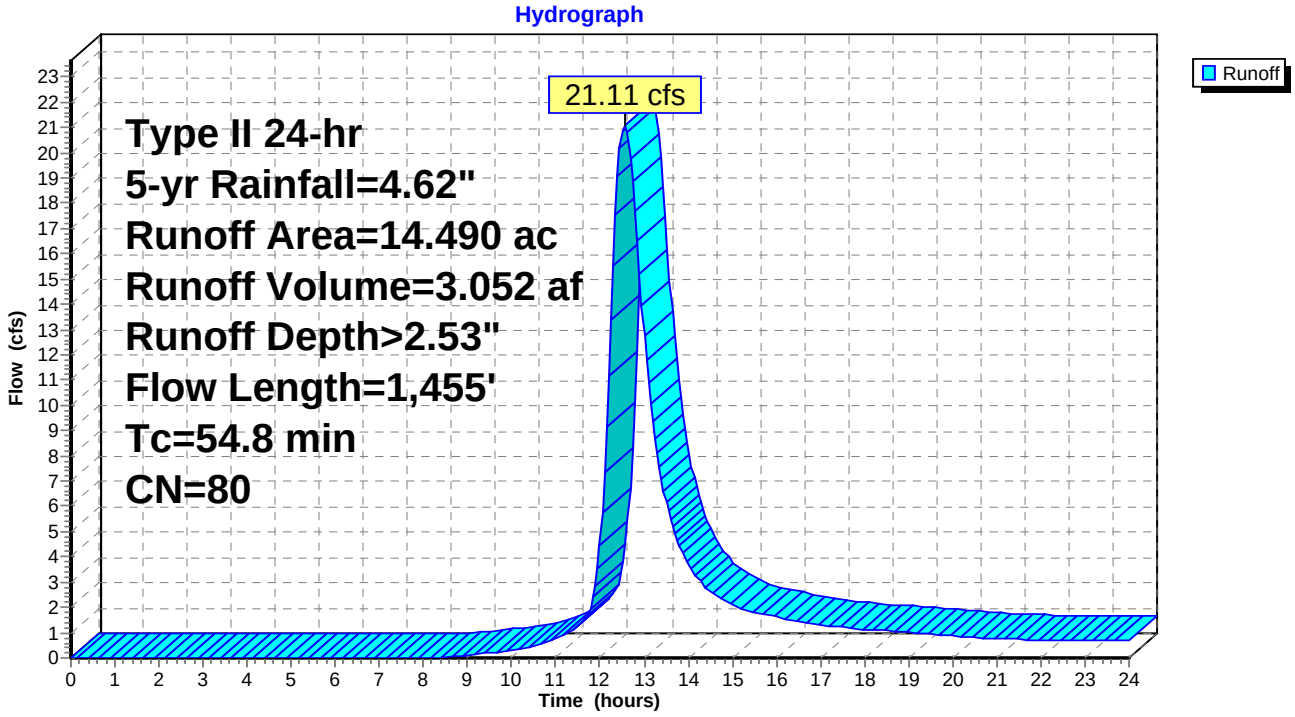
Runoff = 21.11 cfs @ 12.56 hrs, Volume= 3.052 af, Depth> 2.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 5-yr Rainfall=4.62"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 2.53" for 5-yr event
Inflow = 17.16 cfs @ 12.44 hrs, Volume= 2.190 af
Outflow = 17.04 cfs @ 12.54 hrs, Volume= 2.181 af, Atten= 1%, Lag= 5.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.18 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 1.22 fps, Avg. Travel Time= 8.2 min

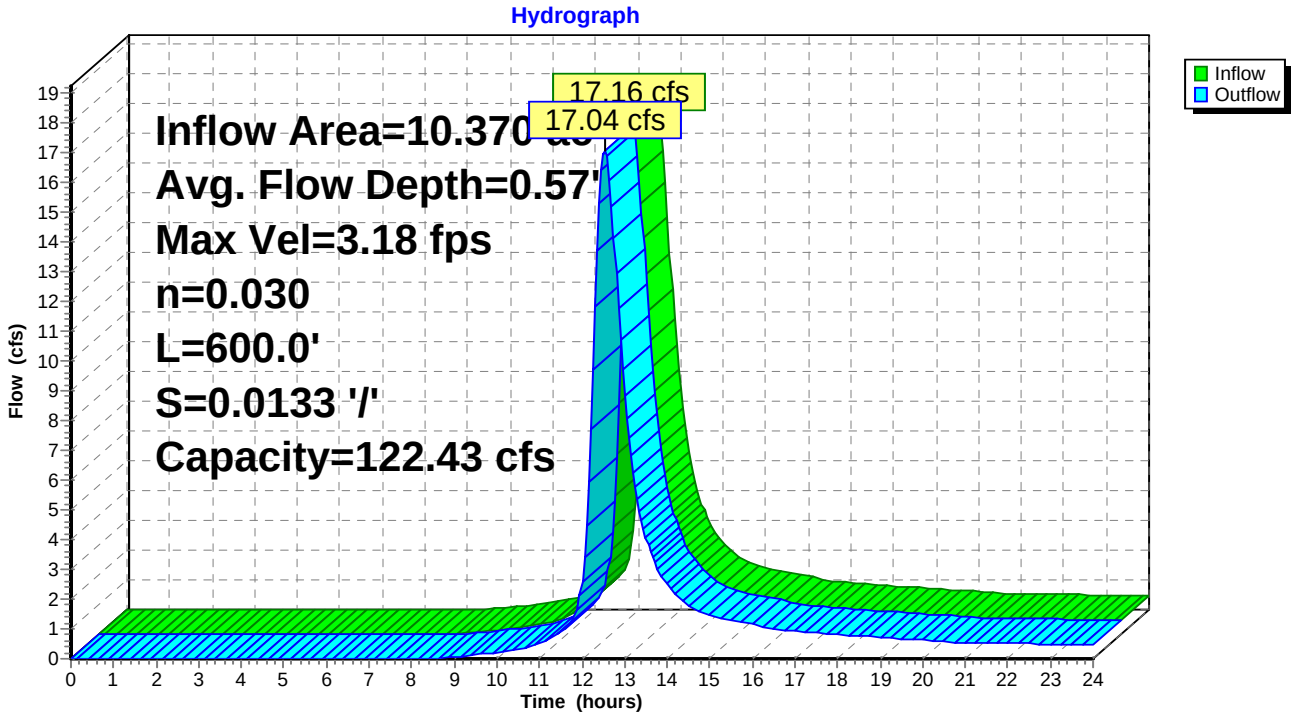
Peak Storage= 3,216 cf @ 12.48 hrs
Average Depth at Peak Storage= 0.57'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

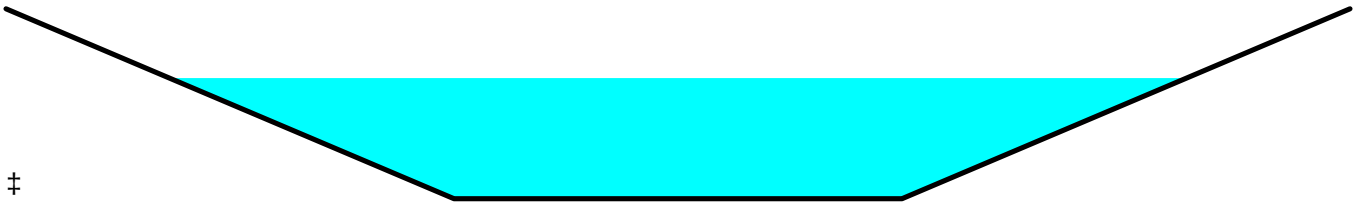
Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 2.53" for 5-yr event
Inflow = 21.11 cfs @ 12.56 hrs, Volume= 3.052 af
Outflow = 21.05 cfs @ 12.62 hrs, Volume= 3.044 af, Atten= 0%, Lag= 3.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.38 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.36 fps, Avg. Travel Time= 5.5 min

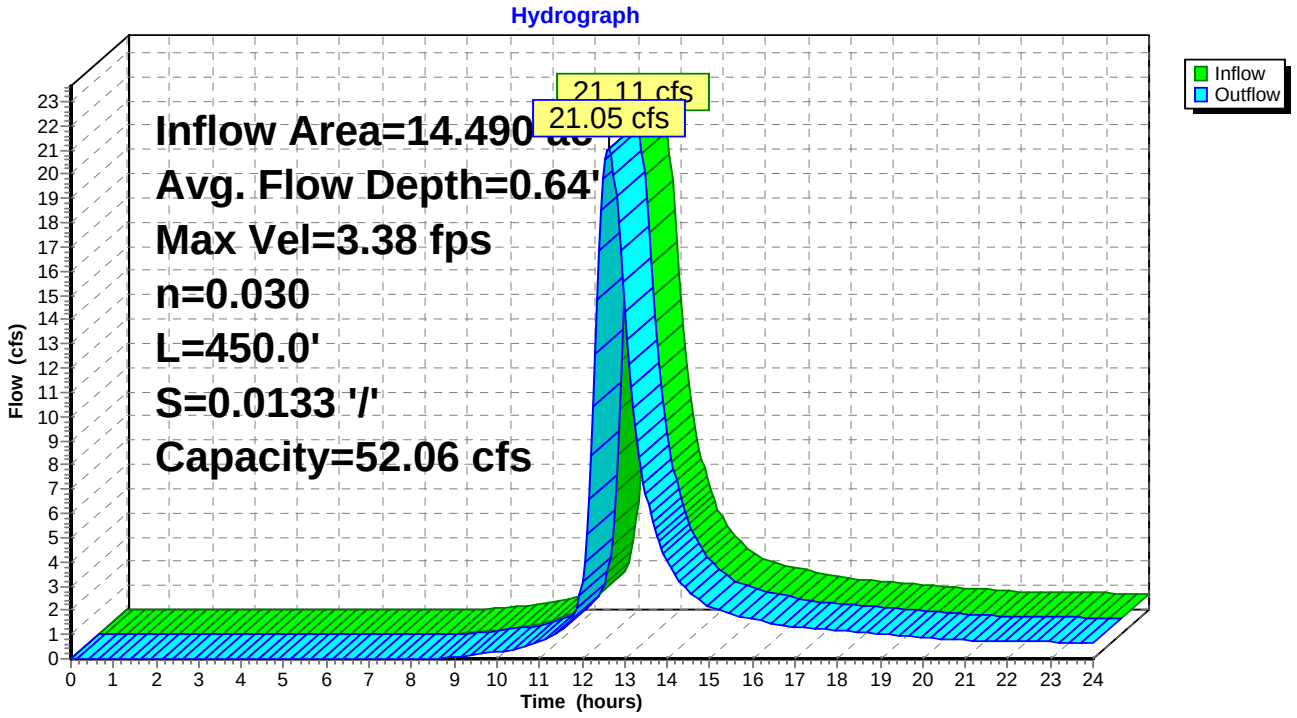
Peak Storage= 2,807 cf @ 12.59 hrs
Average Depth at Peak Storage= 0.64'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>3.30"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=22.38 cfs 2.848 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>3.29"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=27.54 cfs 3.970 af

Reach 1R: Swale 1c Avg. Flow Depth=0.65' Max Vel=3.43 fps Inflow=22.38 cfs 2.848 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=22.26 cfs 2.838 af

Reach 2R: Swale 1d Avg. Flow Depth=0.73' Max Vel=3.64 fps Inflow=27.54 cfs 3.970 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=27.46 cfs 3.961 af

Summary for Subcatchment P-1c: P-1c

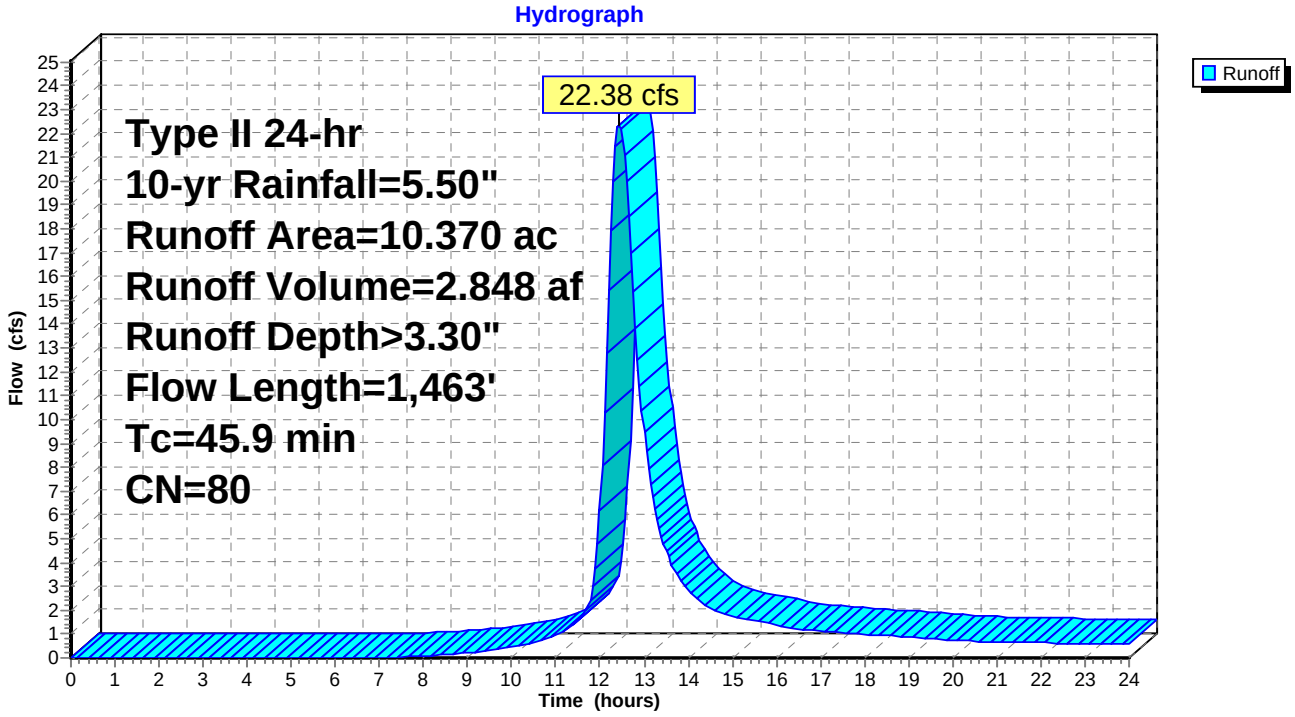
Runoff = 22.38 cfs @ 12.44 hrs, Volume= 2.848 af, Depth> 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

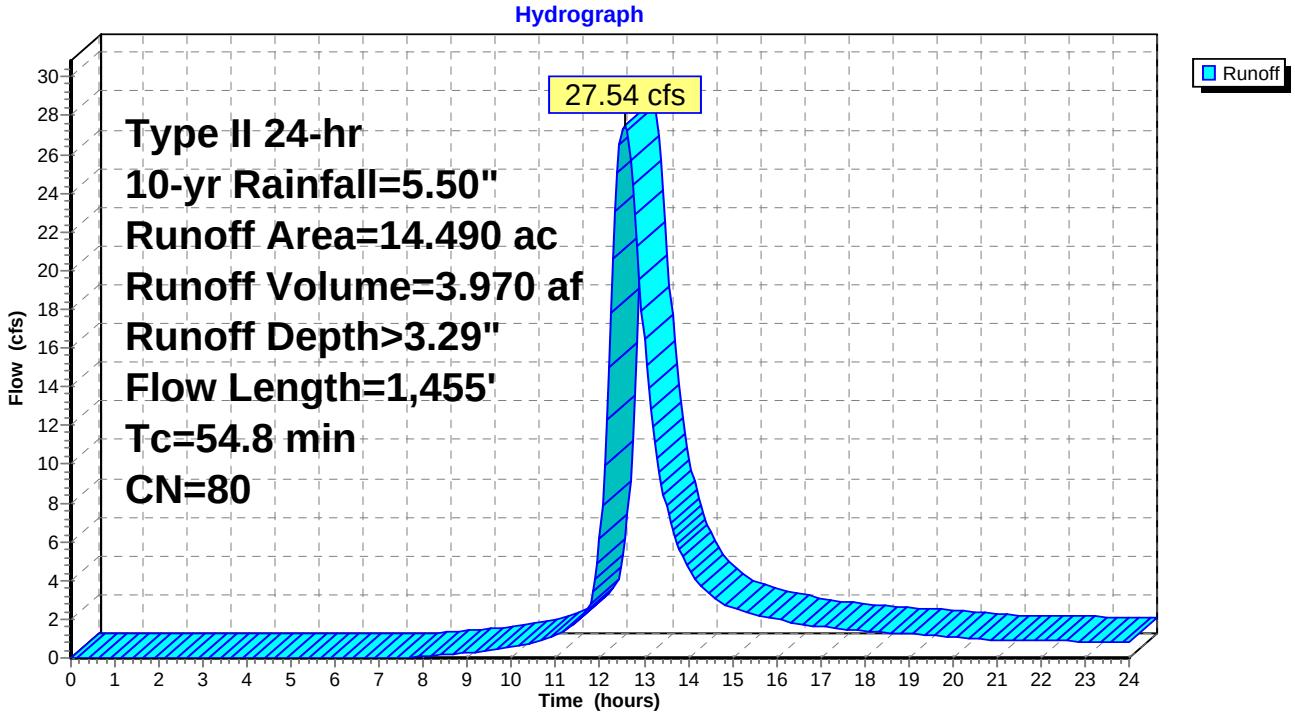
Runoff = 27.54 cfs @ 12.56 hrs, Volume= 3.970 af, Depth> 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=5.50"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



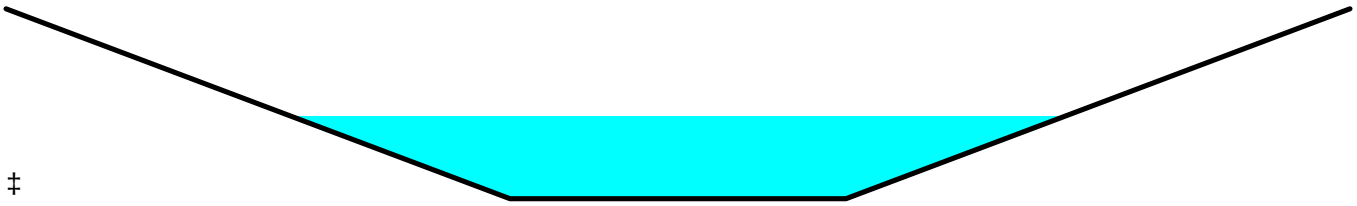
Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 3.30" for 10-yr event
Inflow = 22.38 cfs @ 12.44 hrs, Volume= 2.848 af
Outflow = 22.26 cfs @ 12.52 hrs, Volume= 2.838 af, Atten= 1%, Lag= 5.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.43 fps, Min. Travel Time= 2.9 min
Avg. Velocity = 1.30 fps, Avg. Travel Time= 7.7 min

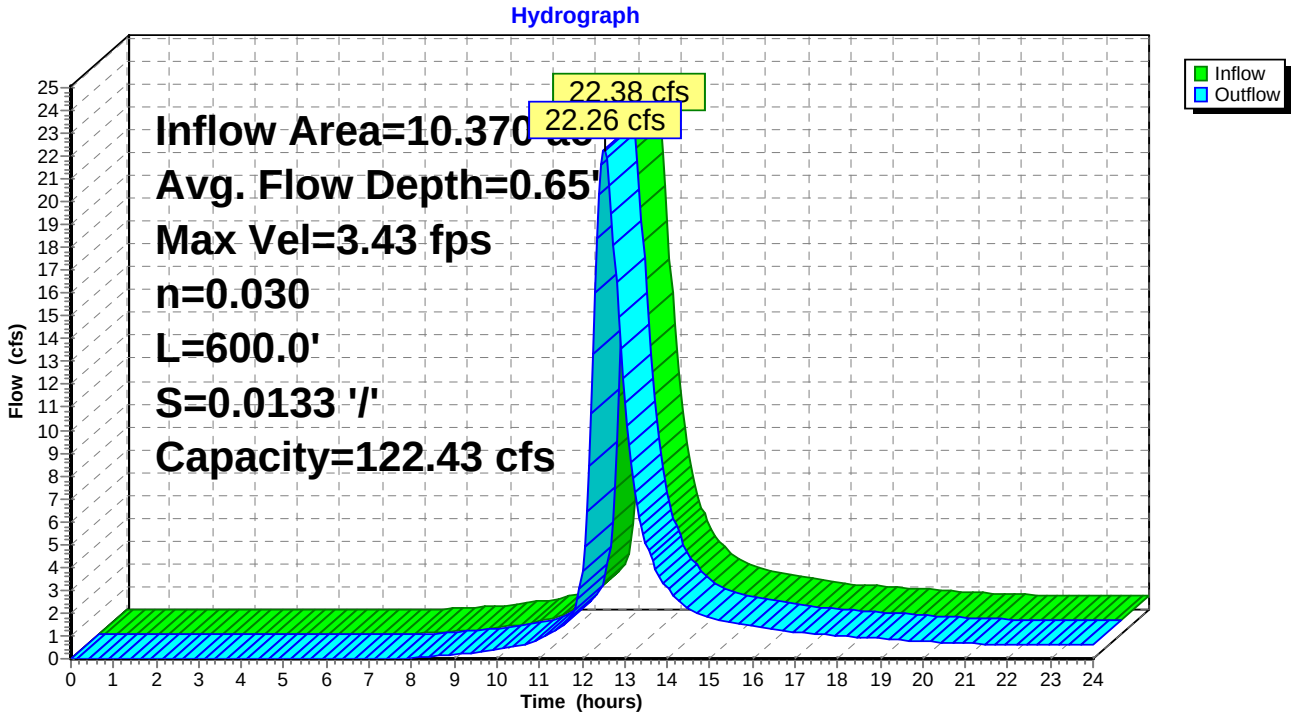
Peak Storage= 3,892 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.65'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 3.29" for 10-yr event
Inflow = 27.54 cfs @ 12.56 hrs, Volume= 3.970 af
Outflow = 27.46 cfs @ 12.61 hrs, Volume= 3.961 af, Atten= 0%, Lag= 3.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.64 fps, Min. Travel Time= 2.1 min
Avg. Velocity = 1.45 fps, Avg. Travel Time= 5.2 min

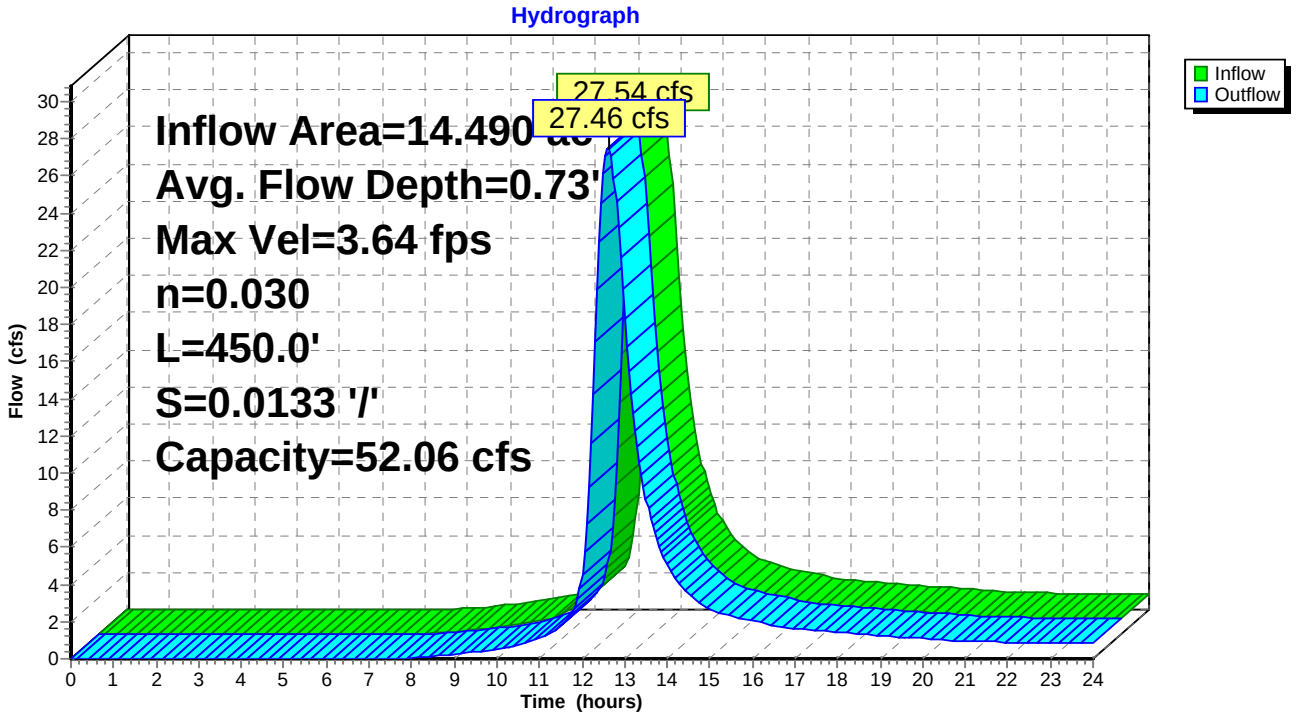
Peak Storage= 3,398 cf @ 12.58 hrs
Average Depth at Peak Storage= 0.73'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>4.38"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=29.70 cfs 3.785 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>4.37"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=36.56 cfs 5.278 af

Reach 1R: Swale 1c Avg. Flow Depth=0.76' Max Vel=3.71 fps Inflow=29.70 cfs 3.785 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=29.54 cfs 3.774 af

Reach 2R: Swale 1d Avg. Flow Depth=0.84' Max Vel=3.94 fps Inflow=36.56 cfs 5.278 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=36.46 cfs 5.267 af

Summary for Subcatchment P-1c: P-1c

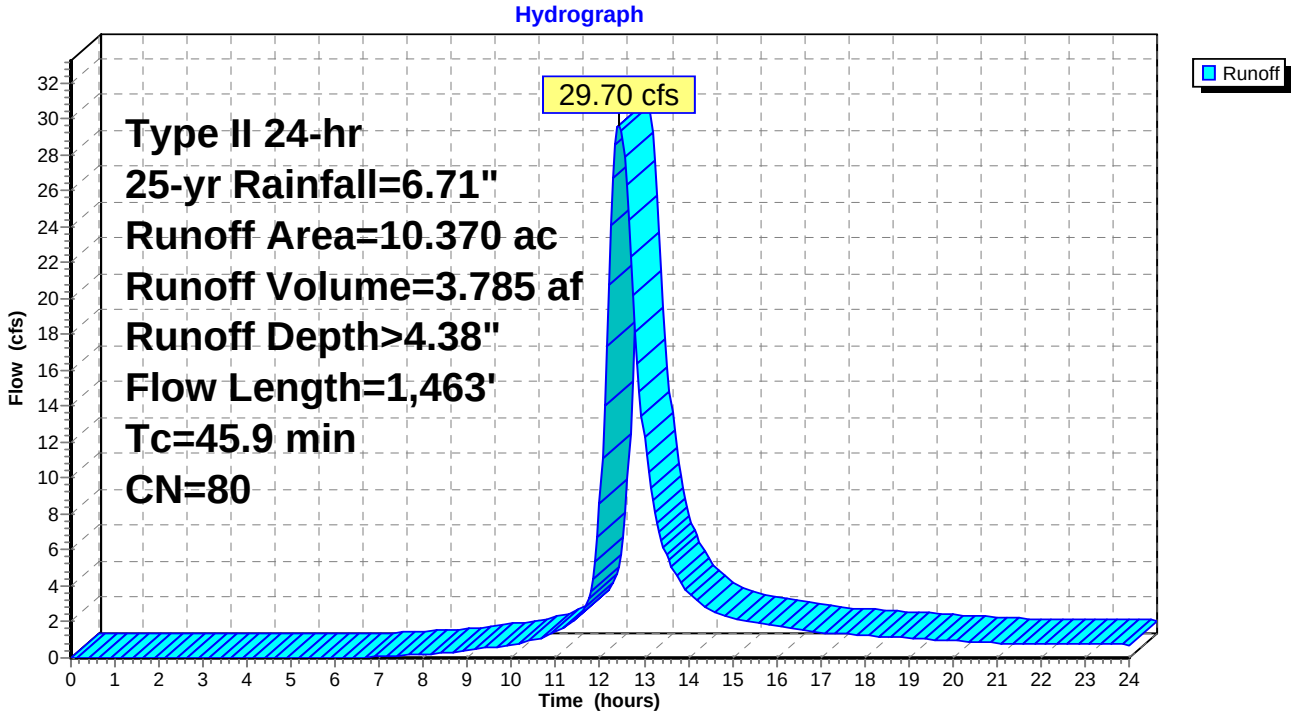
Runoff = 29.70 cfs @ 12.43 hrs, Volume= 3.785 af, Depth> 4.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

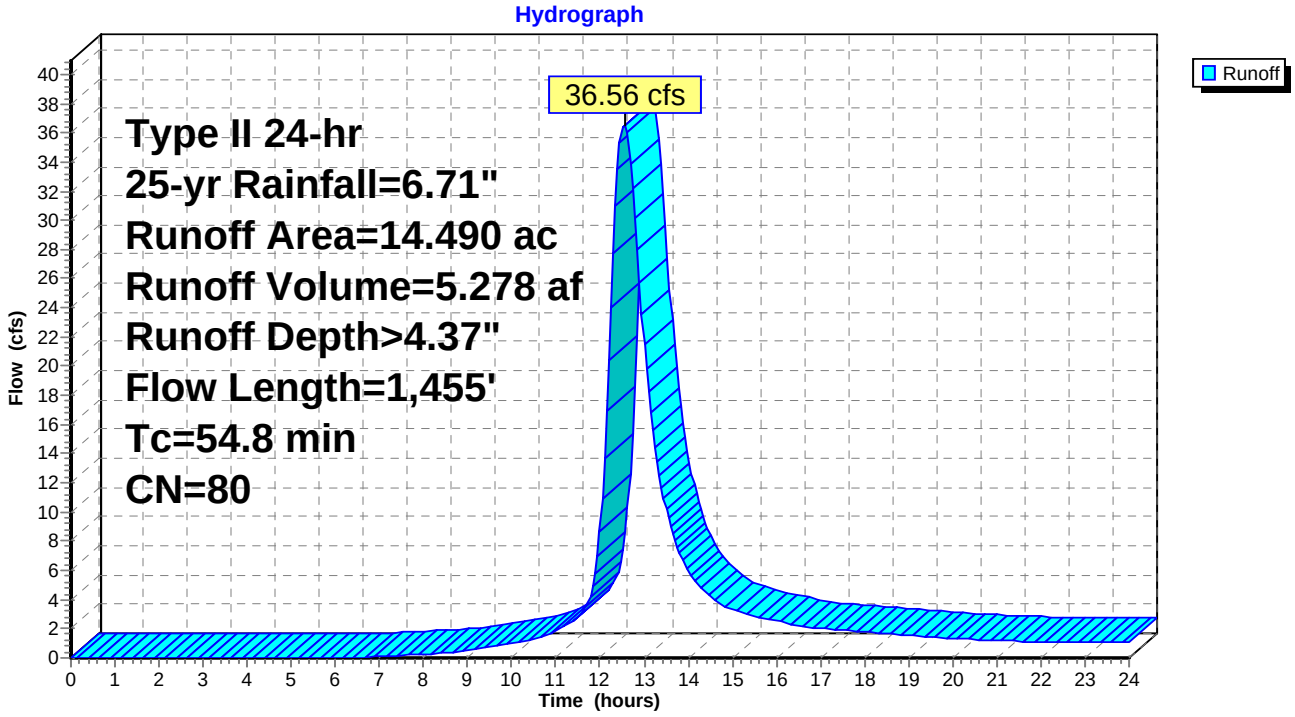
Runoff = 36.56 cfs @ 12.55 hrs, Volume= 5.278 af, Depth> 4.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.71"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



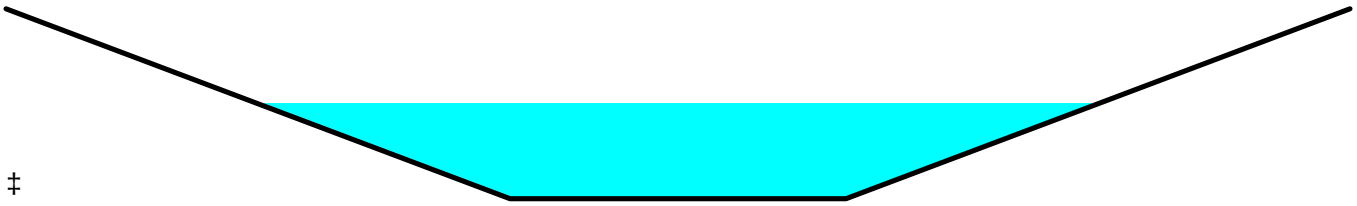
Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 4.38" for 25-yr event
Inflow = 29.70 cfs @ 12.43 hrs, Volume= 3.785 af
Outflow = 29.54 cfs @ 12.51 hrs, Volume= 3.774 af, Atten= 1%, Lag= 5.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.71 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 1.40 fps, Avg. Travel Time= 7.2 min

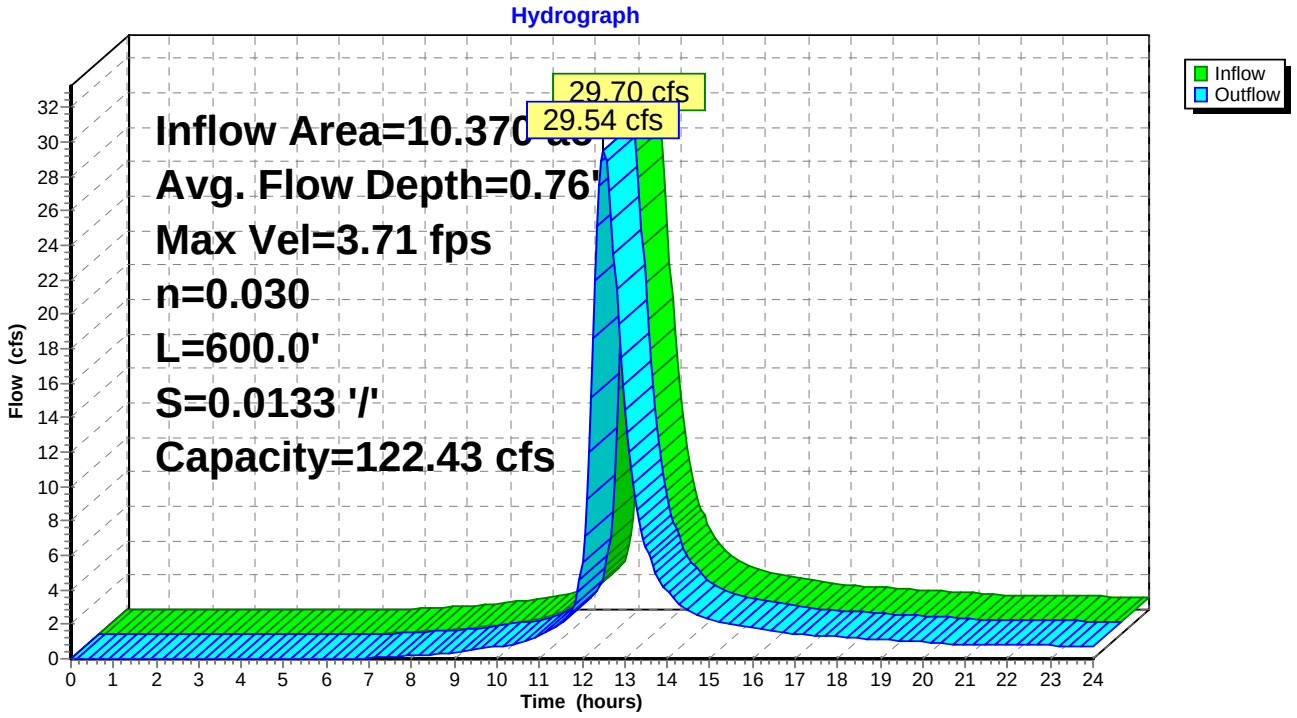
Peak Storage= 4,774 cf @ 12.47 hrs
Average Depth at Peak Storage= 0.76'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 4.37" for 25-yr event
Inflow = 36.56 cfs @ 12.55 hrs, Volume= 5.278 af
Outflow = 36.46 cfs @ 12.60 hrs, Volume= 5.267 af, Atten= 0%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.94 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.56 fps, Avg. Travel Time= 4.8 min

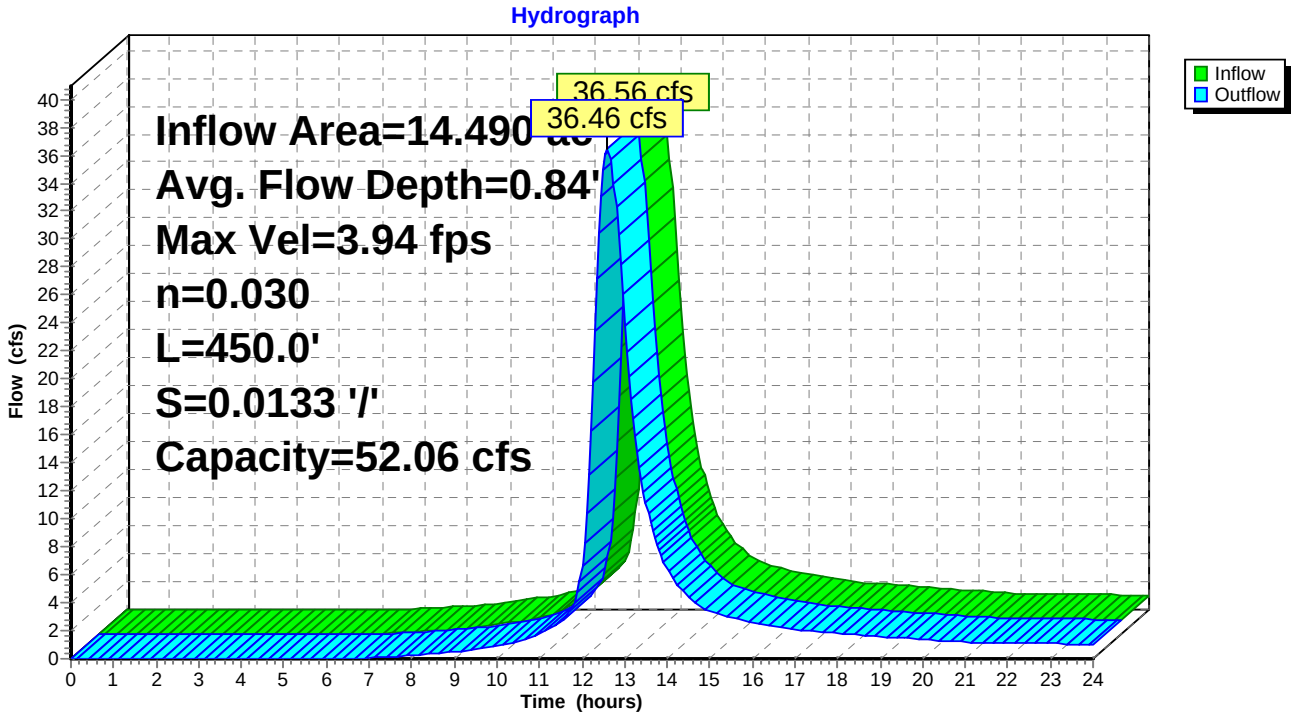
Peak Storage= 4,173 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.84'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>5.21"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=35.20 cfs 4.499 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>5.19"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=43.35 cfs 6.273 af

Reach 1R: Swale 1c Avg. Flow Depth=0.82' Max Vel=3.89 fps Inflow=35.20 cfs 4.499 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=35.01 cfs 4.486 af

Reach 2R: Swale 1d Avg. Flow Depth=0.91' Max Vel=4.13 fps Inflow=43.35 cfs 6.273 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=43.23 cfs 6.261 af

Summary for Subcatchment P-1c: P-1c

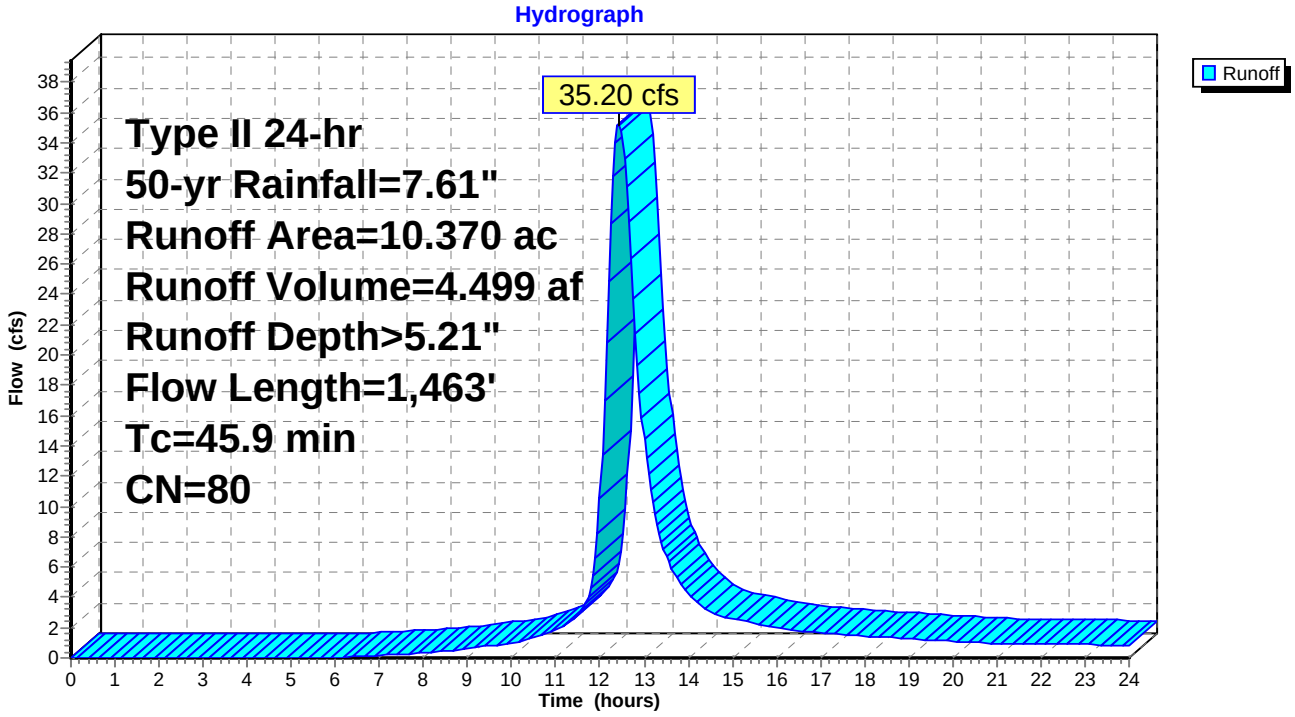
Runoff = 35.20 cfs @ 12.43 hrs, Volume= 4.499 af, Depth> 5.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

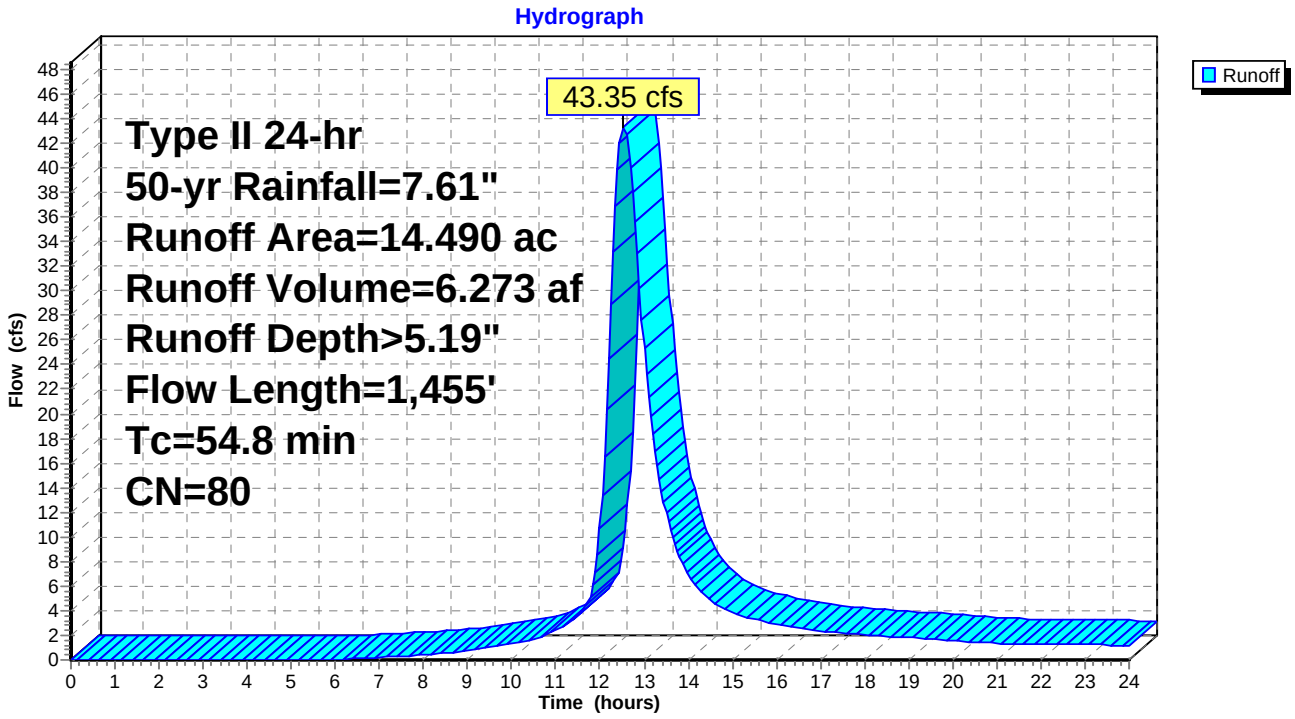
Runoff = 43.35 cfs @ 12.54 hrs, Volume= 6.273 af, Depth> 5.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 50-yr Rainfall=7.61"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 5.21" for 50-yr event
Inflow = 35.20 cfs @ 12.43 hrs, Volume= 4.499 af
Outflow = 35.01 cfs @ 12.51 hrs, Volume= 4.486 af, Atten= 1%, Lag= 4.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.89 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.46 fps, Avg. Travel Time= 6.8 min

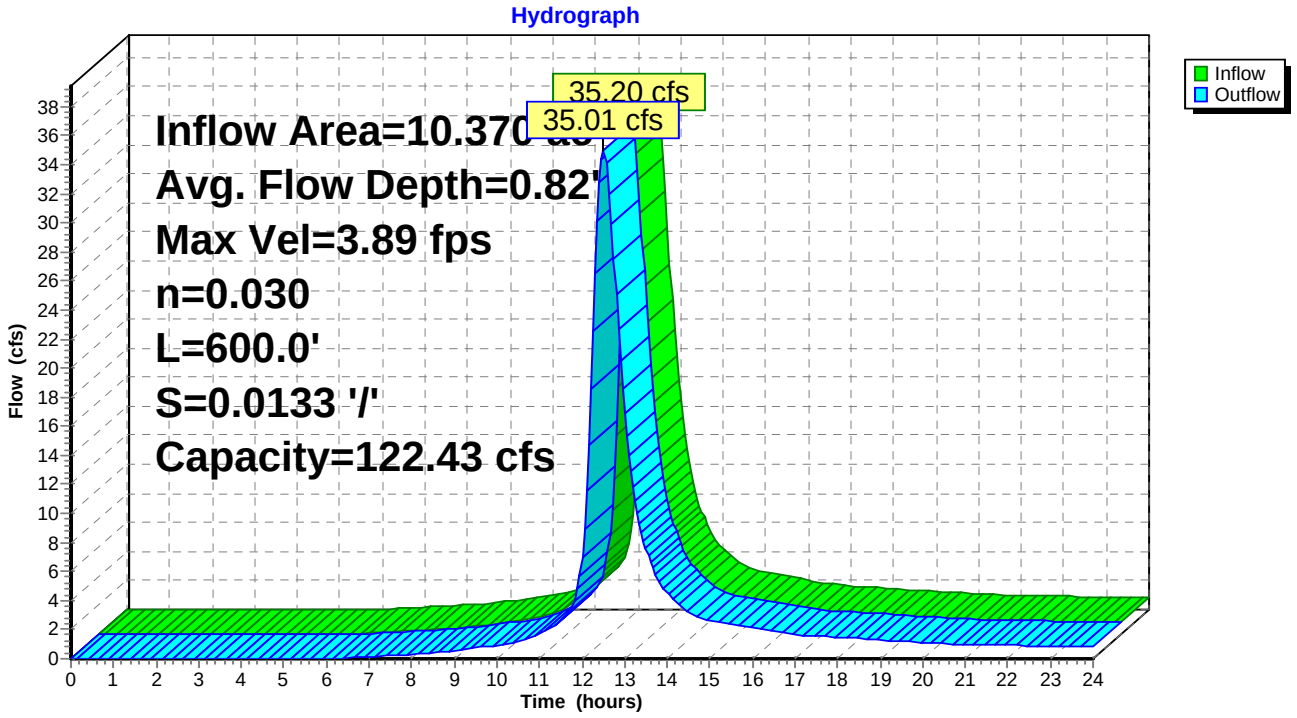
Peak Storage= 5,400 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.82'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 5.19" for 50-yr event
Inflow = 43.35 cfs @ 12.54 hrs, Volume= 6.273 af
Outflow = 43.23 cfs @ 12.60 hrs, Volume= 6.261 af, Atten= 0%, Lag= 3.3 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.13 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.63 fps, Avg. Travel Time= 4.6 min

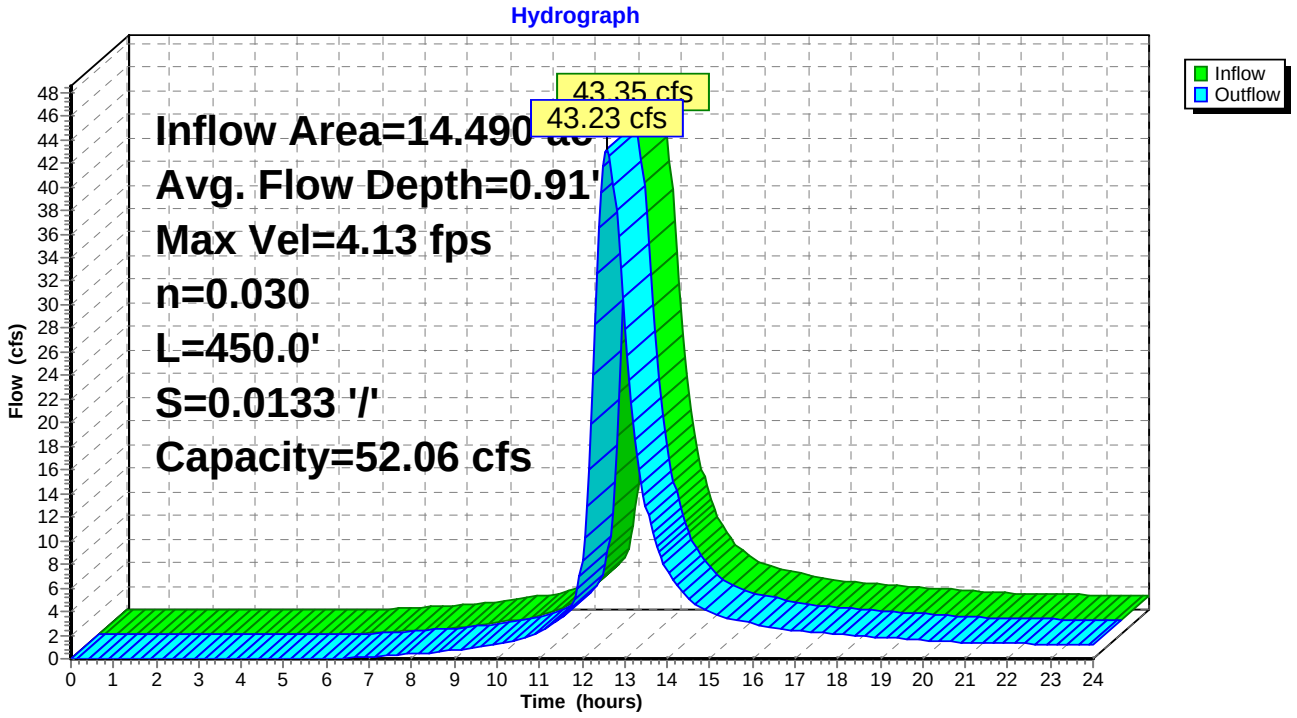
Peak Storage= 4,723 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.91'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P-1c: P-1c Runoff Area=10.370 ac 0.00% Impervious Runoff Depth>6.11"
Flow Length=1,463' Tc=45.9 min CN=80 Runoff=41.22 cfs 5.279 af

Subcatchment P-1d: P-1d Runoff Area=14.490 ac 2.00% Impervious Runoff Depth>6.10"
Flow Length=1,455' Tc=54.8 min CN=80 Runoff=50.70 cfs 7.361 af

Reach 1R: Swale 1c Avg. Flow Depth=0.89' Max Vel=4.07 fps Inflow=41.22 cfs 5.279 af
n=0.030 L=600.0' S=0.0133 '/' Capacity=122.43 cfs Outflow=40.93 cfs 5.265 af

Reach 2R: Swale 1d Avg. Flow Depth=0.99' Max Vel=4.31 fps Inflow=50.70 cfs 7.361 af
n=0.030 L=450.0' S=0.0133 '/' Capacity=52.06 cfs Outflow=50.56 cfs 7.348 af

Summary for Subcatchment P-1c: P-1c

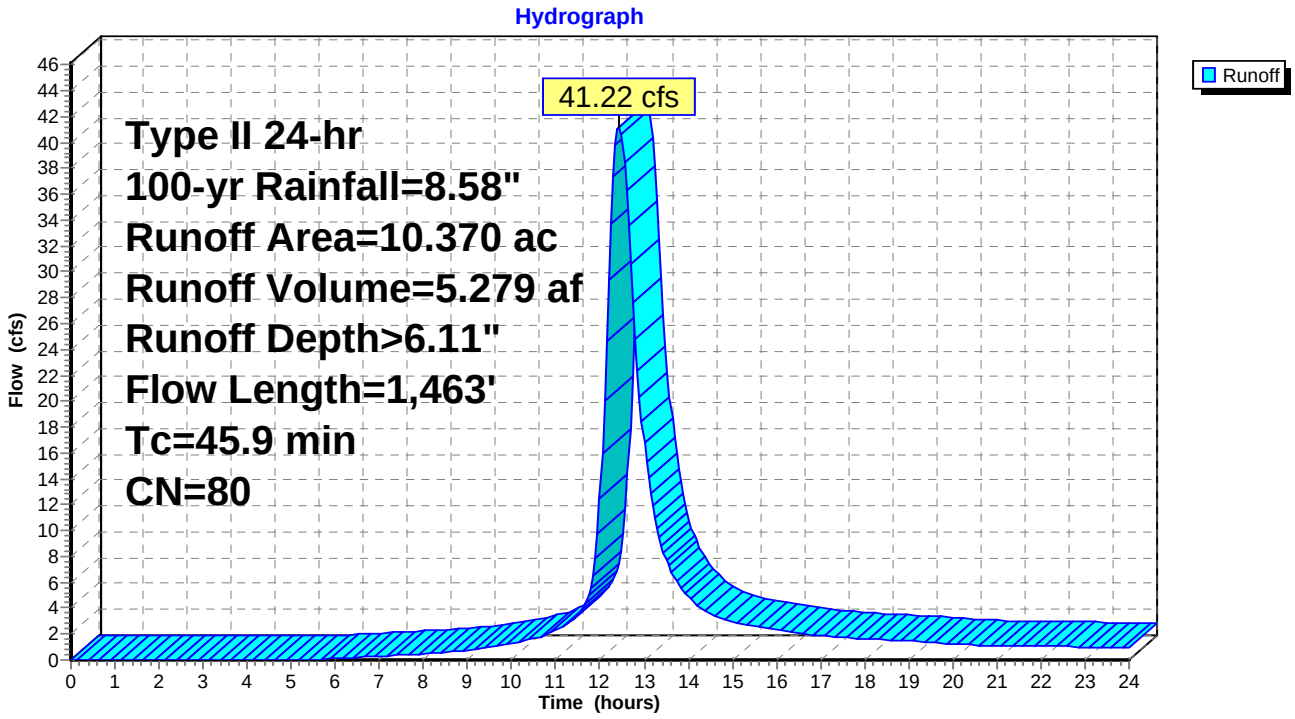
Runoff = 41.22 cfs @ 12.42 hrs, Volume= 5.279 af, Depth> 6.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
10.370	80	>75% Grass cover, Good, HSG D
10.370		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
13.8	609	0.0110	0.73		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
6.9	365	0.0160	0.89		**Shallow Concentrated Flow, CD** Short Grass Pasture Kv= 7.0 fps
0.5	339	0.0500	11.90	77.32	**Channel Flow, DE** Area= 6.5 sf Perim= 9.3' r= 0.70' n= 0.022 Earth, clean & straight
45.9	1,463	Total			

Subcatchment P-1c: P-1c



Summary for Subcatchment P-1d: P-1d

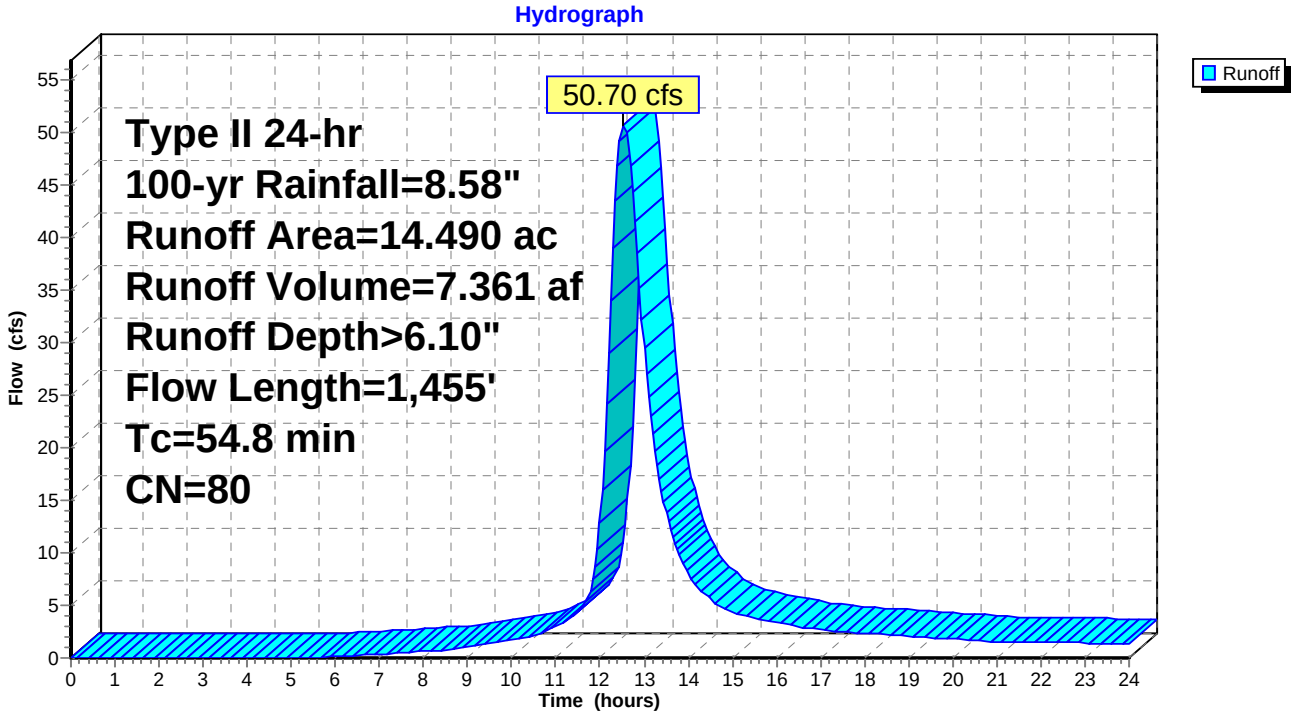
Runoff = 50.70 cfs @ 12.54 hrs, Volume= 7.361 af, Depth> 6.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-yr Rainfall=8.58"

Area (ac)	CN	Description
14.200	80	>75% Grass cover, Good, HSG D
0.290	98	Paved parking, HSG B
14.490	80	Weighted Average
14.200		98.00% Pervious Area
0.290		2.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.7	150	0.0100	0.10		**Sheet Flow, AB** Grass: Dense n= 0.240 P2= 3.56"
29.3	1,231	0.0100	0.70		**Shallow Concentrated Flow, BC** Short Grass Pasture Kv= 7.0 fps
0.8	74	0.0500	1.57		**Shallow Concentrated Flow, DE** Short Grass Pasture Kv= 7.0 fps
54.8	1,455	Total			

Subcatchment P-1d: P-1d



Summary for Reach 1R: Swale 1c

Inflow Area = 10.370 ac, 0.00% Impervious, Inflow Depth > 6.11" for 100-yr event
Inflow = 41.22 cfs @ 12.42 hrs, Volume= 5.279 af
Outflow = 40.93 cfs @ 12.50 hrs, Volume= 5.265 af, Atten= 1%, Lag= 4.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.07 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 1.53 fps, Avg. Travel Time= 6.5 min

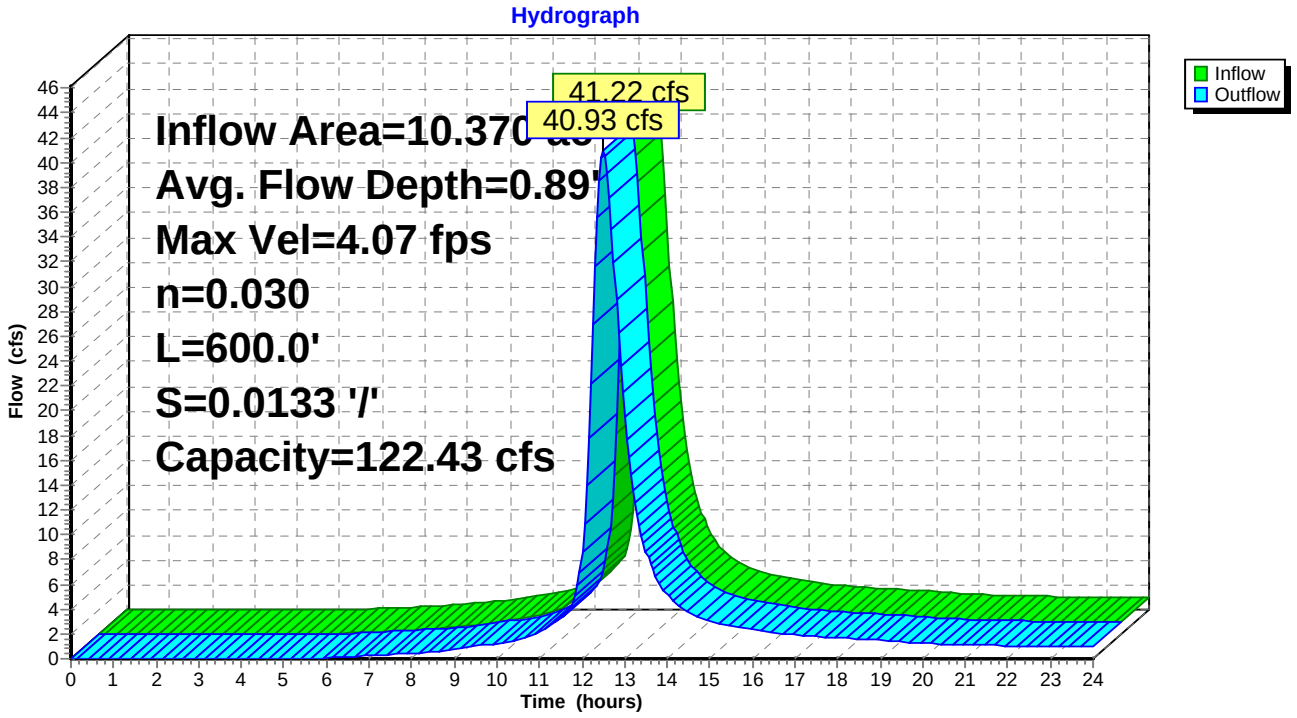
Peak Storage= 6,051 cf @ 12.46 hrs
Average Depth at Peak Storage= 0.89'
Bank-Full Depth= 1.50' Flow Area= 22.5 sf, Capacity= 122.43 cfs

6.00' x 1.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 24.00'
Length= 600.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 422.00'



‡

Reach 1R: Swale 1c



Stage-Discharge for Reach 1R: Swale 1c

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)	Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00	430.53	3.06	14.88	431.06	4.48	58.71
430.01	0.23	0.02	430.54	3.09	15.41	431.07	4.50	59.86
430.02	0.41	0.05	430.55	3.12	15.97	431.08	4.53	61.02
430.03	0.54	0.10	430.56	3.15	16.52	431.09	4.55	62.20
430.04	0.65	0.17	430.57	3.18	17.09	431.10	4.57	63.40
430.05	0.75	0.24	430.58	3.21	17.67	431.11	4.60	64.60
430.06	0.84	0.32	430.59	3.24	18.26	431.12	4.62	65.82
430.07	0.93	0.42	430.60	3.27	18.86	431.13	4.64	67.05
430.08	1.01	0.53	430.61	3.30	19.47	431.14	4.67	68.29
430.09	1.09	0.64	430.62	3.33	20.09	431.15	4.69	69.55
430.10	1.16	0.77	430.63	3.36	20.72	431.16	4.71	70.83
430.11	1.23	0.90	430.64	3.39	21.37	431.17	4.73	72.11
430.12	1.30	1.05	430.65	3.42	22.02	431.18	4.76	73.41
430.13	1.36	1.20	430.66	3.45	22.68	431.19	4.78	74.72
430.14	1.42	1.37	430.67	3.48	23.36	431.20	4.80	76.04
430.15	1.48	1.54	430.68	3.51	24.05	431.21	4.82	77.39
430.16	1.54	1.72	430.69	3.54	24.74	431.22	4.85	78.74
430.17	1.60	1.91	430.70	3.56	25.45	431.23	4.87	80.10
430.18	1.65	2.11	430.71	3.59	26.17	431.24	4.89	81.49
430.19	1.71	2.32	430.72	3.62	26.90	431.25	4.91	82.88
430.20	1.76	2.54	430.73	3.65	27.64	431.26	4.93	84.29
430.21	1.81	2.76	430.74	3.67	28.39	431.27	4.96	85.72
430.22	1.86	3.00	430.75	3.70	29.15	431.28	4.98	87.15
430.23	1.91	3.24	430.76	3.73	29.93	431.29	5.00	88.60
430.24	1.96	3.49	430.77	3.76	30.72	431.30	5.02	90.07
430.25	2.00	3.76	430.78	3.78	31.51	431.31	5.04	91.55
430.26	2.05	4.03	430.79	3.81	32.32	431.32	5.06	93.04
430.27	2.09	4.31	430.80	3.84	33.14	431.33	5.09	94.55
430.28	2.14	4.60	430.81	3.86	33.97	431.34	5.11	96.07
430.29	2.18	4.90	430.82	3.89	34.82	431.35	5.13	97.61
430.30	2.22	5.20	430.83	3.91	35.68	431.36	5.15	99.16
430.31	2.27	5.52	430.84	3.94	36.54	431.37	5.17	100.73
430.32	2.31	5.85	430.85	3.97	37.42	431.38	5.19	102.31
430.33	2.35	6.18	430.86	3.99	38.31	431.39	5.21	103.91
430.34	2.39	6.53	430.87	4.02	39.21	431.40	5.23	105.52
430.35	2.43	6.88	430.88	4.04	40.13	431.41	5.25	107.14
430.36	2.47	7.24	430.89	4.07	41.06	431.42	5.28	108.78
430.37	2.50	7.62	430.90	4.09	41.99	431.43	5.30	110.43
430.38	2.54	8.00	430.91	4.12	42.95	431.44	5.32	112.10
430.39	2.58	8.39	430.92	4.14	43.91	431.45	5.34	113.79
430.40	2.62	8.79	430.93	4.17	44.88	431.46	5.36	115.49
430.41	2.65	9.20	430.94	4.19	45.87	431.47	5.38	117.20
430.42	2.69	9.62	430.95	4.22	46.87	431.48	5.40	118.93
430.43	2.72	10.05	430.96	4.24	47.88	431.49	5.42	120.67
430.44	2.76	10.49	430.97	4.27	48.91	431.50	**5.44**	**122.43**
430.45	2.79	10.93	430.98	4.29	49.95			
430.46	2.83	11.39	430.99	4.31	51.00			
430.47	2.86	11.86	431.00	4.34	52.06			
430.48	2.89	12.34	431.01	4.36	53.14			
430.49	2.93	12.83	431.02	4.39	54.22			
430.50	2.96	13.33	431.03	4.41	55.33			
430.51	2.99	13.83	431.04	4.43	56.44			
430.52	3.03	14.35	431.05	4.46	57.56			

Stage-Area-Storage for Reach 1R: Swale 1c

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.02	0.1	74
430.04	0.2	150
430.06	0.4	229
430.08	0.5	311
430.10	0.7	396
430.12	0.8	484
430.14	1.0	575
430.16	1.1	668
430.18	1.3	765
430.20	1.4	864
430.22	1.6	966
430.24	1.8	1,071
430.26	2.0	1,180
430.28	2.2	1,290
430.30	2.3	1,404
430.32	2.5	1,521
430.34	2.7	1,640
430.36	2.9	1,763
430.38	3.1	1,888
430.40	3.4	2,016
430.42	3.6	2,147
430.44	3.8	2,281
430.46	4.0	2,418
430.48	4.3	2,557
430.50	4.5	2,700
430.52	4.7	2,846
430.54	5.0	2,994
430.56	5.2	3,145
430.58	5.5	3,299
430.60	5.8	3,456
430.62	6.0	3,616
430.64	6.3	3,779
430.66	6.6	3,944
430.68	6.9	4,113
430.70	7.1	4,284
430.72	7.4	4,458
430.74	7.7	4,636
430.76	8.0	4,816
430.78	8.3	4,998
430.80	8.6	5,184
430.82	9.0	5,373
430.84	9.3	5,564
430.86	9.6	5,759
430.88	9.9	5,956
430.90	10.3	6,156
430.92	10.6	6,359
430.94	10.9	6,565
430.96	11.3	6,774
430.98	11.6	6,986
431.00	12.0	7,200
431.02	12.4	7,417
431.04	12.7	7,638
431.06	13.1	7,861
431.08	13.5	8,087
431.10	13.9	8,316
431.12	14.2	8,548
431.14	14.6	8,783
431.16	15.0	9,020
431.18	15.4	9,261
431.20	15.8	9,504
431.22	16.3	9,750
431.24	16.7	10,000
431.26	17.1	10,251
431.28	17.5	10,506
431.30	17.9	10,764
431.32	18.4	11,025
431.34	18.8	11,288
431.36	19.3	11,555
431.38	19.7	11,824
431.40	20.2	12,096
431.42	20.6	12,371
431.44	21.1	12,649
431.46	21.5	12,930
431.48	22.0	13,214
431.50	**22.5**	**13,500**

Summary for Reach 2R: Swale 1d

Inflow Area = 14.490 ac, 2.00% Impervious, Inflow Depth > 6.10" for 100-yr event
Inflow = 50.70 cfs @ 12.54 hrs, Volume= 7.361 af
Outflow = 50.56 cfs @ 12.59 hrs, Volume= 7.348 af, Atten= 0%, Lag= 3.2 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.31 fps, Min. Travel Time= 1.7 min
Avg. Velocity = 1.71 fps, Avg. Travel Time= 4.4 min

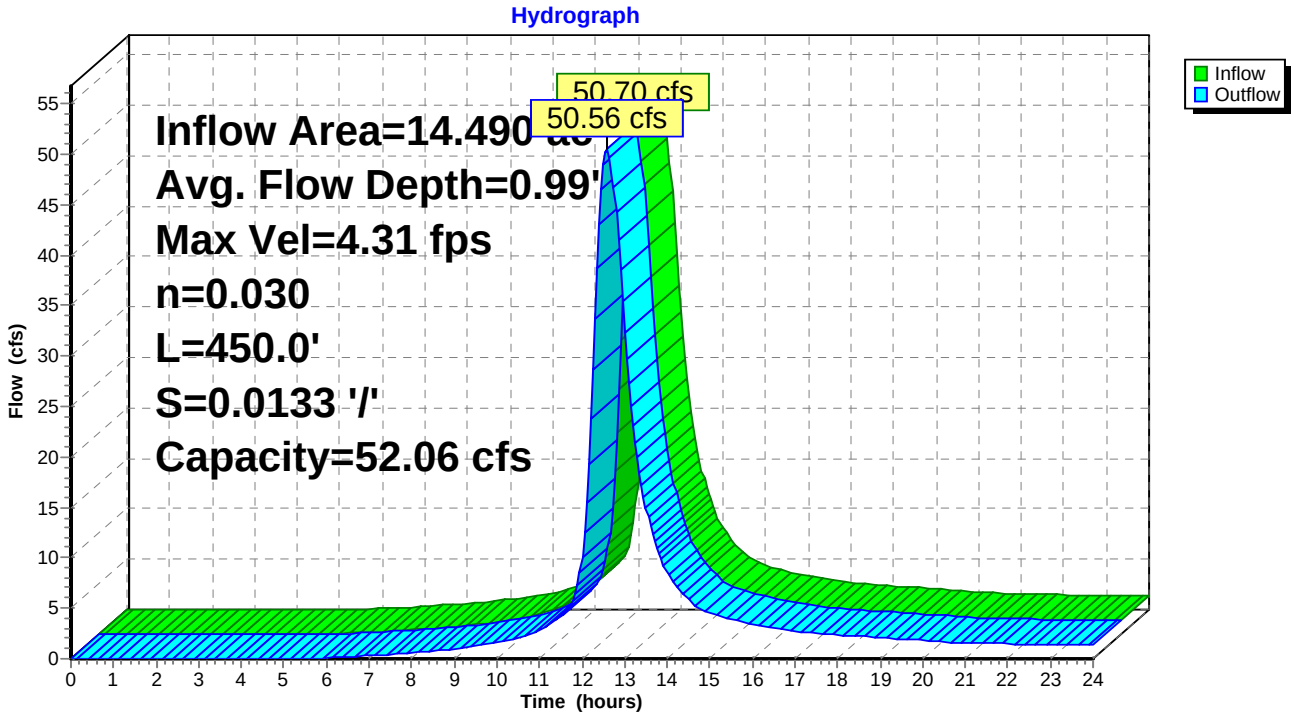
Peak Storage= 5,294 cf @ 12.56 hrs
Average Depth at Peak Storage= 0.99'
Bank-Full Depth= 1.00' Flow Area= 12.0 sf, Capacity= 52.06 cfs

6.00' x 1.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 6.0 '/' Top Width= 18.00'
Length= 450.0' Slope= 0.0133 '/'
Inlet Invert= 430.00', Outlet Invert= 424.00'



‡

Reach 2R: Swale 1d



Stage-Discharge for Reach 2R: Swale 1d

Elevation (feet)	Velocity (ft/sec)	Discharge (cfs)
430.00	0.00	0.00
430.01	0.26	0.02
430.02	0.42	0.05
430.03	0.54	0.10
430.04	0.65	0.16
430.05	0.75	0.24
430.06	0.84	0.32
430.07	0.93	0.42
430.08	1.01	0.52
430.09	1.09	0.64
430.10	1.16	0.77
430.11	1.23	0.90
430.12	1.30	1.05
430.13	1.36	1.20
430.14	1.42	1.36
430.15	1.48	1.54
430.16	1.54	1.72
430.17	1.60	1.91
430.18	1.65	2.11
430.19	1.71	2.32
430.20	1.76	2.54
430.21	1.81	2.76
430.22	1.86	3.00
430.23	1.91	3.24
430.24	1.96	3.49
430.25	2.00	3.76
430.26	2.05	4.03
430.27	2.09	4.31
430.28	2.14	4.60
430.29	2.18	4.90
430.30	2.22	5.20
430.31	2.27	5.52
430.32	2.31	5.85
430.33	2.35	6.18
430.34	2.39	6.53
430.35	2.43	6.88
430.36	2.47	7.24
430.37	2.50	7.61
430.38	2.54	8.00
430.39	2.58	8.39
430.40	2.62	8.79
430.41	2.65	9.20
430.42	2.69	9.62
430.43	2.72	10.05
430.44	2.76	10.49
430.45	2.79	10.93
430.46	2.83	11.39
430.47	2.86	11.86
430.48	2.89	12.34
430.49	2.93	12.83
430.50	2.96	13.32
430.51	2.99	13.83
430.52	3.03	14.35
430.53	3.06	14.88
430.54	3.09	15.41
430.55	3.12	15.96
430.56	3.15	16.52
430.57	3.18	17.09
430.58	3.21	17.67
430.59	3.24	18.26
430.60	3.27	18.86
430.61	3.30	19.47
430.62	3.33	20.09
430.63	3.36	20.72
430.64	3.39	21.36
430.65	3.42	22.02
430.66	3.45	22.68
430.67	3.48	23.36
430.68	3.51	24.04
430.69	3.54	24.74
430.70	3.56	25.45
430.71	3.59	26.17
430.72	3.62	26.90
430.73	3.65	27.64
430.74	3.67	28.39
430.75	3.70	29.15
430.76	3.73	29.93
430.77	3.76	30.71
430.78	3.78	31.51
430.79	3.81	32.32
430.80	3.84	33.14
430.81	3.86	33.97
430.82	3.89	34.82
430.83	3.91	35.67
430.84	3.94	36.54
430.85	3.97	37.42
430.86	3.99	38.31
430.87	4.02	39.21
430.88	4.04	40.13
430.89	4.07	41.05
430.90	4.09	41.99
430.91	4.12	42.94
430.92	4.14	43.91
430.93	4.17	44.88
430.94	4.19	45.87
430.95	4.22	46.87
430.96	4.24	47.88
430.97	4.27	48.91
430.98	4.29	49.95
430.99	4.31	51.00
431.00	**4.34**	**52.06**

Stage-Area-Storage for Reach 2R: Swale 1d

Elevation (feet)	End-Area (sq-ft)	Storage (cubic-feet)
430.00	0.0	0
430.01	0.1	27
430.02	0.1	55
430.03	0.2	83
430.04	0.2	112
430.05	0.3	142
430.06	0.4	172
430.07	0.4	202
430.08	0.5	233
430.09	0.6	265
430.10	0.7	297
430.11	0.7	330
430.12	0.8	363
430.13	0.9	397
430.14	1.0	431
430.15	1.0	466
430.16	1.1	501
430.17	1.2	537
430.18	1.3	573
430.19	1.4	610
430.20	1.4	648
430.21	1.5	686
430.22	1.6	725
430.23	1.7	764
430.24	1.8	804
430.25	1.9	844
430.26	2.0	885
430.27	2.1	926
430.28	2.2	968
430.29	2.2	1,010
430.30	2.3	1,053
430.31	2.4	1,096
430.32	2.5	1,140
430.33	2.6	1,185
430.34	2.7	1,230
430.35	2.8	1,276
430.36	2.9	1,322
430.37	3.0	1,369
430.38	3.1	1,416
430.39	3.3	1,464
430.40	3.4	1,512
430.41	3.5	1,561
430.42	3.6	1,610
430.43	3.7	1,660
430.44	3.8	1,711
430.45	3.9	1,762
430.46	4.0	1,813
430.47	4.1	1,865
430.48	4.3	1,918
430.49	4.4	1,971
430.50	4.5	2,025
430.51	4.6	2,079
430.52	4.7	2,134
430.53	4.9	2,189
430.54	5.0	2,245
430.55	5.1	2,302
430.56	5.2	2,359
430.57	5.4	2,416
430.58	5.5	2,474
430.59	5.6	2,533
430.60	5.8	2,592
430.61	5.9	2,652
430.62	6.0	2,712
430.63	6.2	2,773
430.64	6.3	2,834
430.65	6.4	2,896
430.66	6.6	2,958
430.67	6.7	3,021
430.68	6.9	3,084
430.69	7.0	3,148
430.70	7.1	3,213
430.71	7.3	3,278
430.72	7.4	3,344
430.73	7.6	3,410
430.74	7.7	3,477
430.75	7.9	3,544
430.76	8.0	3,612
430.77	8.2	3,680
430.78	8.3	3,749
430.79	8.5	3,818
430.80	8.6	3,888
430.81	8.8	3,958
430.82	9.0	4,029
430.83	9.1	4,101
430.84	9.3	4,173
430.85	9.4	4,246
430.86	9.6	4,319
430.87	9.8	4,393
430.88	9.9	4,467
430.89	10.1	4,542
430.90	10.3	4,617
430.91	10.4	4,693
430.92	10.6	4,769
430.93	10.8	4,846
430.94	10.9	4,924
430.95	11.1	5,002
430.96	11.3	5,080
430.97	11.5	5,159
430.98	11.6	5,239
430.99	11.8	5,319
431.00	**12.0**	**5,400**

Hydrograph Return Recap Period Table

Hydrograph Return Period Recap

Hyd. No.	Hydrograph Type (Origin)	Inflow Hyd(s)	Peak Outflow (cfs)						Hydrograph Description
			2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
E-1a	Subcatchment	-	34.44	60.28	83.71	117.77	144.01	172.85	E-1a
E-1b	Subcatchment	-	23.31	40.17	55.38	77.39	94.29	112.82	E-1b
E-2	Subcatchment	-	4.94	9.01	12.80	18.42	22.78	27.62	E-2
E-3	Subcatchment	-	2.90	5.60	8.12	11.86	14.79	18.05	E-3
E-4	Subcatchment	-	5.08	8.75	12.05	16.82	20.49	24.52	E-4
Pond 1b	Pond	E-1b	7.89	13.99	17.45	21.58	24.33	27.04	Pond 1b
R-1	Reach	Pond 1b	7.80	13.92	17.41	21.55	24.30	27.02	R-1
R-2	Reach	E-1a, R-1	29.60	55.05	76.72	106.97	129.63	154.25	R-2

Hydrograph Return Period Recap

Hyd. No.	Hydrograph Type (Origin)	Inflow Hyd(s)	Peak Outflow (cfs)						Hydrograph Description
			2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
P-1a	Subcatchment	-	20.58	34.35	46.63	64.28	77.76	92.49	P-1a
P-1b	Subcatchment	-	22.43	36.16	48.22	65.36	78.35	92.48	P-1b
P-1c	Subcatchment	-	10.76	16.61	21.66	28.75	34.08	39.84	P-1c
P-1d	Subcatchment	-	13.53	20.89	27.24	36.16	42.87	50.14	P-1d
P-1e	Subcatchment	-	4.25	5.76	7.00	8.69	9.94	11.29	P-1e
P-2	Subcatchment	-	5.27	8.70	11.76	16.14	19.49	23.14	P-2
P-3	Subcatchment	-	4.89	7.51	9.76	12.91	15.27	17.83	P-3
P-4	Subcatchment	-	3.48	5.64	7.55	10.26	12.32	14.56	P-4
Pond 1b	Pond	P-1b	9.46	14.79	17.87	21.65	24.17	26.68	Pond 1b
Pond 1c	Pond	P-1c	5.91	12.36	17.77	25.56	31.26	33.74	Pond 1c
Pond 1d	Pond	P-1d	0.83	3.04	5.46	8.35	11.47	17.01	Pond 1d
Pond 1e	Pond	P-1e	0.05	0.36	1.74	5.34	7.73	9.72	Pond 1e
Pond 3	Pond	P-3	1.96	2.61	4.15	7.29	9.70	12.37	Pond 3
R-1	Reach	Pond 1b	9.40	14.75	17.84	21.63	24.15	26.65	R-1
R-2	Reach	R-1, P-1a	23.36	40.02	53.19	71.27	84.71	99.20	R-2

R-3	Reach	R-2, Pond 1c, Pond 1d	29.54	52.33	71.43	98.99	119.32	141.12	R-3
R-4	Reach	R-3, Pond 1e	29.35	52.32	71.45	98.96	119.18	141.08	R-4

Hydrograph Summary Report

Hydrograph Summary Report (2-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	34.44	12.27	157,426	-	-
E-1b	E-1b	-	23.31	12.10	71,113	-	-
E-2	E-2	-	4.94	13.14	50,530	-	-
E-3	E-3	-	2.90	12.17	11,326	-	-
E-4	E-4	-	5.08	12.28	23,217	-	-
Pond 1b	Pond 1b	E-1b	7.89	12.37	67,257	443.05	20,980
R-1	R-1	Pond-1b	7.80	12.51	66,821	-	-
R-2	R-2	E-1a, Pond-1b	29.60	12.83	217,713	-	-
P-1a	P-1a	-	20.58	12.37	106,766	-	-
P-1b	P-1b	-	22.43	12.17	81,923	-	-
P-1c	P-1c	-	10.76	12.49	63,206	-	-
P-1d	P-1d	-	13.53	12.59	87,294	-	-
P-1e	P-1e	-	4.25	12.00	10,367	-	-
P-2	P-2	-	5.27	12.94	46,174	-	-
P-3	P-3	-	4.89	12.19	18,382	-	-
P-4	P-4	-	3.48	12.34	17,032	-	-
Pond 1b	Pond 1b	P-1b	9.46	12.48	77,972	443.2	24,569
Pond 1c	Pond 1c	P-1c	5.91	12.95	60,331	412.02	21,610
Pond 1d	Pond 1d	P-1d	0.83	17.84	32,060	412.05	59,552
Pond 1e	Pond 1e	P-1e	0.05	19.59	871	406.36	9,484
Pond 3	Pond 3	P-3	1.96	12.53	17,729	424.22	5,703
R-1	R-1	Pond 1b	9.40	12.60	77,537	-	-
R-2	R-2	R-1, P-1a	23.36	12.93	179,641	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	29.54	13.05	270,377	-	-
R-4	R-4	R-3, Pond 1e	29.35	13.15	269,898	-	-
E-1	E-1	E-1a, Pond-1b	29.60	12.83	217,713	-	-
P-1	P-1	R-3, Pond 1e	29.35	13.15	269,898	-	-
E-2	E-2	-	4.94	13.14	50,530	-	-
P-2	P-2	-	5.27	12.94	46,174	-	-
E-3	E-3	-	2.90	12.17	11,326	-	-
P-3	P-3	Pond 3	1.96	12.53	17,729	-	-
E-4	E-4	-	5.08	12.28	23,217	-	-
P-4	P-4	-	3.48	12.34	17,032	-	-

Hydrograph Summary Report (5-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	60.28	12.26	262,231	-	-
E-1b	E-1b	-	40.17	12.09	118,396	-	-
E-2	E-2	-	9.01	13.09	86,423	-	-
E-3	E-3	-	5.60	12.16	20,038	-	-
E-4	E-4	-	8.75	12.27	38,246	-	-
Pond 1b	Pond 1b	E-1b	13.99	12.35	113,822	443.64	36,914
R-1	R-1	Pond-1b	13.92	12.46	113,212	-	-
R-2	R-2	E-1a, Pond-1b	55.05	12.75	367,124	-	-
P-1a	P-1a	-	34.35	12.36	172,280	-	-
P-1b	P-1b	-	36.16	12.17	129,460	-	-
P-1c	P-1c	-	16.61	12.48	96,311	-	-
P-1d	P-1d	-	20.89	12.58	133,076	-	-
P-1e	P-1e	-	5.76	12.00	14,288	-	-
P-2	P-2	-	8.70	12.91	73,878	-	-
P-3	P-3	-	7.51	12.19	28,009	-	-
P-4	P-4	-	5.64	12.33	26,964	-	-
Pond 1b	Pond 1b	P-1b	14.79	12.48	124,843	443.75	40,079
Pond 1c	Pond 1c	P-1c	12.36	12.77	91,563	412.56	26,575
Pond 1d	Pond 1d	P-1d	3.04	14.29	72,440	412.82	79,043
Pond 1e	Pond 1e	P-1e	0.36	12.87	4,792	406.39	9,707
Pond 3	Pond 3	P-3	2.61	12.57	27,225	424.88	9,333
R-1	R-1	Pond 1b	14.75	12.58	124,277	-	-
R-2	R-2	R-1, P-1a	40.02	12.85	290,719	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	52.33	12.94	452,719	-	-
R-4	R-4	R-3, Pond 1e	52.32	13.03	455,812	-	-
E-1	E-1	E-1a, Pond-1b	55.05	12.75	367,124	-	-
P-1	P-1	R-3, Pond 1e	52.32	13.03	455,812	-	-
E-2	E-2	-	9.01	13.09	86,423	-	-
P-2	P-2	-	8.70	12.91	73,878	-	-
E-3	E-3	-	5.60	12.16	20,038	-	-
P-3	P-3	Pond 3	2.61	12.57	27,225	-	-
E-4	E-4	-	8.75	12.27	38,246	-	-
P-4	P-4	-	5.64	12.33	26,964	-	-

Hydrograph Summary Report (10-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	83.71	12.26	357,933	-	-
E-1b	E-1b	-	55.38	12.09	161,564	-	-
E-2	E-2	-	12.80	13.06	119,616	-	-
E-3	E-3	-	8.12	12.15	28,227	-	-
E-4	E-4	-	12.05	12.27	51,924	-	-
Pond 1b	Pond 1b	E-1b	17.45	12.36	156,424	444.13	53,139
R-1	R-1	Pond-1b	17.41	12.47	155,727	-	-
R-2	R-2	E-1a, Pond-1b	76.72	12.72	503,859	-	-
P-1a	P-1a	-	46.63	12.36	231,173	-	-
P-1b	P-1b	-	48.22	12.17	171,801	-	-
P-1c	P-1c	-	21.66	12.48	125,279	-	-
P-1d	P-1d	-	27.24	12.57	173,151	-	-
P-1e	P-1e	-	7.00	12.00	17,598	-	-
P-2	P-2	-	11.76	12.90	98,663	-	-
P-3	P-3	-	9.76	12.19	36,460	-	-
P-4	P-4	-	7.55	12.32	35,763	-	-
Pond 1b	Pond 1b	P-1b	17.87	12.50	166,661	444.12	52,919
Pond 1c	Pond 1c	P-1c	17.77	12.71	118,701	412.93	30,105
Pond 1d	Pond 1d	P-1d	5.46	13.86	110,337	413.46	96,315
Pond 1e	Pond 1e	P-1e	1.74	12.21	8,102	406.46	10,264
Pond 3	Pond 3	P-3	4.15	12.50	35,545	425.31	11,943
R-1	R-1	Pond 1b	17.84	12.60	166,007	-	-
R-2	R-2	R-1, P-1a	53.19	12.82	390,428	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	71.43	12.92	617,115	-	-
R-4	R-4	R-3, Pond 1e	71.45	13.00	623,213	-	-
E-1	E-1	E-1a, Pond-1b	76.72	12.72	503,859	-	-
P-1	P-1	R-3, Pond 1e	71.45	13.00	623,213	-	-
E-2	E-2	-	12.80	13.06	119,616	-	-
P-2	P-2	-	11.76	12.90	98,663	-	-
E-3	E-3	-	8.12	12.15	28,227	-	-
P-3	P-3	Pond 3	4.15	12.50	35,545	-	-
E-4	E-4	-	12.05	12.27	51,924	-	-
P-4	P-4	-	7.55	12.32	35,763	-	-

Hydrograph Summary Report (25-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	117.77	12.25	498,326	-	-
E-1b	E-1b	-	77.39	12.08	224,900	-	-
E-2	E-2	-	18.42	13.02	168,751	-	-
E-3	E-3	-	11.86	12.15	40,511	-	-
E-4	E-4	-	16.82	12.26	71,874	-	-
Pond 1b	Pond 1b	E-1b	21.58	12.39	218,976	444.84	78,237
R-1	R-1	Pond-1b	21.55	12.48	218,192	-	-
R-2	R-2	E-1a, Pond-1b	106.97	12.70	704,801	-	-
P-1a	P-1a	-	62.28	12.35	316,638	-	-
P-1b	P-1b	-	65.36	12.16	232,785	-	-
P-1c	P-1c	-	28.75	12.47	166,530	-	-
P-1d	P-1d	-	36.16	12.57	230,171	-	-
P-1e	P-1e	-	8.69	12.00	22,172	-	-
P-2	P-2	-	16.14	12.89	134,557	-	-
P-3	P-3	-	12.91	12.18	48,439	-	-
P-4	P-4	-	10.26	12.32	48,482	-	-
Pond 1b	Pond 1b	P-1b	21.65	12.53	226,991	444.85	78,683
Pond 1c	Pond 1c	P-1c	25.56	12.65	157,382	413.33	34,148
Pond 1d	Pond 1d	P-1d	8.35	13.69	164,787	414.39	122,964
Pond 1e	Pond 1e	P-1e	5.34	12.11	12,632	406.58	11,220
Pond 3	Pond 3	P-3	7.29	12.42	47,393	425.69	14,356
R-1	R-1	Pond 1b	21.63	12.62	226,207	-	-
R-2	R-2	R-1, P-1a	71.27	12.79	534,830	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	98.99	12.88	854,212	-	-
R-4	R-4	R-3, Pond 1e	98.96	12.97	864,535	-	-
E-1	E-1	E-1a, Pond-1b	106.97	12.70	704,801	-	-
P-1	P-1	R-3, Pond 1e	98.96	12.97	864,535	-	-
E-2	E-2	-	18.42	13.02	168,751	-	-
P-2	P-2	-	16.14	12.89	134,557	-	-
E-3	E-3	-	11.86	12.15	40,511	-	-
P-3	P-3	Pond 3	7.29	12.42	47,393	-	-
E-4	E-4	-	16.82	12.26	71,874	-	-
P-4	P-4	-	10.26	12.32	48,482	-	-

Hydrograph Summary Report (50-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	144.01	12.25	607,575	-	-
E-1b	E-1b	-	94.29	12.08	274,167	-	-
E-2	E-2	-	22.78	13.02	207,171	-	-
E-3	E-3	-	14.79	12.15	50,225	-	-
E-4	E-4	-	20.49	12.26	87,338	-	-
Pond 1b	Pond 1b	E-1b	24.33	12.41	267,720	445.39	98,435
R-1	R-1	Pond-1b	24.30	12.50	266,805	-	-
R-2	R-2	E-1a, Pond-1b	129.63	12.69	861,355	-	-
P-1a	P-1a	-	77.76	12.35	382,587	-	-
P-1b	P-1b	-	78.35	12.16	279,612	-	-
P-1c	P-1c	-	34.08	12.47	197,893	-	-
P-1d	P-1d	-	42.87	12.56	273,557	-	-
P-1e	P-1e	-	9.94	12.00	25,570	-	-
P-2	P-2	-	19.49	12.89	162,174	-	-
P-3	P-3	-	15.27	12.18	57,543	-	-
P-4	P-4	-	12.32	12.32	58,283	-	-
Pond 1b	Pond 1b	P-1b	24.17	12.55	273,383	445.35	97,217
Pond 1c	Pond 1c	P-1c	31.26	12.62	187,003	413.57	36,654
Pond 1d	Pond 1d	P-1d	11.47	13.56	206,431	415.03	142,627
Pond 1e	Pond 1e	P-1e	7.73	12.07	16,030	406.64	11,728
Pond 3	Pond 3	P-3	9.7	12.38	56,410	425.91	15,854
R-1	R-1	Pond 1b	24.15	12.64	272,511	-	-
R-2	R-2	R-1, P-1a	84.71	12.78	646,213	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	119.32	12.86	1,036,641	-	-
R-4	R-4	R-3, Pond 1e	119.18	12.95	1,050,101	-	-
E-1	E-1	E-1a, Pond-1b	129.63	12.69	861,355	-	-
P-1	P-1	R-3, Pond 1e	119.18	12.95	1,050,101	-	-
E-2	E-2	-	22.78	13.02	207,171	-	-
P-2	P-2	-	19.49	12.89	162,174	-	-
E-3	E-3	-	14.79	12.15	50,225	-	-
P-3	P-3	Pond 3	9.7	12.38	56,410	-	-
E-4	E-4	-	20.49	12.26	87,338	-	-
P-4	P-4	-	12.32	12.32	58,283	-	-

Hydrograph Summary Report (100-Year Storm)

Hyd. No.	Hydrograph	Inflow Hyd(s)	Peak Flow (cfs)	Time to Peak (hrs)	Hyd. Volume (cf)	Max. Elevation (ft)	Total Storage Used (cf)
E-1a	E-1a	-	172.85	12.25	728,715	-	-
E-1b	E-1b	-	112.82	12.08	328,747	-	-
E-2	E-2	-	27.62	13.01	250,034	-	-
E-3	E-3	-	18.05	12.14	61,071	-	-
E-4	E-4	-	24.52	12.26	104,500	-	-
Pond 1b	Pond 1b	E-1b	27.04	12.42	321,821	446.00	121,348
R-1	R-1	Pond-1b	27.02	12.51	320,819	-	-
R-2	R-2	E-1a, Pond-1b	154.25	12.68	1,035,029	-	-
P-1a	P-1a	-	92.49	12.34	455,376	-	-
P-1b	P-1b	-	92.48	12.16	331,143	-	-
P-1c	P-1c	-	39.84	12.47	232,218	-	-
P-1d	P-1d	-	50.14	12.56	320,994	-	-
P-1e	P-1e	-	11.29	12.00	29,272	-	-
P-2	P-2	-	23.14	12.88	192,622	-	-
P-3	P-3	-	17.83	12.18	67,518	-	-
P-4	P-4	-	14.56	12.32	68,999	-	-
Pond 1b	Pond 1b	P-1b	26.68	12.57	324,391	445.91	118,084
Pond 1c	Pond 1c	P-1c	33.74	12.67	219,673	413.98	41,037
Pond 1d	Pond 1d	P-1d	17.01	13.37	252,212	415.57	159,823
Pond 1e	Pond 1e	P-1e	9.72	12.06	19,733	406.68	12,102
Pond 3	Pond 3	P-3	12.37	12.36	66,298	426.13	17,338
R-1	R-1	Pond 1b	26.65	12.65	323,477	-	-
R-2	R-2	R-1, P-1a	99.2	12.77	769,008	-	-
R-3	R-3	R-2, Pond 1c, Pond 1d	141.12	12.89	1,237,540	-	-
R-4	R-4	R-3, Pond 1e	141.08	12.97	1,254,441	-	-
E-1	E-1	E-1a, Pond-1b	154.25	12.68	1,035,029	-	-
P-1	P-1	R-3, Pond 1e	141.08	12.97	1,254,441	-	-
E-2	E-2	-	27.62	13.01	250,034	-	-
P-2	P-2	-	23.14	12.88	192,622	-	-
E-3	E-3	-	18.05	12.14	61,071	-	-
P-3	P-3	Pond 3	12.37	12.36	66,298	-	-
E-4	E-4	-	24.52	12.26	104,500	-	-
P-4	P-4	-	14.56	12.32	68,999	-	-

Hydrodynamic Separator Calculations and Details

Hydrodynamic Separation Product Calculator

64 Cambridge

HDS

CDS CDS1515-3-C

Project Information					
Project Name	64 Cambridge			**Option #**	A
Country	UNITED_STATES	**State**	Connecticut	**City**	Monroe

Contact Information			
First Name	Anthony	**Last Name**	Capuano
Company		**Phone #**	203-880-5455
Email	anthony@sollillc.com		

Design Criteria					
Site Designation	HDS			**Sizing Method**	Treatment Flow Rate
Screening Required?	Yes	**Treatment Flow Rate**	0.01	**Peak Flow (cfs)**	2.48
Groundwater Depth (ft)	0 - 5	**Pipe Invert Depth (ft)**	0 - 5	**Bedrock Depth (ft)**	0 - 5
Multiple Inlets?	No	**Grate Inlet Required?**	Yes	**Pipe Size (in)**	12.00
Required Particle Size Distribution?	Yes	**90° between two inlets?**	N/A		

Treatment Selection				
Treatment Unit	CDS	**System Model**	CDS1515-3-C	
Target Removal	80%	**Particle Size Distribution (PSD)**	50	

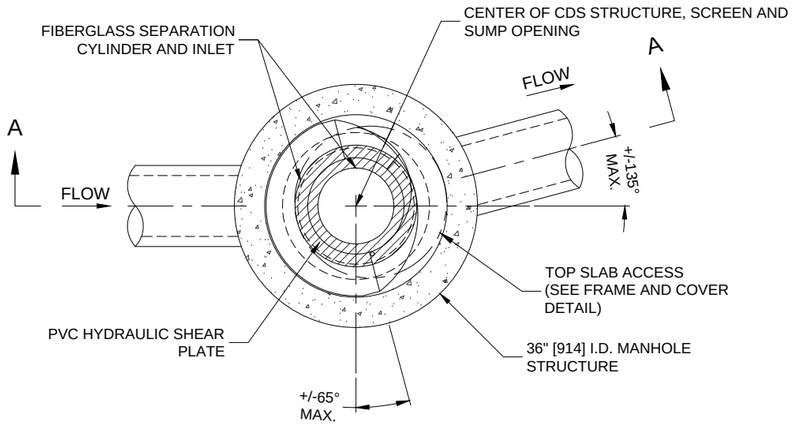
Hydrodynamic Separation Product Calculator

64 Cambridge

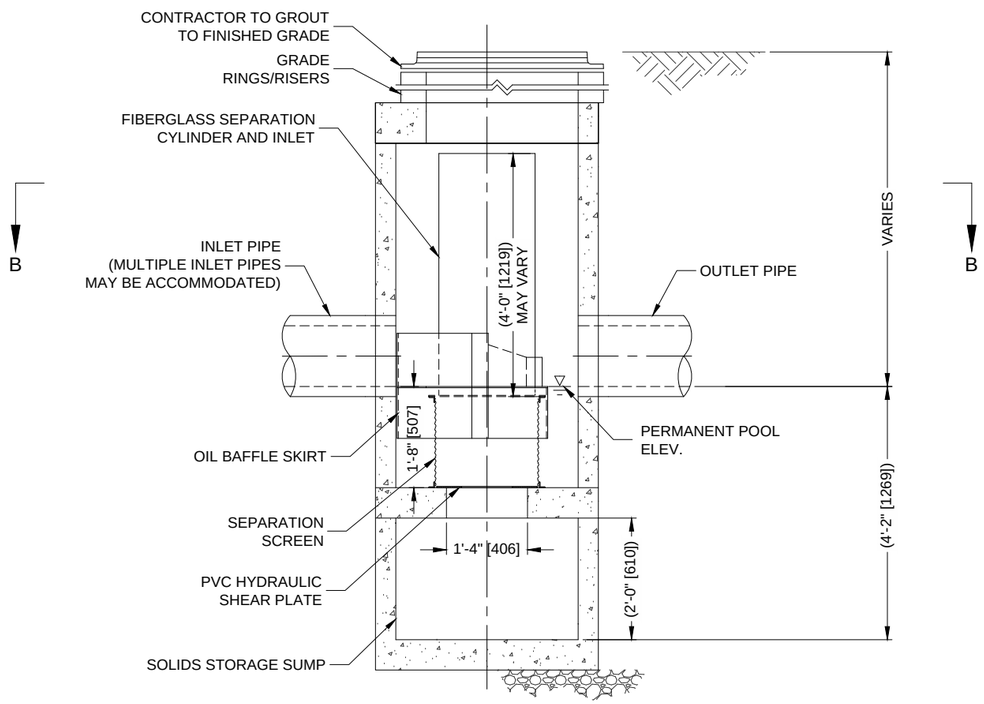
HDS

CDS CDS1515-3-C

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD								
Rainfall Intensity[1] (in/hr)	% Rainfall Volume[1]	Cumulative Rainfall Volume	Rainfall Volume Treated	Total Flowrate (cfs)	Treated Flowrate (cfs)	Operating Rate (%)	Removal Efficiency (%)	Incremental Removal (%)
							Removal Efficiency Adjustment[2] =	
							Predicted % Annual Rainfall Treated =	
							Predicted Net Annual Load Removal Efficiency =	
1 -								
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.								



PLAN VIEW B-B
N.T.S.

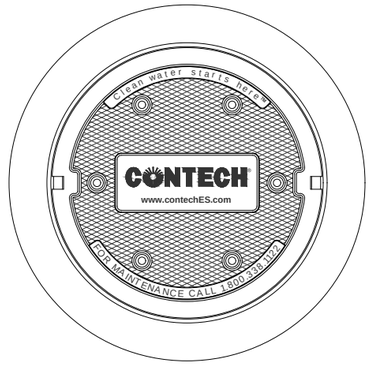


ELEVATION A-A
N.T.S.

THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS: 5,788,848; 6,641,720; 6,511,595; 6,581,781; RELATED FOREIGN PATENTS, OR OTHER PATENTS PENDING.

CDS1515-3-C DESIGN NOTES

THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST		WIDTH	HEIGHT
		*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO..
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CENTERLINES TO MATCH PIPE OPENING CENTERLINES.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CONTECH ENGINEERED SOLUTIONS LLC
www.contechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CDS1515-3-C
ONLINE CDS
STANDARD DETAIL

I:\STORMWATER\COMMOPS\22 CDS\40 STANDARD DRAWINGS\ONLINE (CDS-C)\DWG\CDS1515-3-C-DTL.DWG 8/10/2018 8:18 AM

SECTION (_____)
STORM WATER TREATMENT DEVICE

1.0 GENERAL

1.1 This item shall govern the furnishing and installation of the CDS® by Contech Engineered Solutions LLC, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.

1.2 The Contractor shall furnish all labor, equipment and materials necessary to install the storm water treatment device(s) (SWTD) and appurtenances specified in the Drawings and these specifications.

1.3 The manufacturer of the SWTD shall be one that is regularly engaged in the engineering design and production of systems deployed for the treatment of storm water runoff for at least five (5) years and which have a history of successful production, acceptable to the Engineer. In accordance with the Drawings, the SWTD(s) shall be a CDS® device manufactured by:

Contech Engineered Solutions LLC
9025 Centre Pointe Drive
West Chester, OH, 45069
Tel: 1 800 338 1122

1.4 Related Sections

1.4.1 Section 02240: Dewatering
1.4.2 Section 02260: Excavation Support and Protection
1.4.3 Section 02315: Excavation and Fill
1.4.4 Section 02340: Soil Stabilization

1.5 All components shall be subject to inspection by the engineer at the place of manufacture and/or installation. All components are subject to being rejected or identified for repair if the quality of materials and manufacturing do not comply with the requirements of this specification. Components which have been identified as defective may be subject for repair where final acceptance of the component is contingent on the discretion of the Engineer.

1.6 The manufacturer shall guarantee the SWTD components against all manufacturer originated defects in materials or workmanship for a period of twelve (12) months from the date the components are delivered to the owner for installation. The manufacturer shall upon its determination repair, correct or replace any manufacturer originated defects advised in writing to the manufacturer within the referenced warranty period. The use of SWTD components shall be limited to the application for which it was specifically designed.

1.7 The SWTD manufacturer shall submit to the Engineer of Record a “Manufacturer’s Performance Certification” certifying that each SWTD is capable of achieving the specified removal efficiencies listed in these specifications. The certification shall be supported by independent third-party research

1.8 No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the Engineer of Record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

2.0 MATERIALS

2.1 Housing unit of stormwater treatment device shall be constructed of pre-cast or cast-in-place concrete, no exceptions. Precast concrete components shall conform to applicable sections of ASTM C 478, ASTM C 857 and ASTM C 858 and the following:

- 2.1.1 Concrete shall achieve a minimum 28-day compressive strength of 4,000 pounds per square-inch (psi);
- 2.1.2 Unless otherwise noted, the precast concrete sections shall be designed to withstand lateral earth and AASHTO H-20 traffic loads;
- 2.1.3 Cement shall be Type III Portland Cement conforming to ASTM C 150;
- 2.1.4 Aggregates shall conform to ASTM C 33;
- 2.1.5 Reinforcing steel shall be deformed billet-steel bars, welded steel wire or deformed welded steel wire conforming to ASTM A 615, A 185, or A 497.
- 2.1.6 Joints shall be sealed with preformed joint sealing compound conforming to ASTM C 990.
- 2.1.7 Shipping of components shall not be initiated until a minimum compressive strength of 4,000 psi is attained or five (5) calendar days after fabrication has expired, whichever occurs first.

2.2 Internal Components and appurtenances shall conform to the following:

- 2.2.1 Screen and support structure shall be manufactured of Type 316 and 316L stainless steel conforming to ASTM F 1267-01;
- 2.2.2 Hardware shall be manufactured of Type 316 stainless steel conforming to ASTM A 320;
- 2.2.3 Fiberglass components shall conform to applicable sections of ASTM D-4097
- 2.2.4 Access system(s) conform to the following:
- 2.2.5 Manhole castings shall be designed to withstand AASHTO H-20 loadings and manufactured of cast-iron conforming to ASTM A 48 Class 30.

3.0 PERFORMANCE

3.1 The SWTD shall be sized to either achieve an 80 percent average annual reduction in the total suspended solid load with a particle size distribution having a mean particle size (d_{50}) of 125 microns unless otherwise stated.

3.2 The SWTD shall be capable of capturing and retaining 100 percent of pollutants greater than or equal to 2.4 millimeters (mm) regardless of the pollutant's specific gravity (i.e.: floatable and neutrally buoyant materials) for flows up to the device's rated-treatment capacity. The SWTD shall be designed to retain all previously captured pollutants addressed by this

subsection under all flow conditions. The SWTD shall be capable of capturing and retaining total petroleum hydrocarbons. The SWTD shall be capable of achieving a removal efficiency of 92 and 78 percent when the device is operating at 25 and 50 percent of its rated-treatment capacity. These removal efficiencies shall be based on independent third-party research for influent oil concentrations representative of storm water runoff (20 ± 5 mg/L). The SWTD shall be greater than 99 percent effective in controlling dry-weather accidental oil spills.

3.3 The SWTD shall be designed with a sump chamber for the storage of captured sediments and other negatively buoyant pollutants in between maintenance cycles. The minimum storage capacity provided by the sump chamber shall be in accordance with the volume listed in Table 1. The boundaries of the sump chamber shall be limited to that which do not degrade the SWTD's treatment efficiency as captured pollutants accumulate. The sump chamber shall be separate from the treatment processing portion(s) of the SWTD to minimize the probability of fine particle re-suspension. In order to not restrict the Owner's ability to maintain the SWTD, the minimum dimension providing access from the ground surface to the sump chamber shall be 16 inches in diameter.

3.4 The SWTD shall be designed to capture and retain Total Petroleum Hydrocarbons generated by wet-weather flow and dry-weather gross spills and have a capacity listed in Table 1 of the required unit.

3.5 The SWTD shall convey the flow from the peak storm event of the drainage network, in accordance with required hydraulic upstream conditions as defined by the Engineer. If a substitute SWTD is proposed, supporting documentation shall be submitted that demonstrates equal or better upstream hydraulic conditions compared to that specified herein. This documentation shall be signed and sealed by a Professional Engineer registered in the State of the work. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.6 The SWTD shall have completed field tested following TARP Tier II protocol requirements

4.0 EXECUTION

4.1 The contractor shall exercise care in the storage and handling of the SWTD components prior to and during installation. Any repair or replacement costs associated with events occurring after delivery is accepted and unloading has commenced shall be borne by the contractor.

4.2 The SWTD shall be installed in accordance with the manufacturer's recommendations and related sections of the contract documents. The manufacturer shall provide the contractor installation instructions and offer on-site guidance during the important stages of the installation as identified by the manufacturer at no additional expense. A minimum of 72 hours notice shall be provided to the manufacturer prior to their performance of the services included under this subsection.

4.3 The contractor shall fill all voids associated with lifting provisions provided by the manufacturer. These voids shall be filled with non-shrinking grout providing a finished surface consistent with adjacent surfaces. The contractor shall trim all protruding lifting provisions flush with the adjacent concrete surface in a manner, which leaves no sharp points or edges.

4.4 The contractor shall removal all loose material and pooling water from the SWTD prior to the transfer of operational responsibility to the Owner.

TABLE 1
Storm Water Treatment Device
Storage Capacities

CDS Model	Minimum Sump Storage Capacity $(yd^3)/(m^3)$	Minimum Oil Storage Capacity (gal)/(L)
CDS2015-4	0.9(0.7)	61(232)
CDS2015-5	1.5(1.1)	83(313)
CDS2020-5	1.5(1.1)	99(376)
CDS2025-5	1.5(1.1)	116(439)
CDS3020-6	2.1 (1.6)	184(696)
CDS3025-6	2.1(1.6)	210(795)
CDS3030-6	2.1 (1.6)	236(895)
CDS3035-6	2.1 (1.6)	263(994)
CDS3535-7	2.9(2.2)	377(1426)
CDS4030-8	5.6(4.3)	426(1612)
CDS4040-8	5.6 (4.3)	520(1970)
CDS4045-8	5.6 (4.3)	568(2149)
CDS5640-10	8.7(6.7)	758(2869)
CDS5653-10	8.7(6.7)	965(3652)
CDS5668-10	8.7(6.7)	1172(4435)
CDS5678-10	8.7(6.7)	1309(4956)
CDS7070-DV	3.6(2.8)	914 (3459)
CDS10060-DV	5.0 (3.8)	792 (2997)
CDS10080-DV	5.0 (3.8)	1057 (4000)
CDS100100-DV	5.0 (3.8)	1320 (4996)

END OF SECTION

Water Quality Flow Calculations

WATER QUALITY VOLUME (WQV) COMPUTATIONS FOR DRAINAGE BASIN HDS

Project: 1903601
Location: 64 Cambridge/4 Independence
Date: 05/05/21

Water Quality Volume Calculations:

$WQV = \frac{(1")(R)(A)}{12}$

Where:
WQV = water quality volume (ac-ft)
R = volumentric runoff coefficient = 0.05+0.009(I)
I = percent impervious cover (see below)
A = site area in acres

$I = \frac{A_{IMP}}{A_{TOT}} \times 100$

Where:
I = percent impervious cover
A_{IMP} = area of impervious cover
A_{TOT} = total area of watershed

Watershed Description:	HDS			
Area of impervious coverage, A_{IMP}	0.23	Acres		
Total area of watershed, A_{TOT}	0.31	Acres		
Percent impverious cover, I	74.19	%		
Volumentric runoff coefficient, R	0.72			
Water Quality Volume, WQV	0.019	ac-ft	808	cf

Groundwater Recharge Volume Calculations:

GRv = (P) (D) (I) / 12 *Section 7, Table 7-1, Summary of Stormwater Treatment Practice Sizing Criteria per 2004 Connecticut Stormwater Quality Manual*

GRv = Groundwater Recharge Volume (acre-feet)
P = 1" (90% rainfall event)
D = Recharge Factor, see Table
I = Impervious Area (acres)

Hydrologic Soil Group	Recharge Factor
A	0.60
B	0.40
C	0.25
D	0.10

Total Proposed Impervious Area
10,019 sq.ft.
0.23 acres

HSG - D
Recharge Factor
0.10

GRv = 0.002 acre-feet
83 ft^3

Water Quality Flow Calculations:

WQf = (qu)(A)(Q)
WQf = Peak Discharge for water quality event (cfs)
qu = unit peak discharge (cfs/mi^2 /in)
A = drainage area (square miles)
Q = runoff volume (WQv/A) (watershed inches)

$CN = 1000 / [10 + 5*P + 10*Q - 10*(Q^2 + 1.25*Q*P)^{1/2}]$ *Chapter 7 of 2004 Connecticut Stormwater Quality Manual*

P=	1	inches
Q=	0.074	inches
WQv =	0.002	acre-ft
Total Drainage Area =	0.31	acre
CN =	79.32	

Ia = 200/CN -2

Ia = 0.522

Compute Ia/P

P=	1	inches
Ia / P =	0.52	

Tc= 6 min
0.100 hr

Exhibit 4-III

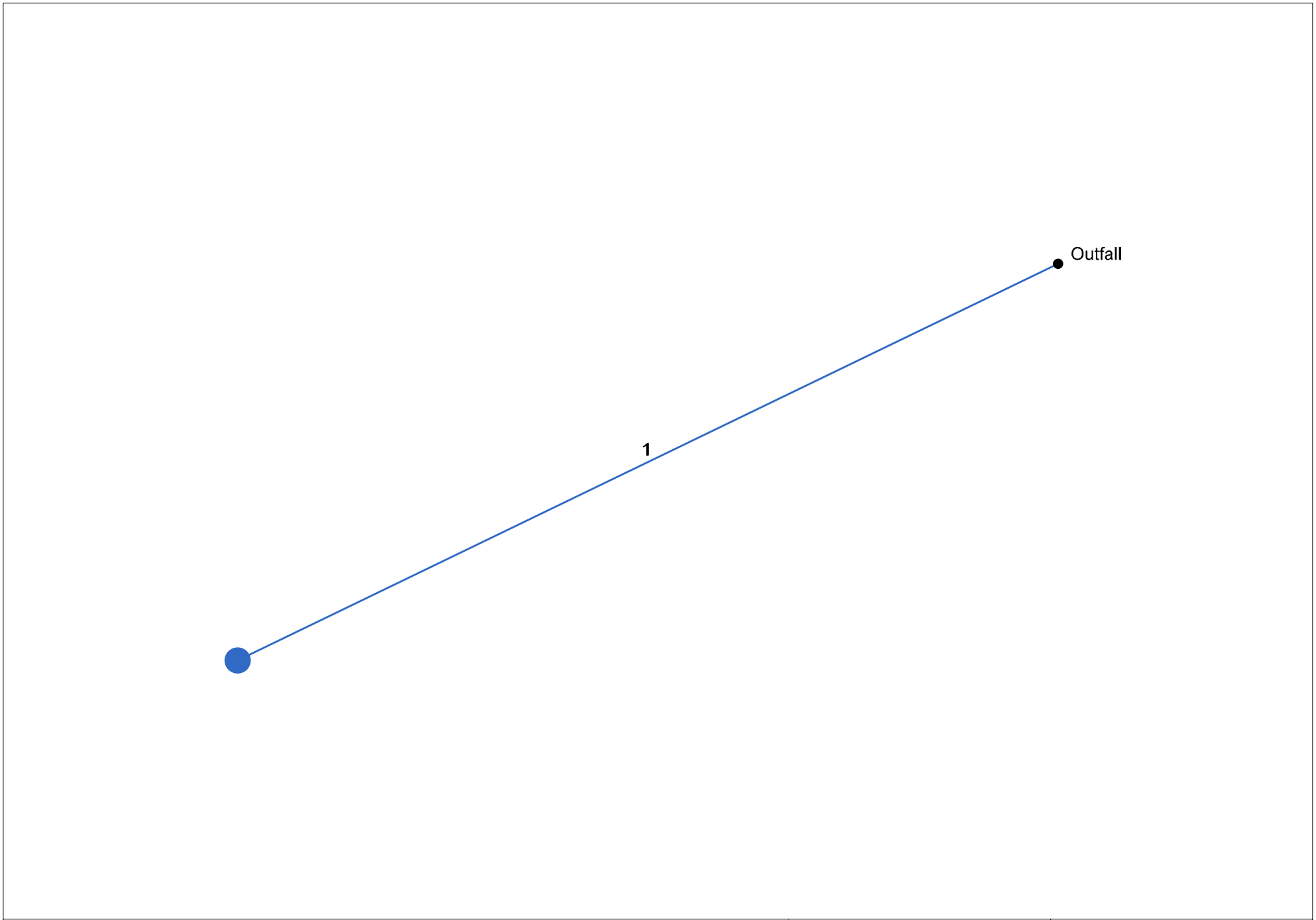
Tc=	0.100
Ia / P =	0.52
q_u =	320

WQf = (qu)(A)(Q)

qu =	320	csm/in
A =	0.000	mi^2 (acre/640)
Q =	0.074	inches
WQf =	0.01	cfs

Storm Sewers Report & Profiles

64 Cambridge Storm Sewers



Project File: Storm.stm	Number of lines: 1	Date: 5/5/2021

Structure Report

Struct No.	Structure ID	Junction Type	Rim Elev (ft)	Structure			Line Out			Line In		
				Shape	Length (ft)	Width (ft)	Size (in)	Shape	Invert (ft)	Size (in)	Shape	Invert (ft)
1		Grate	412.00	Cir	4.00	4.00	12	Cir	410.00			

Storm Sewer Tabulation

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	150.000	0.31	0.31	0.80	0.25	0.25	6.0	6.0	10.0	2.48	2.73	3.37	12	0.50	409.25	410.00	410.25	410.82	410.25	412.00	HYD-1

64 Cambridge Storm Sewers | Number of lines: 1 | Run Date: 5/5/2021

NOTES:Intensity = 49.85 / (Inlet time + 3.80) ^ 0.70; Return period =Yrs. 100 ; c = cir e = ellip b = box

Inlet Report

Line No	Inlet ID	Q = CIA (cfs)	Q carry (cfs)	Q capt (cfs)	Q Byp (cfs)	Junc Type	Curb Inlet		Grate Inlet			Gutter							Inlet			Byp Line No
							Ht (in)	L (ft)	Area (sqft)	L (ft)	W (ft)	So (ft/ft)	W (ft)	Sw (ft/ft)	Sx (ft/ft)	n	Depth (ft)	Spread (ft)	Depth (ft)	Spread (ft)	Depr (in)	
1		2.48	0.00	2.48	0.00	Grate	0.0	0.00	2.00	2.00	2.00	Sag	2.00	0.050	0.020	0.013	0.32	12.84	0.32	12.84	0.0	Off

64 Cambridge Storm Sewers | Number of lines: **1** | Run Date: 5/5/2021

NOTES: Inlet N-Values = 0.016; Intensity = 49.85 / (Inlet time + 3.80) ^ 0.70; Return period = 100 Yrs. ; * Indicates Known Q added. All curb inlets are throat.

Hydraulic Grade Line Computations

Line	Size	Q	Downstream								Len	Upstream								Check		JL coeff	Minor loss
			Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)		Invert elev (ft)	HGL elev (ft)	Depth (ft)	Area (sqft)	Vel (ft/s)	Vel head (ft)	EGL elev (ft)	Sf (%)	Ave Sf (%)	Enrgy loss (ft)		
(1)	(in) (2)	(cfs) (3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(ft) (12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(K) (23)	(ft) (24)
1	12	2.48	409.25	410.25	1.00	0.79	3.16	0.16	410.41	0.414	150.000	410.00	410.82	0.82	0.69	3.58	0.20	411.02	0.410	0.412	0.618	1.00	0.20

; c = cir e = ellip b = box

Hydraflow HGL Computation Procedure

General Procedure:

Hydraflow computes the HGL using the Bernoulli energy equation. Manning's equation is used to determine energy losses due to pipe friction. In a standard step, iterative procedure, Hydraflow assumes upstream HGLs until the energy equation balances. If the energy equation cannot balance, supercritical flow exists and critical depth is temporarily assumed at the upstream end. A supercritical flow Profile is then computed using the same procedure in a downstream direction using momentum principles.

Col. 1 The line number being computed. Calculations begin at Line 1 and proceed upstream.

Col. 2 The line size. In the case of non-circular pipes, the line rise is printed above the span.

Col. 3 Total flow rate in the line.

Col. 4 The elevation of the downstream invert.

Col. 5 Elevation of the hydraulic grade line at the downstream end. This is computed as the upstream HGL + Minor loss of this line's downstream line.

Col. 6 The downstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 7 Cross-sectional area of the flow at the downstream end.

Col. 8 The velocity of the flow at the downstream end, (Col. 3 / Col. 7).

Col. 9 Velocity head (Velocity squared / 2g).

Col. 10 The elevation of the energy grade line at the downstream end, HGL + Velocity head, (Col. 5 + Col. 9).

Col. 11 The friction slope at the downstream end (the S or Slope term in Manning's equation).

Col. 12 The line length.

Col. 13 The elevation of the upstream invert.

Col. 14 Elevation of the hydraulic grade line at the upstream end.

Col. 15 The upstream depth of flow inside the pipe (HGL - Invert elevation) but not greater than the line size.

Col. 16 Cross-sectional area of the flow at the upstream end.

Col. 17 The velocity of the flow at the upstream end, (Col. 3 / Col. 16).

Col. 18 Velocity head (Velocity squared / 2g).

Col. 19 The elevation of the energy grade line at the upstream end, HGL + Velocity head, (Col. 14 + Col. 18) .

Col. 20 The friction slope at the upstream end (the S or Slope term in Manning's equation).

Col. 21 The average of the downstream and upstream friction slopes.

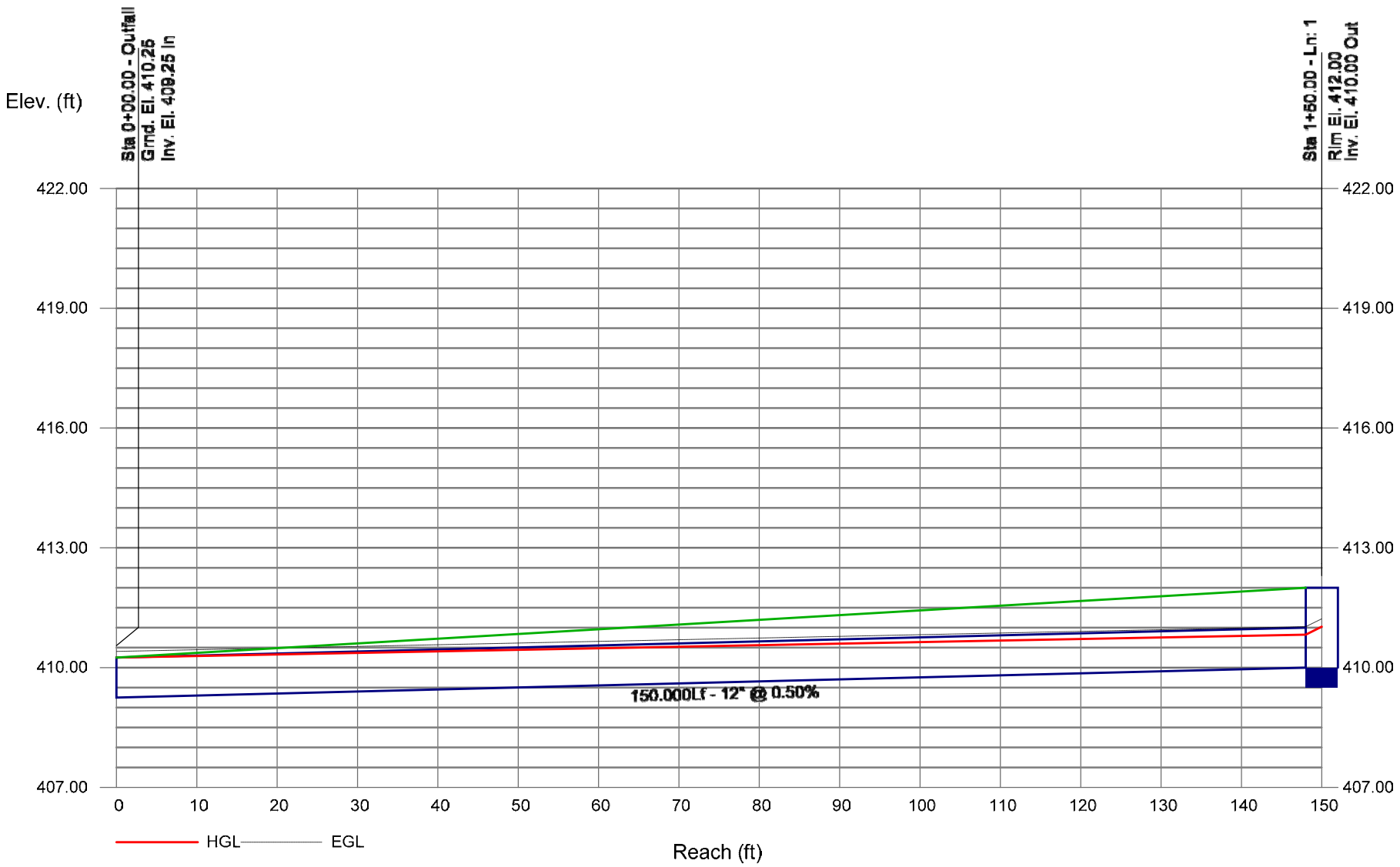
Col. 22 Energy loss. Average Sf/100 x Line Length (Col. 21/100 x Col. 12). Equals (EGL upstream - EGL downstream) +/- tolerance.

Col. 23 The junction loss coefficient (K).

Col. 24 Minor loss. (Col. 23 x Col. 18). Is added to upstream HGL and used as the starting HGL for the next upstream line(s).

Storm Sewer Profile

Proj. file: Storm.stm



Runoff Coefficient Calculations

Project **Proposed Site Remediation** By **AWC** Date **05/05/21**

Location **64 Cambridge Drive & 4 Independence Drive** Checked **KMS** Date **05/05/21**

Bold one: Present **Developed** **Proposed Subcatchment Area**

1. Runoff Coefficient ©

Soil Name and hydrologic group (Appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	C [1]			Area [x] acres [ ] mi^2 [ ] %	Product of C x area
D	Impervious Area	0.95			0.230	0.22
D	Pervious Area	0.35			0.080	0.03
						0.00
						0.00
						0.00
						0.00
						0.00
						0.00
1 Use only one C source per line				Totals =	0.310	0.25

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{0.25}{0.31} =$ 0.80 Use C = **0.80**

2. Runoff

		Storm 1	Storm 2	Storm 3
Frequency	yr			
Rainfall, P (24-hour)	in			
S				
Runoff, Q	in			

(Use P and CN with Table 2-1, Fig. 2-1,

APPENDIX C
UTILITY INFORMATION

Drainage Test Pit Logs

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 F: (203) 880-9695

Proposed Site Development & Restoration

64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut

TP-1

Project # 1903601

March 27, 2020

TEST PIT FIELD LOG

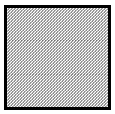
PERSONNEL PRESENT	EXCAVATION EQUIPMENT					
Chris Pawlowski	Contractor	Rockhead LLC			Assumed Ground Surface El.	419.00
Stuart Rudkin	Operator	Stuart Rudkin			Datum	
	Make	John Deere	Model	160	Temperature	55°F
	Bucket Capacity	2 YD	Reach	14'	Weather	Clear

Depth	Soil Description	Excav. Effort	Cobble and Boulder Data	Remark No.
0" - 48"	Miscellaneous fill	E/**M**/D	**C**/S/M/L	

REMARKS:

1. Ledge @ 48"

TEST PIT PLAN



North

LEGEND

COBBLES AND BOULDERS

Size Range Classification	Letter Designation
3" - 12"	Cobble (C)
12" - 24"	Small (S)
24" - 36"	Medium (M)
36" and Larger	Large (L)

PROPORTIONS USED (QUANTITATIVE TERMS)

TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

QUALITATIVE TERMS

OCCASIONAL
FEW
FREQUENT
NUMEROUS

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

▼ Observed Depth to Groundwater

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 F: (203) 880-9695

Proposed Site Development & Restoration

64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut

TP-2

Project # 1903601

March 27, 2020

TEST PIT FIELD LOG

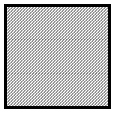
PERSONNEL PRESENT	EXCAVATION EQUIPMENT					
Chris Pawlowski	Contractor	Rockhead LLC			Assumed Ground Surface El.	410.00
Stuart Rudkin	Operator	Stuart Rudkin			Datum	
	Make	John Deere	Model	160	Temperature	55°F
	Bucket Capacity	2 YD	Reach	14'	Weather	Clear

Depth	Soil Description	Excav. Effort	Cobble and Boulder Data	Remark No.
0" - 6"	Miscellaneous sediment/silt	**E**/M/D	**C**/S/M/L	
6" - 72"	Olive brown coarse sandy loam	**E**/M/D	**C**/S/M/L	

REMARKS:

1. Mottles @ 32"
2. Possible ledge @ 72"

TEST PIT PLAN



North

LEGEND

COBBLES AND BOULDERS

Size Range Classification	Letter Designation
3" - 12"	Cobble (C)
12" - 24"	Small (S)
24" - 36"	Medium (M)
36" and Larger	Large (L)

PROPORTIONS USED (QUANTITATIVE TERMS)

TRACE (TR)	0-10%
LITTLE (LI)	10-20%
SOME (SO)	20-35%
AND	35-50%

QUALITATIVE TERMS

OCCASIONAL
FEW
FREQUENT
NUMEROUS

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

▼ Observed Depth to Groundwater

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468
T: (203) 880-5455 F: (203) 880-9695

Proposed Site Development & Restoration

64 Cambridge Drive & 4 Independence Drive, Monroe, Connecticut

TP-3

Project # 1903601

May 5, 2020

TEST PIT FIELD LOG

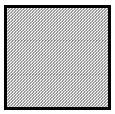
PERSONNEL PRESENT	EXCAVATION EQUIPMENT					
Chris Pawlowski	Contractor	Rockhead LLC			Assumed Ground Surface El.	430.50
Stan Tiburske	Operator	Stan Tiburske			Datum	
	Make	John Deere	Model	360	Temperature	60°F
	Bucket Capacity	4 YD	Reach	16'	Weather	Clear

Depth	Soil Description	Excav. Effort	Cobble and Boulder Data	Remark No.
0" - 16"	Topsoil	**E**/M/D	**C**/S/M/L	
16" - 36"	Miscellaneous sediment/silt	**E**/M/D	**C**/S/M/L	
36" - 48"	Yellow-brown fine sandy loam	**E**/M/D	**C**/S/M/L	
48" - 110"	Olive brown coarse sandy loam, little silt	**E**/M/D	**C**/S/M/L	

REMARKS:

1. Ledge @ 110"

TEST PIT PLAN



North

LEGEND

COBBLES AND BOULDERS

Size Range Classification	Letter Designation
3" - 12"	Cobble (C)
12" - 24"	Small (S)
24" - 36"	Medium (M)
36" and Larger	Large (L)

PROPORTIONS USED (QUANTITATIVE TERMS)

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AND	35-50%

QUALITATIVE TERMS

OCCASIONAL
FEW
FREQUENT
NUMEROUS

EXCAVATION EFFORT

E - Easy
M - Moderate
D - Difficult

▼ Observed Depth to Groundwater

APPENDIX D
MATERIAL ACCEPTANCE PROCEDURE

Material Acceptance Procedure
Excerpt from “Connecticut Department of Environmental Protection’s Regulations for Solid Waste Management”

Rockhead Material Acceptance Procedure
64 Cambridge Drive & 4 Independence Drive
Monroe, CT 06468

Revised August 2020

1.0 PURPOSE:

The purpose of this document is to provide guidance for implementing a procedure for materials received by ROCKHEAD facilities to confirm that they meet the requirements for clean fill.

2.0 SCOPE:

This procedure applies to all ROCKHEAD recyclable materials handling operations.

3.0 RESPONSIBILITIES:

ROCKHEAD personnel shall:

1. Conduct initial screening of material as described within this procedure.
2. Confirm that only customers with signed Certificates of Conformance will deposit material at any ROCKHEAD facility.
3. Timely process all Certificates of Conformance.

These procedures will be updated as necessary to conform with all applicable environmental regulations.

4.0 DEFINITIONS:

Certificate of Conformance (C/C)- A document used to check that the owner or generator of material brought to the sight has read and agreed to abide by ROCKHEAD requirements that only material on the Material Acceptance List are allowed at the site. (Exhibit A)

Clean Fill - "Clean fill" means (1) natural soil (2) rock, stone, sand, gravel, brick, ceramics, clean concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard and (3) polluted soil as defined in subdivision (50) of subsection (a) of section 22a-133k-1 of the Regulations of Connecticut State Agencies, (the “RSRs”), which soil has been treated to reduce the concentration of pollutants to levels which do not exceed the applicable pollutant mobility criteria and direct exposure criteria established in sections 22a-133k-1 through 22a-133k-3 of the RSRs and which soil is reused in accordance with Section 22a-133k-2(h)(3) of the RSRs.

Material Acceptance List — a document developed to ensure compliance with the CTDEEP definition of clean fill which includes uncontaminated soil, rock, stone, sand, gravel, concrete, brick and asphalt fragments. (Exhibit B)

Natural soil - means soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is found at a concentration greater than its analytical detectable limit. See Section 22a-133k-2 (h)(4) of the RSRs.

PID Meter- tool used to initially screen incoming materials for volatile organics

5.0 PROCEDURE:

5.1 Scale House Review

5.1.1 All drivers will be asked to:

- Identify the company they represent
- Provide signed C/C

5.1.2 ROCKHEAD personnel will confirm receipt of a signed CC. This ensures that the customer agrees to abide by ROCKHEAD's restrictions of acceptable materials that can be brought to the site. If the customer does not have a signed C/C, the load will be rejected. The customer will be given a copy of the C/C to complete and return at a later time for use on a future load of material.

5.1.3 The type and source of the material the customer is transporting is then checked against the Material Acceptance List provided in Exhibit B by ROCKHEAD personnel. If the material passes this requirement, a location will be designated to the driver to dump the load.

5.2 Field Operator Review/Verification

5.2.1 ROCKHEAD personnel will conduct a visual inspection of the load at the dumping location to verify that only material identified in Exhibit B is accepted. If the load contains soils, the procedures under Sections 5.3 and 5.4 are to be followed.

5.3 Soil Screening

5.3.1 Soils proposed to be deposited and used as fill must have been tested by the owner or generator using current test methods for the following substances:

Extractable Petroleum Hydrocarbons (ETPH)

Polychlorinated Biphenyls (PCBs)

Total Metals (As, Ba, Cd, Cr, Pb, Se, Ag)

Total Mercury (Hg)

Metals by Toxicity Characteristic Leaching Procedure

Semi-volatile Organic Compounds (SVOCs)

Volatile Organic Compounds (VOCs)

Any other substance reasonably expected to be present based on the environmental conditions at the material source

5.3.2 Soil sampling results should be submitted to Rockhead for its review and approval at least 5 days prior to transport of fill material to the facility. The application for approval should include a description of how the material was generated, the history of the site, and the sampling procedures. (Exhibit D)

5.3.3 A properly calibrated PID meter will be used to evaluate each load of soil that enters the facility. This will be performed by ROCKHEAD personnel prior to accepting the material on-site. If any odor or PID readings above background levels are detected, the material will be rejected and not allowed to remain at the facility. The decision as to whether an odor is above background is up to the discretion of Rockhead.

5.4 Rockhead Quality Assurance / Quality Control Procedures

5.4.1 Material proposed to be deposited and used as fill at the property shall be evaluated in accordance with the analytical testing requirements indicated below.

5.4.2 Material must be randomly sampled for chemical constituents and physical characteristics according to prevailing standards and practices for collection and analyzing soil and sediment samples. The required random sampling frequency to be completed by Rockhead shall be one sample per 3,000 cubic yards of materials imported to the facility.

6.0 EDUCATION AND TRAINING:

ROCKHEAD will require that any of its employees involved in the acceptance of materials are familiar with this procedure.

7.0 REFERENCES

Exhibit A – Certificate of Conformity

Exhibit B – Material Acceptance List

Exhibit C – Automatically Rejected Materials

Exhibit D – Soil Disposal Application

Exhibit A

CERTIFICATE OF CONFORMITY

I (we) certify that all materials delivered to Rockhead LLC, 64 Cambridge Drive and/or 4 Independence Drive in Monroe, Connecticut, contain only materials which meet the state of Connecticut Department of Energy and Environmental Protection Sec. 22a-209-1 definition of "Clean Fill".

"Clean Fill" means (1) natural soil (2) rock, stone, sand, gravel, brick, ceramics, clean concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard. I (we) also certify that these materials do not contain, nor are they mixed with hazardous wastes, hazardous materials, oil or petroleum, waste oil or chemical liquids regulated by local, state and/or federal law.

In addition, I (we) agree to defend, indemnify and hold harmless ROCKHEAD, LLC, Astro Land Holdings, LLC, Spacely Land Holdings, LLC and their respective officers, agents and employees from any harm, damage or loss resulting from a delivery that does not conform to these restrictions.

Company Name:

_____

Signature:

By:_____

Print Name: _____

Its:_____
Duly Authorized

Dated:_____

Exhibit B

Acceptable Materials

- Natural Soil
- Rock
- Stone
- Sand
- Gravel
- Clean Concrete
- Ceramics
- Brick
- Asphalt Paving Fragments

Exhibit C

Automatically Rejected Materials

Contaminated soil
Odorous material
Concrete pipe/holding tanks
Stained/painted concrete
Concrete with residual mastic
Electrical wires
Fabrics
Roofing/siding
Vinyl tile
Floor coverings
Glass
Wood/brush
Stumps
Materials from
Batteries
Insulation
Other Construction Debris
Trash
Rubber/tires
Plaster/lath/sheet rock
Surfacing materials/stucco
Scrap metal
"High Risk" usages - at discretion of management. Examples include: auto facilities, machine shops, metal finishing operations, etc.

Exhibit D

Soil Disposal Application

1. History of site from which soil was removed, including whether the site is now or formerly enrolled in the Voluntary Remediation Program or the CT Transfer Act:

2. Description of soil excavation – amount, etc.

3. Attach results of soil analysis confirming compliance with the Connecticut Remediation Standard Regulations for the following substances:

Extractable Petroleum Hydrocarbons (ETPH)

Polychlorinated Biphenyls (PCBs)

Total Metals (As, Ba, Cd, Cr, Pb, Se, Ag)

Total Mercury (Hg)

Metals by Toxicity Characteristic Leaching Procedure

Semi-volatile Organic Compounds (SVOCs)

Volatile Organic Compounds (VOCs)

Any other substance reasonably expected to be present based on the environmental conditions at the material source

4. Samples shall be taken at source site for every 250 yards of export unless virgin material source information is provided showing a clean site history and no evidence of fill, industrial or agricultural use.

Connecticut Secretary of the State
Authenticated Electronic Legal Material

Agency
Department of Environmental Protection

Subject
Solid Waste Management

Inclusive Sections
§§ 22a-209-1—22a-209-17

CONTENTS

Sec. 22a-209-1. Definitions
Sec. 22a-209-2. Prohibition of open dumps
Sec. 22a-209-3. Applicability
Sec. 22a-209-4. Permits for solid waste facilities
Sec. 22a-209-5. Contract approvals
Sec. 22a-209-6. Certification of operators
Sec. 22a-209-7. Solid waste disposal areas
Sec. 22a-209-8. Special waste disposal
Sec. 22a-209-9. Solid waste transfer stations
Sec. 22a-209-10. Resource recovery facilities and other volume reduction plants
Sec. 22a-209-11. Variances
Sec. 22a-209-12. Violations
Sec. 22a-209-13. Closing of solid waste facilities
Sec. 22a-209-14. Disposal of residue
Sec. 22a-209-15. Biomedical waste
Sec. APPENDIX I.
Sec. 22a-209-16. Fees for transfer of a permit to construct or a permit to operate a solid waste facility
Sec. 22a-209-17. Mercury-containing lamps

Solid Waste Management

Sec. 22a-209-1. Definitions

"AASHTO specification" means a standard of performance for buried structures set forth in "Standard Specifications for Transportation Materials," published by the American Association of State Highway and Transportation Officials in 1989, 14TH edition.

"All weather access" means that affected roads or land surface can support operation of vehicles for the transportation of solid waste and vehicles for the maintenance of solid waste facilities under all normal climatic conditions, provided that snow is removed and flooding is precluded.

"Alter" (1) when referring to a solid waste facility which has no permit, means to change the existing configuration or method of operation of the facility in any manner, including but not limited to adding to the volume of solid waste deposited at the facility; (2) when referring to a solid waste facility which holds a permit, means to change the approved configuration or method of operation of the facility in any manner, including but not limited to adding to the approved volume of solid waste deposited at the facility.

"Asbestos" means actinolite, amosite, antnophyllite, chrysotile, crocidolite, tremolite, or any material which contains the above, all or part of which is in a friable state.

"ASTM specification" means a standard for pipes or other construction materials set forth in "Annual Book of ASTM Standards," published by the American Society of Testing Materials in 1989.

"Base flood" means a flood that has a one percent or greater chance of recurring in any year or a flood of a magnitude equaled or exceeded once in 100 years on the average over a significantly long period. If the Commissioner deems it necessary for a particular location, the base flood shall represent a less common occurrence as specified by him or her.

"Bird hazard" means an increase in the likelihood of bird/aircraft collisions that may cause damage to the aircraft or injury to its occupants.

"Bulky waste" means landclearing debris and waste resulting directly from demolition activities other than clean fill.

"Cell construction method" means the spreading, compacting and daily covering of solid wastes through use of the area, ramp, or trench methods of landfilling.

"Certified operator" means the solid waste facility operator or an employee of the such operator who is present on site and oversees or carries out the daily operation of the facility, and whose qualifications are approved in accordance with Section 22a-209-6 of the Regulations of Connecticut State Agencies.

"Certified soil scientist" means a person who has been certified as a soil scientist by the Board of Directors of the Society of Soil Scientists of Southern New England.

"Clean fill" means (1) natural soil (2) rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard and (3) polluted soil as defined in subdivision (45) of subsection (a) of section 22a-133k-1 of the Regulations of Connecticut State Agencies which soil has been treated to reduce the concentration of pollutants to levels which do not exceed the

applicable pollutant mobility criteria and direct exposure criteria established in sections 22a-133k-1 through 22a-133k-3 of the Regulations of Connecticut State Agencies and which soil is reused in accordance with R.C.S.A. subdivision (3) of subsection (h) of section 22a-133k-2 of such regulations.

"Cover material" means soil, or other suitable material as approved by the Commissioner, which is used to cover compacted solid waste in a solid or special waste disposal area. Any soils used shall be classified as GM, silty gravels, poorly graded gravel-sand-silt mixtures; GC, clayey gravels, poorly graded gravel-sand-clay mixtures; SM, silty sands, poorly graded sand-silt mixtures; SC, clayey sands, poorly graded sand-clay mixtures; ML, inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity in accordance with the unified soil classification system.

"Dewater" means to subject material to a process that removes water.

"Dioxin sampling well" means a stainless steel ground water monitoring well installed within the area of predicted leachate plume from any portion of a solid waste facility at which residue is disposed.

"Facility plan" means the engineering studies and proposals to build, establish, alter, operate, monitor and close a solid waste facility, required by Section 22a-209-4(b) (2) of the Regulations of Connecticut State Agencies.

"Floodplain" means the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, which are inundated by the base flood.

"Friable" means readily crumbled, pulverized or reduced to powder, when dry, by hand pressure.

"Geotextile" means a woven or nonwoven fabric or film which is utilized for the engineering management of soil and water.

"Groundwater" means water present in the zone of saturation.

"Groundwater monitoring well" means a dug, driven or drilled well used to determine groundwater elevation, direction of groundwater flow, or the quality of groundwater.

"Hazardous Waste" means any waste material which may pose a present or potential hazard to human health or the environment when improperly treated, stored, transported or disposed of or otherwise managed, including hazardous waste identified in accordance with Section 3001 of the Resource Conservation and Recovery Act of 1976 (42 USC 6901 et seq.) as amended.

"Leachate" means that liquid which results from ground or surface water which has been in contact with solid waste and has extracted material, either dissolved or suspended, from the solid waste.

"Lift" means a horizontal layer of cells within a solid waste disposal area at which the cell construction method is utilized.

"Lower explosive limit" means the lowest percent by volume of gas which will propagate a flame in air at 25°C and atmospheric pressure.

"Maximum high water table" means the highest elevation reached by the upper level of

APPENDIX E
INSPECTION & MAINTENANCE PLAN

Long-Term Inspection & Maintenance Plan

LONG-TERM INSPECTIONS & MAINTENANCE MANUAL

For The Proposed:

Site Development & Restoration

Located At:
64 Cambridge Drive & 4 Independence Drive
Monroe, Connecticut 06468

Prepared On:
May 26th, 2020

Submission for:
Site Development Plan &
Inland Wetlands Application

Prepared By:

SOLLI ENGINEERING

501 Main Street, Suite 2A
Monroe, Connecticut 06468
T: (203) 880 - 5455

Prepared For:

Astro Land Holdings LLC & Spacely Land Holdings LLC

16 Cross Street
New Canaan, Connecticut 06840

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INTRODUCTION

The long-term Stormwater Management System Operations and Maintenance (O&M) Plan, filed with the Town of Monroe, shall be implemented at the proposed Site Redevelopment & Restoration at 64 Cambridge Dive & 4 Independence Drive, to ensure that the stormwater management functions as designed. The owner possesses the primary responsibility for overseeing and implementing the O&M plan and assigning a Property Manager who will be responsible for the proper operation and maintenance of the stormwater structures. In case of transfer of property ownership, future property owners shall be notified of the presence of the stormwater management system and the requirements for proper implementation of the O&M plan. Included in the manual is the O&M plan identifying key components of the stormwater system as well as a log for tracking inspections & maintenance.

The stormwater management system protects and enhances the stormwater runoff water quality through the removal of sediment and pollutants, and source control significantly reduces the amount of pollutants entering the system. Preventive maintenance of the system will include a comprehensive source reduction program of regular vacuuming and litter removal, prohibitions on the use of pesticides and maintenance of designated waste and recycling.

RESPONSIBILITY

The purpose of the Stormwater Operations and Maintenance (O&M) plan is to ensure inspection of the system, removal of accumulated sediments, oils, and debris and implementation of corrective action and record keeping activities. The below O&M activities associated with the site will be performed by a Contract Operator for the scope of maintenance. The Contract Operator will be a professional engineer or other technical professional with expertise and experience with stormwater management facilities operation and maintenance.

The ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided:

Responsibility for Operations and Maintenance

Contact:	Astro Land Holdings LLC & Spacely Land Holdings LLC
Address:	16 Cross Street
City, State:	New Canaan, Connecticut 06840

DOCUMENTATION

An inspection and maintenance record log and schedule will be kept by the Owner or Property Manager summarizing inspections, maintenance, repairs and any corrective actions taken. The log will include the date on which each inspection or maintenance task was performed, a description of the inspection findings or maintenance completed, and the name of the inspector or maintenance personnel performing the task. If a maintenance task requires the clean-out of any sediments or debris, the location where the sediment and debris was disposed after removal will be indicated. Inspection & Maintenance Logs will be kept on file at the on-site Property Management office.

MAINTENANCE PROGRAM

The Owner, Property Manager and maintenance staff will conduct the Operation and Maintenance program set forth in this document. The Owner or Property Manager will ensure that inspections and record keeping are timely and accurate, and that cleaning and maintenance are performed in accordance with the recommended frequency for each stormwater component. Inspection & Maintenance Log Forms, shall include the date and the amount of the last significant storm event in excess of 1" of rain in a 24-hour period, physical conditions of the structures, depth of sediment in structures, evidence of overtopping or debris blockage and maintenance required of each structure. The following areas, facilities and measures will be inspected by the Owner or Property Manager and maintained as specified below. Identified deficiencies will be corrected. Accumulated sediments and debris will be properly handled and disposed of off-site, in accordance with local, state, and federal guidelines and regulations.

OUTLET CONTROL STRUCTURES

Outlet control structures are concrete structures which are designed to retain removed trash, debris, and coarse sediment from stormwater runoff and serve as temporary spill containment devices for floatables such as oil and greases prior to discharge into a storm sewer pipe. The functions of a deep sump catch basin include:

- A grate and/or vertical notch found in the curbing that allow stormwater to enter the structure while filtering out larger objects such as trash and leaves.

At a minimum, outlet control structures shall be inspected twice per year. Ideally, inspections should be conducted in the fall, at the end of the leaf-drop, in the spring following snow-melt and following heavy rain falls, defined as a storm event exceeding one inch of rain fall within a twenty-four hour period to verify that inlet openings are not clogged by debris. Each structure should be cleaned whenever the depth of sediment deposits is greater than or equal to one half the depth of the sump from the bottom of the structure to the bottom of the lowest pipe invert. Structures shall be inspected for a buildup of sediments, oils, debris, cracks, breaks, or deformations. Any function of the structure that is not in working order will be replaced with similar materials, as per detail, to prevent the storm sewer system from failing.

The structures shall be cleaned by means of handheld shovels, scallop shovel and/or vacuum truck. Vacuum truck may be required instead of shovels to avoid damage to structure. The grate opening shall be clear of any foreign or lodged object. If floating hydrocarbons are observed during an inspection, the

material should be removed immediately by skimming, absorbent materials or other methods and salts used in the winter will be removed from the structure sumps in the early spring. Leaves, pine needles and branches brought down by autumn winds, rain, and cold weather will be removed from the structure sumps in the late fall. Collected sediment, debris and hydrocarbons will be properly disposed of per local, state and federal requirements.

RIPRAP APRON OUTLET PROTECTION

Inspect at least once annually for accumulation of sediment and debris and for signs of erosion within approach channel, riprap apron or down-slope of the apron. Remove debris whenever observed during inspection. Remove sediment when accumulation exceeds 25% of riprap depth. Snow should not be stored within or down-slope of the riprap apron. Repair any erosion and re-grade or replace riprap material, as warranted by inspection. Reconstruct the riprap apron if down-slope channelization indicates that the apron is not level or that discharge has become concentrated, and corrections cannot be made through minor re-grading.

PESTICIDES, HERBICIDES AND FERTILIZERS

Pesticides and herbicides shall be used sparingly. Fertilizers should be restricted to the use of organic fertilizers only. Exterior storage of fertilizers, herbicides, pesticides or other toxic or hazardous materials should be prohibited.

TRASH REMOVAL

Once a month the owner of the site or a designated property manager should walk the site and remove any debris or trash that is seen. The site walk shall include the existing surface detention basin to the east of the retaining wall and the surrounding wooded area adjacent to the edge of the proposed paved area to the south. All trash and debris are to be collected and disposed of in an approved manner.

SNOW REMOVAL

Snow accumulations removed from roadway, driveway and parking areas should be placed in areas outlined on the approved Overall Site Plan (Sheet 2.10) where sand and other debris will remain after snowmelt for later removal. Excess snow should be removed from the site and properly disposed of in an approved snow disposal facility. Care must be exercised not to deposit snow in the following areas: on top of storm drain catch basins; in natural depressions and where sand and debris can directly get into the watercourse.

STREET SWEEPING

Street sweeping is a pollution prevention practice that removes sediment, debris and trash that accumulates along streets and roads from winter sanding practices and everyday use. Street sweeping is often performed to improve aesthetics and to reduce the export of sand to the drainage network and receiving waters. In addition to sediment, debris and trash, other pollutants that may be minimized through street sweeping include some nutrients, oxygen-demanding substances and trace metals.

There are three typical types of sweeping methods, including mechanical, regenerative-air and vacuum-assisted. Mechanical sweepers are the most common and use rotating brooms or brushes to force debris from the pavement. Regenerative-air sweepers combine the rotating brooms of mechanical sweepers with forced air to dislodge the remaining dirt and use a high-power vacuum to pick up the dislodged particles. Vacuum filter sweepers are available in wet and dry types. Dry types use brooms to agitate the sediment prior to vacuuming. Wet types work in a similar fashion but use water to suppress dust during the collection activity. Vacuum sweepers and regenerative air sweepers are considered the more effective than the mechanical sweeper.

At a minimum, street sweeping should be performed once annually, preferably as soon as possible after the snow melts to reduce the amount of sand, grit, and debris and associated pollutants from winter sanding from entering surface waters. Identify areas of concern based on traffic volume, land use, field observations of sediment and trash accumulation and proximity to surface waters. Increase sweeping frequency in these areas to maximize pollutant removal benefits.

EMERGENCY SPILL CONTAINMENT

The Owner, along with the on-site Property Manager is responsible for educating staff and informing tenants on the environmental benefits associated with the use of pavement at the site. Staff must be trained, and tenants informed via the community website as to the proper spill prevention control and response procedures should a spill occur on the pavement surface. Proper spill control products, such as a granular dry absorbent, must be kept on-site at the property management office in a clean, dry chemical and corrosion resistant container.

A spill of greater than 10 gallons of oil or a spill of any quantity that has reached a surface water, into a sewer, storm drain, ditch, or culvert leading to a surface water, is immediately reported to one or more municipal, state, or federal authority.

In the event of a hazardous waste spill on-site, the following protocol should be followed.

- If it is safe to do so, maintenance staff or tenants detecting an oil spill should immediately stop the release and use available materials to prevent the spread of oil, Tetra Tech 6 particularly from discharging towards leaching catch basins located within the access driveway.
- If there is a potentially flammable, toxic or explosive condition, evacuate the vicinity of the spill.
- If it’s believed that a reportable or dangerous condition exists, immediately call your local Fire Department to notify them of the release.
- If it is believed that a reportable condition exists, immediately call the Connecticut Department of Energy & Environmental Protection (CT DEEP) to notify them of the release. Call the CT DEEP Emergency Response Section toll free statewide number, 860-424-3338. Be prepared to provide the following information to the CT DEEP and the Fire Department:
    - Identity of the caller
    - Contact phone number
    - Location of the spill

    - Type of product spilled
    - Approximate quantity or product spilled
    - Extent of actual and/or potential water pollution
    - Date and time of spill
    - Cause of spill
- Contact a Licensed Site Professional (LSP) to assist in further handling of the material(s) and DEP.

	Title:	**Inpsection #:**
	Location:	**Project #:**
		Field Date:

INSPECTION & MAINTENANCE LOG

Name(s) & Title(s) of Individual(s) performing inspection: _____

Week of Inspection: _____

Type of Inspection:

☐ **Monthly** ☐ **Quarterly** ☐ **Biannually** ☐ **Annually** ☐ **Emergency**

Weather (during inspection)

☐ **Clear** ☐ **Cloudy** ☐ **Rain** ☐ **Snow** ☐ **Sunny** ☐ **Windy** ☐ **Fog**

Other:

Time of Inspection:		**Temp. during inspection:**	°F
Start Time:	**a.m.** **End Time:** **a.m.**	**Precip. since last inspection:**	"

Site Specific BMP's

#	BMP	Maintenance Required	Corrective Action Needed & Notes
1		☐ Yes ☐ No	
2		☐ Yes ☐ No	
3		☐ Yes ☐ No	
4		☐ Yes ☐ No	
5		☐ Yes ☐ No	
6		☐ Yes ☐ No	
7		☐ Yes ☐ No	
8		☐ Yes ☐ No	
9		☐ Yes ☐ No	
10		☐ Yes ☐ No	

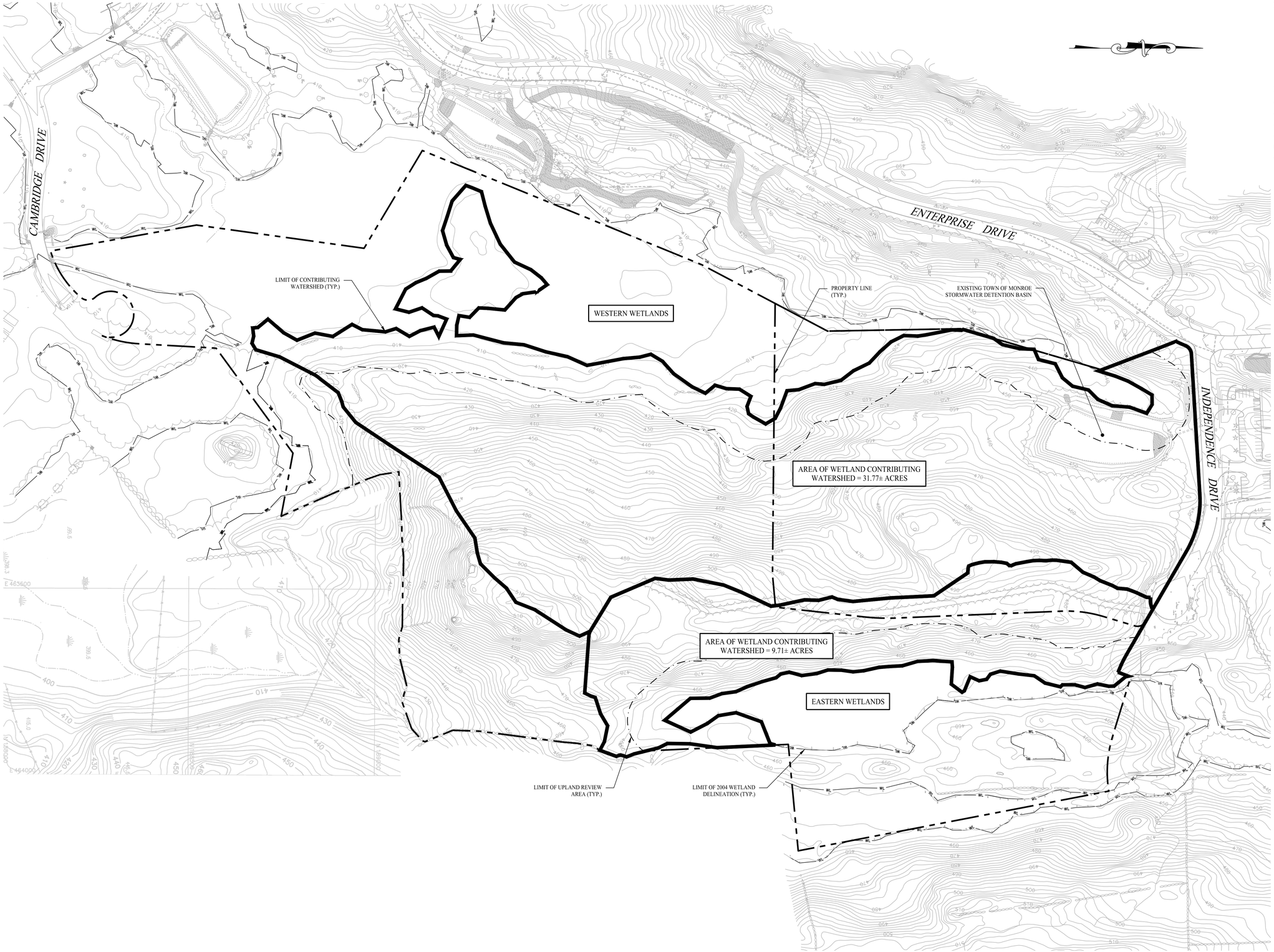
Overall Site Maintenance Concerns

BMP/Activity	Maintenance Required	Corrective Action Needed & Notes
Are discharge points & receiving waters free of any sediment deposits?	☐ Yes ☐ No	
Are storm drain inlets properly working?	☐ Yes ☐ No	
Is trash/litter from site areas collected & placed in covered dumpsters?	☐ Yes ☐ No	
What is the level of sediment within the storwmater basins?	☐ Yes ☐ No	
What is the level of sediment within the outlet control structures?	☐ Yes ☐ No	
(Other)	☐ ☐ Yes ☐ No	

Inspector(s) Signature(s): _____

APPENDIX F
PLANS

Watershed Area Maps (WS1, WS2, WS3, WS4)



GENERAL NOTES

1. 2004 WETLAND AND TOPOGRAPHIC INFORMATION TAKEN FROM A PLAN ENTITLED "PEPPER STREET BUSINESS PARK LAYOUT PLAN, PEPPER STREET MONROE, CONNECTICUT, PREPARED FOR MONROE LAND HOLDINGS, LLC" DATED OCTOBER 26, 2005, REVISED NOVEMBER 7, 2005, SCALE: 1"=200', BY SPATH-BJORKLUND ASSOCIATES, INC. WETLANDS WERE DELINEATED IN 2004 BY ENVIRONMENTAL PLANNING SERVICES.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- 2004 WETLANDS DELINEATION
- LIMIT OF WATERSHED
- LIMIT OF UPLAND REVIEW AREA

Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	CJB
Approved By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" =120'

Kevin Solli, P.E.
CT 25759

Project:

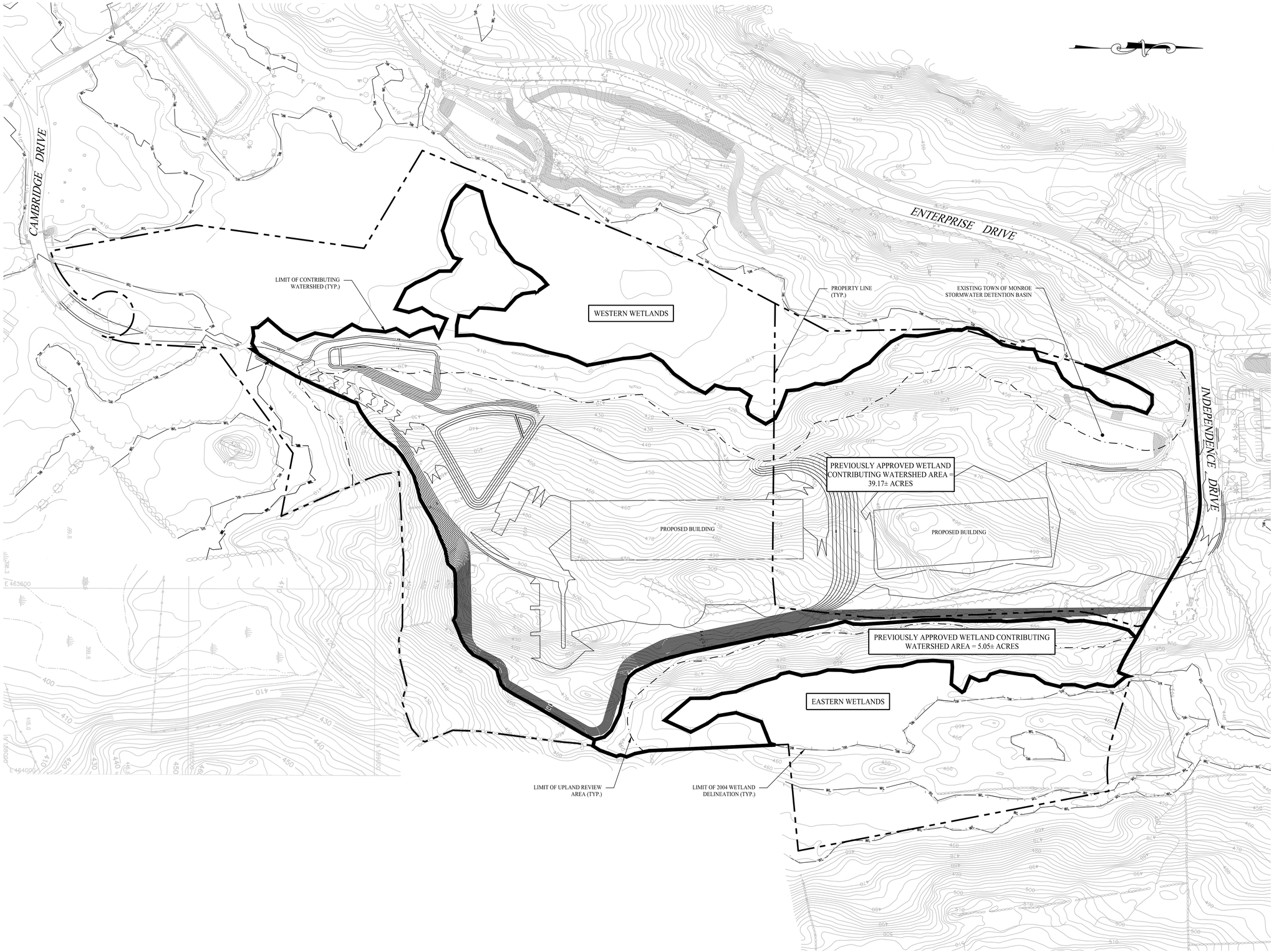
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: PRE-EXISTING WATERSHED AREA MAP

Sheet #: WS-1

May 07, 2021 - 11:17am anthony
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GENERAL NOTES

1. 2004 WETLAND AND TOPOGRAPHIC INFORMATION TAKEN FROM A PLAN ENTITLED "PEPPER STREET BUSINESS PARK LAYOUT PLAN, PEPPER STREET MONROE, CONNECTICUT, PREPARED FOR MONROE LAND HOLDINGS, LLC" DATED OCTOBER 26, 2005, REVISED NOVEMBER 7, 2005, SCALE: 1"=200', BY SPATH-BJORKLUND ASSOCIATES, INC. WETLANDS WERE DELINEATED IN 2004 BY ENVIRONMENTAL PLANNING SERVICES.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- 2004 WETLANDS DELINEATION
- LIMIT OF WATERSHED
- LIMIT OF UPLAND REVIEW AREA

Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

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Drawn By:	CJP
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Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 120'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: PREVIOUSLY APPROVED WATERSHED AREA MAP

Sheet #: WS-2

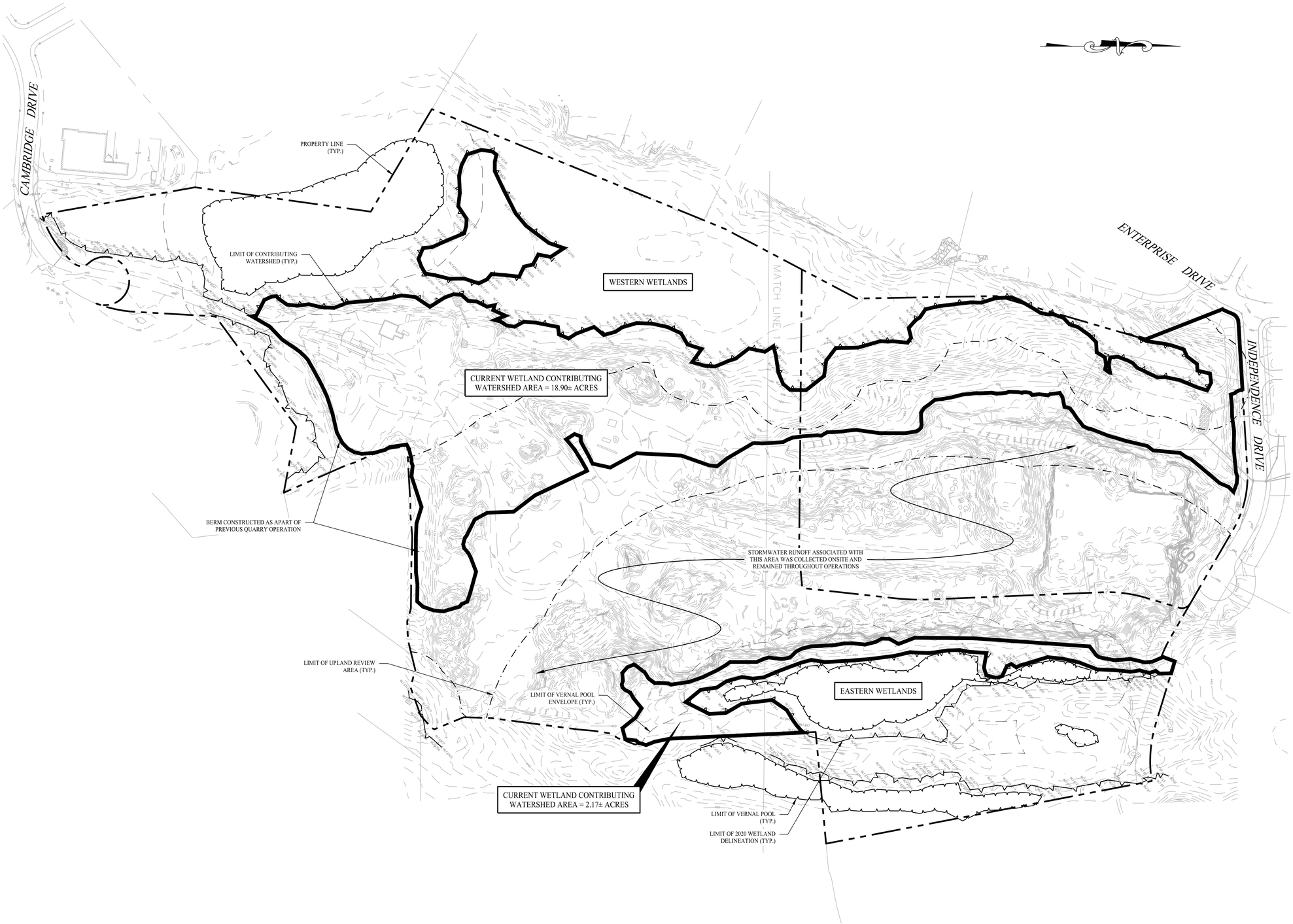
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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 04/06/20; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY. WETLANDS WERE DELINEATED IN 2020 BY WILLIAM KENNY ASSOCIATES LLC.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- 2020 WETLANDS DELINEATION
- LIMIT OF WATERSHED
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE



Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

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Checked By:	CJB
Approved By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 120'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
CURRENT WATERSHED AREA MAP	WS-3

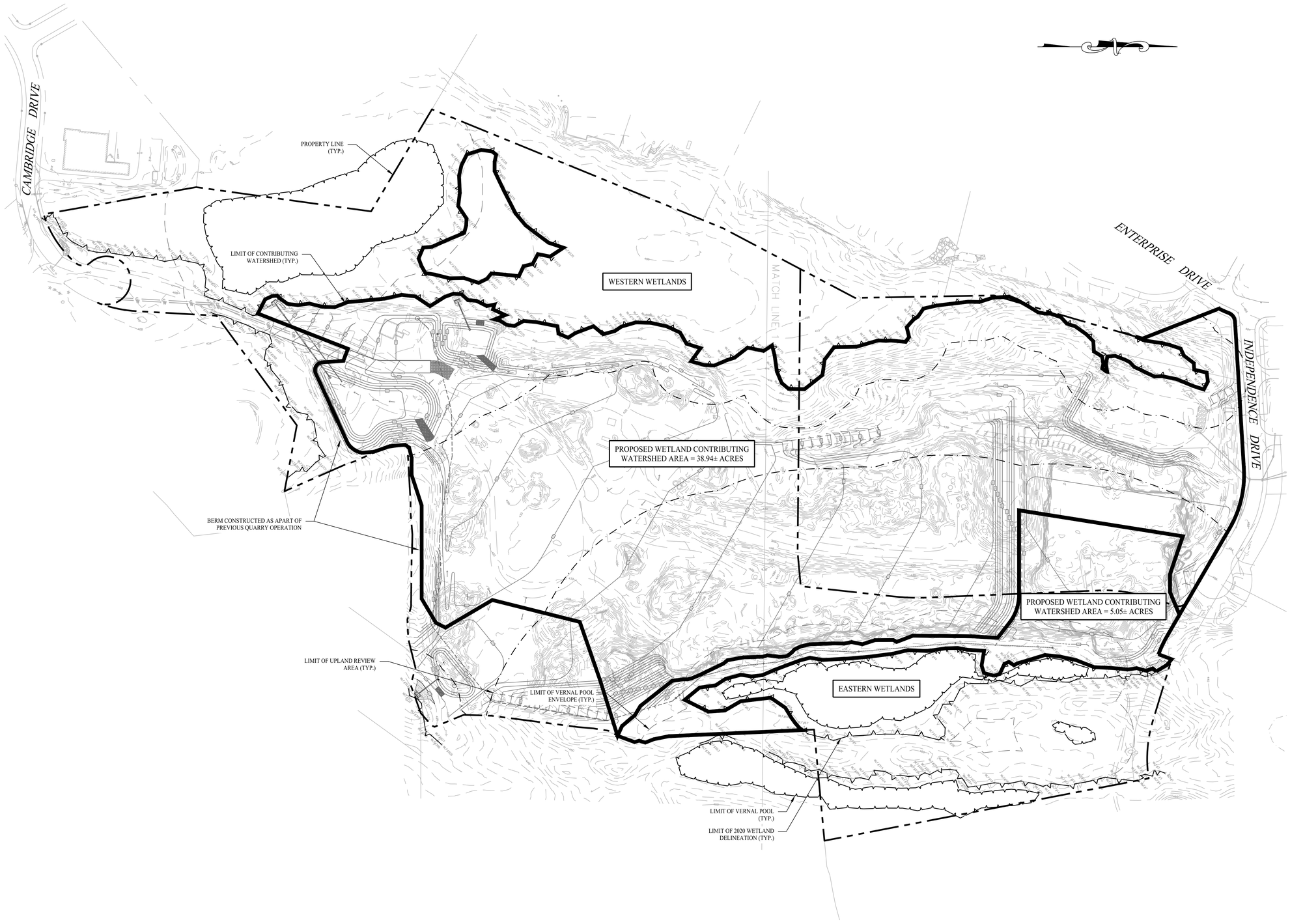
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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 04/06/20; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY. WETLANDS WERE DELINEATED IN 2020 BY WILLIAM KENNY ASSOCIATES LLC.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- 2020 WETLANDS DELINEATION
- LIMIT OF WATERSHED
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE



Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

SOLLI ENGINEERING
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Drawn By:	CJP
Checked By:	CJB
Approved By:	KMS
Project #:	1903601
Plan Date:	05/05/21
Scale:	1" = 120'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: PROPOSED WATERSHED AREA MAP

Sheet #: WS-4

May 07, 2021 – 11:18am anthony
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October 28, 2020

Mr. Kevin Solli, P.E.
Solli Engineering
501 Main Street, Suite 2A
Monroe, CT 06468

Via Electronic Transmission

RE: Hydrogeologic Investigation
64 Cambridge Drive and
4 Independence Drive, Monroe CT

Dear Mr. Solli:

WSP USA (WSP) has completed a study to evaluate the existing hydrogeology for the properties at 64 Cambridge Drive (52.93 acres) and 4 Independence Drive (18.97 acres) in Monroe, Connecticut (the Site). As part of this study, WSP reviewed all available published geologic and hydrogeologic data along with geologic log data from a subsurface investigation conducted by Fuss & O'Neill Inc. (F&O) in 2002. This hydrogeologic study was conducted in accordance with the approved scope-of work outlined in WSP's September 11, 2020 proposal letter.

The scope-of-work was designed to address the hydrogeology-related comments provided by the Southwest Conservation District (SWCD) in reference to their review of an Inland Wetlands Application for the Site. The SWCD's review focused primarily on the applicant's proposed plan to re-establish the watersheds of critical onsite wetlands that have lost watershed and recharged due to nearby excavation-related activities. The SWCD's principle hydrogeology-related comment was that the applicant should retain a certified hydrogeologist and collect additional data to obtain a more refined understanding of the groundwater flow regime at the site prior to approval of an Inland Wetlands Application.

BACKGROUND

In an Inland Wetland Site Application (#IWC-2020-03R) for the Site, the applicant has proposed to re-establish the watersheds of two onsite wetlands (Wetland #2 and #3). Both wetlands have lost a considerable amount of recharge related to onsite excavation activities that have disrupted the surface-water flows into the wetlands. The re-establishment of the wetland watersheds will achieve the goal of re-hydrating the two wetlands by reconnecting the surface hydrology. The surface hydrology would be re-established by bringing in 1.3 million cubic yards of fill material for the main excavation hole (and surface water), the uses of sediment traps and vegetated swales along with other Best Management Practices.

In an August 2020 report[1] documenting the findings of their review of the applicant's inland wetland application, the SWCD concluded that reconnecting the surface hydrology makes sense as a way

[1] Southwest Conservation District, August 2020, Review of Inland Wetlands Application 64 Cambridge Drive and 4 Independence Drive, Monroe, CT.

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4 Research Drive, Suite 204
Shelton, CT 06484

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Fax: +1 (203) 926-9140
wsp.com

to rehydrate wetlands #2 and #3. The SWCD also concluded that "*gaining an understanding of how groundwater will affect the wetlands targeted for rehydration is critical*".

PREVIOUS INVESTIGATIONS

To obtain additional information on the hydrogeology beneath the Site, WSP reviewed the data from a subsurface investigation completed by F&O at 64 Cambridge Drive and 490 Pepper Street (an adjacent property located south and west of 64 Cambridge Drive) in 2002. The subsurface investigation included the digging of 16 test pits and the drilling of 16 test borings. The test pits were completed to depths ranging from 5 to 9 ft bg (feet below grade) and the test borings were drilled to depths ranging from 7.5 to 37.5 ft bg. Eight of the test borings were converted into monitoring wells. The geologic logs for the test pits and test borings are included in Appendix I.

The geologic data obtained from the F&O investigation indicates that the unconsolidated material at and adjacent to the Site is comprised primarily of fine to medium sand with silt and some gravel. Twenty-eight (28) falling head permeability tests were conducted on soil samples collected from the 16 test pits. Data from these test pits were used to estimate hydraulic conductivity of the unconsolidated material in and near the Site. The estimated hydraulic conductivity values from the falling head tests ranged from 0.02 ft/day (foot per day) and 67 ft/day.

The depth to groundwater in the eight monitoring wells in late-March 2002, ranged from 3 to 9 ft bg. A plot showing the estimated groundwater elevation contours derived from these wells in March 2002 is presented in Appendix II. The plot shows that the shallow groundwater in this area flowed towards wetland #1 at the time of the measurement, indicating that the wetland was a groundwater discharge sink (i.e. groundwater was recharging the wetland). Groundwater was observed in three of the test pits (TP-3, TP-11 and TP-12) at depths ranging from approximately 6 to 7 ft bg.

FIELD INVESTIGATION

In 2020, WSP initiated an investigation to obtain information on the groundwater flow regime at and near the site. The investigation focused on the shallow groundwater system near wetlands #1, 2, 3 and 4. The investigation include the installation of two groundwater monitoring wells and the installation wetland bed piezometers.

DRILLING AND MONITORING WELL INSTALLATION

Between October 2 and 5, 2020, WSP supervised the advancement of two borings in the northeastern portion of the Site (WSP-MW-1 and WSP-MW-2) near wetland systems W-2 and W-4 to obtain data on the shallow groundwater system in the area. The borings were advanced using the hollow-stem auger and air-rotary drilling methods. Soil samples from grade to the bedrock of the boring were collected with a 2-foot long split-spoon sampler to identify the stratigraphy and the depth to bedrock. The soil samples were described by a WSP hydrogeologist.

WSP-MW-1 and WSP-MW-2 were advanced to depths of 36 and 40 ft bg, respectively. Groundwater-monitoring wells were installed in the three borings to depths of 25 to 40 ft bg. The monitoring wells were constructed with 10 feet of 10-slot, Schedule 40 PVC well screen. Copies of the geologic logs, including well construction details, are included in Appendix I.

Table 1 summarizes the available well completion information for the existing and new wells at the Site and figure 1 shows the locations of the onsite monitoring wells. The available boring logs are included in Appendix I.

Table 1
Summary of Available Well Completion Information

Well Name	Total Depth	Depth to Rock	Casing Length	Top Screen	Bottom Screen	Screen length	Construction Date
	(feet below grade)					(feet)	
MW-1	505.0	6	20	no screen			May-11
MW-2	8.5	Unknown	2.5	2.5	7.5	5	Mar-02
MW-3	37.5	37.5	7.5	7.5	37.5	30	Mar-02
WSP-Well 1	35.8	16.0	30	30	40	10	Oct-20
WSP-Well 2	39.7	11.0	26	27.8	34	10	Oct-20

INSTALLATION OF WETLAND BED PIEZOMETERS

To obtain additional information on the vertical groundwater flow gradient through the wetland beds, piezometers were installed in or near wetland systems W-1 (PZ-D-shallow and PZ-D-deep), W-2 (PZ-C), W-3 (PZ-A-shallow and PZ-A-deep, PZ-B-shallow and PZ-B-deep) and W-4 (PZ-C). The streambed piezometers were installed in October.

Each piezometer consisted of a 1-foot long, 1.25-inch diameter, stainless-steel screen attached to a 1.25-inch diameter steel riser pipe of variable length. The piezometers were driven into the wetland bottoms until the top of the screen was at least 1 foot below the streambed. The piezometers were developed by surging and pumping to ensure that the piezometer screens were connected with the formation. Piezometer locations are shown on figure 1.

Table 2
Summary of Available Piezometer Completion Information

Date	Piezometer Location	Piezometer Name	Total Length of Piezometer	Depth to Top of Screen	Depth to Bottom of Screen
			(feet)	(feet below grade)	
10/5/2020	PZ-A	Shallow	6.57	1.27	2.57
		Deep	6.72	2.55	3.87
	PZ-B	Shallow	6.60	1.70	3.00
		Deep	7.63	3.58	4.91
	PZ-C	Shallow	6.60	1.16	2.50
	PZ-D	Shallow	6.60	1.77	3.08
		Deep	9.75	3.45	4.75

INVESTIGATION RESULTS

The data obtained from the above-described data review and investigation were used to gaining an understanding of how groundwater will affect the wetlands targeted for rehydration.

SURFICIAL GEOLOGY

WSP used the geologic descriptions from published a surficial geology map, the test pits completed in 2002 by F&O, the existing and new soil borings, to identify any significant confining or stratigraphically different units in the overburden beneath the Site which would need to be incorporated into the in the analysis. Analysis of the geologic logs revealed that the unconsolidated material beneath the site is comprised mainly of very fine to medium sand with varying amounts of silt, gravel and cobbles. As expected, because of limited thickness of the overburden deposited at and adjacent to the Site no significantly stratigraphic unit was identified that would likely impact how changes in groundwater configuration and or stage resulting from filling the main excavation hole would impact the wetlands. The geologic boring logs including descriptions of the overburden material are attached in Appendix I.

BEDROCK GEOLOGY

The bedrock underlying the Site is mapped as an Ordovician age metamorphic rock unit known as the Brookfield Gneiss, dark and light, medium- to coarse-grained dioritic gneiss. The Brookfield Gneiss is known to have little primary permeability based on the porosity of the bedrock and exhibit low to moderate secondary permeability caused by the presence of crevices, fractures, faults and weathering of the rock. Typically, metamorphic bedrock units cannot transmit large volumes of water unless areas are encountered where the interconnection of secondary openings within the rock are prevalent. The most prominent bedrock joints and fractures near the site are generally high angle fractures that trend in a north to south or east to west direction.

GROUNDWATER

Estimated groundwater elevation in the monitoring wells in October 2020 and March 2002 (prior to the start of excavation activities) are shown on table 3 and figure 2. They also show the estimated surface-water elevation in September 2020 and March 2019.

Table 3

Monitoring Well and Surface Water-Level Elevations

Name	Screen Setting Depth	Estimated Measurement Point Elevation	Estimated October 5 - 6, 2020 Groundwater Elevation	Estimated March 21 - 27, 2002 Groundwater Elevation
		(feet mean sea level)		
WSP-Well 1	Shallow	460.59	429.11	not measured
WSP-Well 2	Shallow	454.78	430.15	
MW-1	Deep	422.23	406.83	
MW-2	Shallow	415.17	< 407.67 (dry)	408.17
MW-3	Shallow	411.55	405.46	408.85
PZ-A	Shallow	455.57	< 449.00 (dry)	not measured
	Deep	454.42	< 447.70 (dry)	not measured
PZ-B	Shallow	455.37	< 448.77 (dry)	not measured
	Deep	454.49	< 446.86 (dry)	not measured
PZ-C	Shallow	456.83	< 450.23 (dry)	not measured
PZ-D	Shallow	407.4	403.50	not measured
	Shallow	408.88	403.45	not measured
USGS NT-15	Shallow	261.23	250.73	254.84
Surface water	Not Applicable		Sep-20	Mar-19
			~ 381	~ 400

USGS WELL NT-15

The water-level measurements at the United States geological Survey (USGS) Station NT-15 in Newtown, Connecticut were used to characterize an annual and seasonal groundwater level fluctuation in the region. This is the closest USGS well (approximately 4 miles) to the property with sufficiently long period of water-level measurements. Well NT-15 is installed in unconsolidated glacial deposits. A hydrograph of water-level measurements made at NT-15 is included in Appendix III.

Table 4 shows groundwater elevation frequencies at NT-15 from December 1966 through October 15, 2020). The groundwater elevation frequencies represent the percentage of time the groundwater elevation in the wells is equal to or greater than the corresponding elevation. The groundwater elevation frequencies at the Site on October 5, 2020 and March 27, 2002 were 96 percent and 59 percent, respectively. The October 2020 frequency indicates that the regional groundwater levels at the Site were extremely low and likely reflective of drought conditions. Accounting for the extremely low regional groundwater elevation at the site in October is critical in when assessing the impact excavation-related activities have had on the groundwater flow regime at the site.

Table 4
Groundwater Elevation Statistics

Well ID	Percent of Time Groundwater Elevation Equals or Exceeds that Shown (all groundwater elevation in feet mean sea level)								
	5	10	30	50	70	80	90	95	99
USGS Well NT-15	258.89	258.51	257.25	255.72	253.80	252.76	251.67	250.94	250.02

Southwestern Portion of Site Near Wetland #1

The data presented on table 3 shows that the elevation of the overburden aquifer in October 2020 and March 2002 (pre-excavation) in the southwestern portion of the Site near wetland #1 are comparable. As expected, because of natural groundwater seasonal fluctuation and the dry condition encounter in early October 2020 the estimated groundwater elevation in 2002 was approximately 3 feet higher than observed in 2020. The observed depth changed in water level at MW-3 (3.09 feet) from March 2002 to October 2020 was comparable to the reported change in water level (4.03 feet) at the USGS NT 15. The similarly between the observed change in groundwater elevation at MW-3 and the USGS NT 15, provide evidence that activities related to the onsite excavation have had little discernable impact on the seasonal groundwater fluctuation in overburden aquifer system near wetland #1.

The two piezometers (PZ-D-shallow and PZ-D-deep) located in the wetland #1 indicate a slight upward (0.05 foot) gradient through the wetland bed which suggest that the wetland is a groundwater discharge point or being recharged by the shallowed overburden aquifer. Groundwater elevation data derived from the current piezometer (October 2020) and pre-quarry monitoring wells (March 2002) both indicated that wetland #1 is a groundwater discharge sink. This provides evidence that excavation-related activities have had little discernable impact on the configuration of the water-table aquifer near the wetland system.

Based upon water-level data summarized above, excavation-related activities have had little discernable impact on the overburden groundwater aquifer near wetland #1. Therefore, the wetland system should not be significantly impacted when the main excavation hole (and surface water) is filled as a means of rehydrating wetlands #2 and #3.

Northeastern Portion of Site Near Wetlands #2, #3 and #4

As expected, because of the extremely dry conditions in early October 2020 and the loss of watershed recharge related to excavation activities, no groundwater was observed in the overburden aquifer near wetlands #2, #3 and #4 on October 5, 2020. As evidenced by the fact that all of the piezometers located in the northeastern portion (PZ-A-shallow, PZ-A-deep, PZ-B-shallow, PZ-B-deep, and PZ-C) of the Site were dry when measured on October 5, 2020. The groundwater beneath the Site near wetlands #2, #3 and #4 exists in the shallow bedrock aquifer under phreatic, water-table conditions. During the monitoring period (October 5 and 6, 2020), the daily groundwater elevation at WSP MW-1 and WSP MW-2 were approximately 429 and 430 ft msl, respectively. The data presented on table 3 show that the shallow groundwater elevation beneath the wetlands #2, #3 and #4 is approximately 50 and 30 feet higher than observed excavation pit surface water-level elevation in September 2020 and March 2019, respectively. In addition, the estimated groundwater elevation at WSP monitoring wells was approximately 23 feet higher the groundwater elevation in the deep bedrock well (MW-1) located near the weigh station.

The significant difference (over 20 feet) in groundwater elevation between the shallow bedrock aquifer near wetlands #2, #3 and #4 and the deeper bedrock aquifer near the excavation pit provide strong evidence that that there is not a strong hydrogeologic connection between the two aquifer systems. Bedrock aquifer transmits water from high elevation to lower elevations via joints and fractures. In the northeastern portion of the Site, there is a prominent set of high-angle fractures oriented in an east-west direction. If there were a strong connection between the deep and shallow bedrock aquifer systems, the two WSP monitoring wells would have been dry as the groundwater in the shallow aquifer would have drained into the excavation area especially during near drought hydrogeologic conditions.

The isolation between the shallow and deep bedrock aquifer is likely related to the prominent set of high-angler fractures. The near vertical fractures prevent the migration of shallow groundwater toward the excavation area. Furthermore, because there is not a strong hydrogeologic connection between the two aquifer systems, excavation-related activities have likely had little measurable impact on shallow bedrock near wetlands #2, #3 and #4. Thus, the wetland systems should not be significantly impacted when the main excavation hole (and surface water) is filled as a means of rehydrating wetlands #2 and #3.

Near Excavation Hole

The groundwater elevation in the excavation hole (and surface water) should return to near pre-quarry conditions when the wetland rehydration has been completed. Based on the groundwater elevation data presented on table 3, it is anticipated that the post-restoration groundwater elevation in the deep bedrock aquifer could increase by 20 to 30 feet from the October 2020 excavation surface water elevation. In October 2020, the groundwater elevation in the deep bedrock well (MW-1) located near the weigh station was approximately 406.83 ft msl. The reported increase in groundwater elevation at the NT-15 from October 2020 to March 2002 was 4.11 ft msl. Assuming that the change in the deep bedrock groundwater elevation at the Site near the excavation hole is identical to change observed at USGS NT-15, the post-rehabilitation bedrock groundwater elevation would be approximately 411 ft msl. The estimated post-rehabilitation bedrock groundwater near the excavation is comparable the reported elevation (410 ft msl) at that groundwater was first encounter during the excavation operation. Providing evidence that the projected bedrock groundwater elevation is reasonable. In addition, the estimated groundwater elevation at WSP monitoring wells was approximately 20 feet higher the projected bedrock aquifer elevation at the excavation hole.

CONCLUSIONS

GEOLOGY

- The unconsolidated material beneath the Site is comprised mainly of very fine to medium sand with varying amounts of silt, gravel and cobbles. No stratigraphic units were identified that would likely impact the groundwater configuration in the southwestern portion of the Site as a result of the wetland rehabilitation.
- The most prominent bedrock fractures at or near the Site are generally high angle fractures that trend in a north to south or east to west direction.

GROUNDWATER

- The groundwater elevation frequency at the Site on October 5, 2020 was 96 percent and indicates that the groundwater elevation at the Site was likely reflective of a drought condition.

Southwestern Portion of Site Near Wetland #1

- The facts that the observed changed in groundwater elevation at the Site from March 2002 to October 2020 was comparable to the reported change in groundwater elevation at the USGS NT-15 and that the groundwater data show that wetland #1 is a groundwater discharge sink even during extremely dry conditions provides evidence that excavation-related activities had little, if any, discernable impact on seasonal groundwater fluctuation or the configuration of the overburden aquifer near the wetland #1. Therefore, the wetland system should not be significantly impacted when the main excavation surface water is filled.

Northeastern Portion of Site Near Wetlands #2, #3 and #4

- Because of the extremely dry conditions in early October 2020 and the loss of watershed recharge related to excavation activities, no groundwater was observed in the overburden aquifer in near wetlands #2, #3 and #4 in early October 2020.
- The groundwater elevation at the WSP monitoring wells at approximately 430 ft msl were approximately 50 and 30 feet higher than the excavation surface water-level elevation in September 2020 and March 2019, respectively, and approximately 23 feet higher the groundwater elevation in the deep bedrock well located near the weigh station. The difference (over 20 feet) in groundwater elevation between the shallow bedrock aquifer near wetlands #2, #3 and #4 and the deeper bedrock aquifer near the excavation pit provide strong evidence that the two aquifer systems are not strongly connected.
- Bedrock aquifer transmits water from high elevation to lower elevations via joints and fractures. In the northeastern portion of the Site, there is a prominent set of high-angle fractures oriented in an east-west direction. If there were a strong connection between the deep and shallow bedrock aquifer systems, the two WSP monitoring wells would have been dry as the groundwater in the shallow aquifer would have drained into the excavation area especially during near drought hydrogeologic conditions. Because there is not a strong hydrogeologic connection between the two aquifer systems, the wetland systems should not be significantly impacted when the main excavation surface water is filled.

Near Excavation Hole

- The groundwater elevation in the excavation surface water should return to near pre-excavation conditions when the wetland rehydration has been completed. The estimated post-rehabilitation bedrock groundwater elevation would be approximately 411 ft msl.

Feel free to contact Kenneth Taylor me directly at (475) 882-1725 with any questions or comments.

Kind regards,

WSP USA

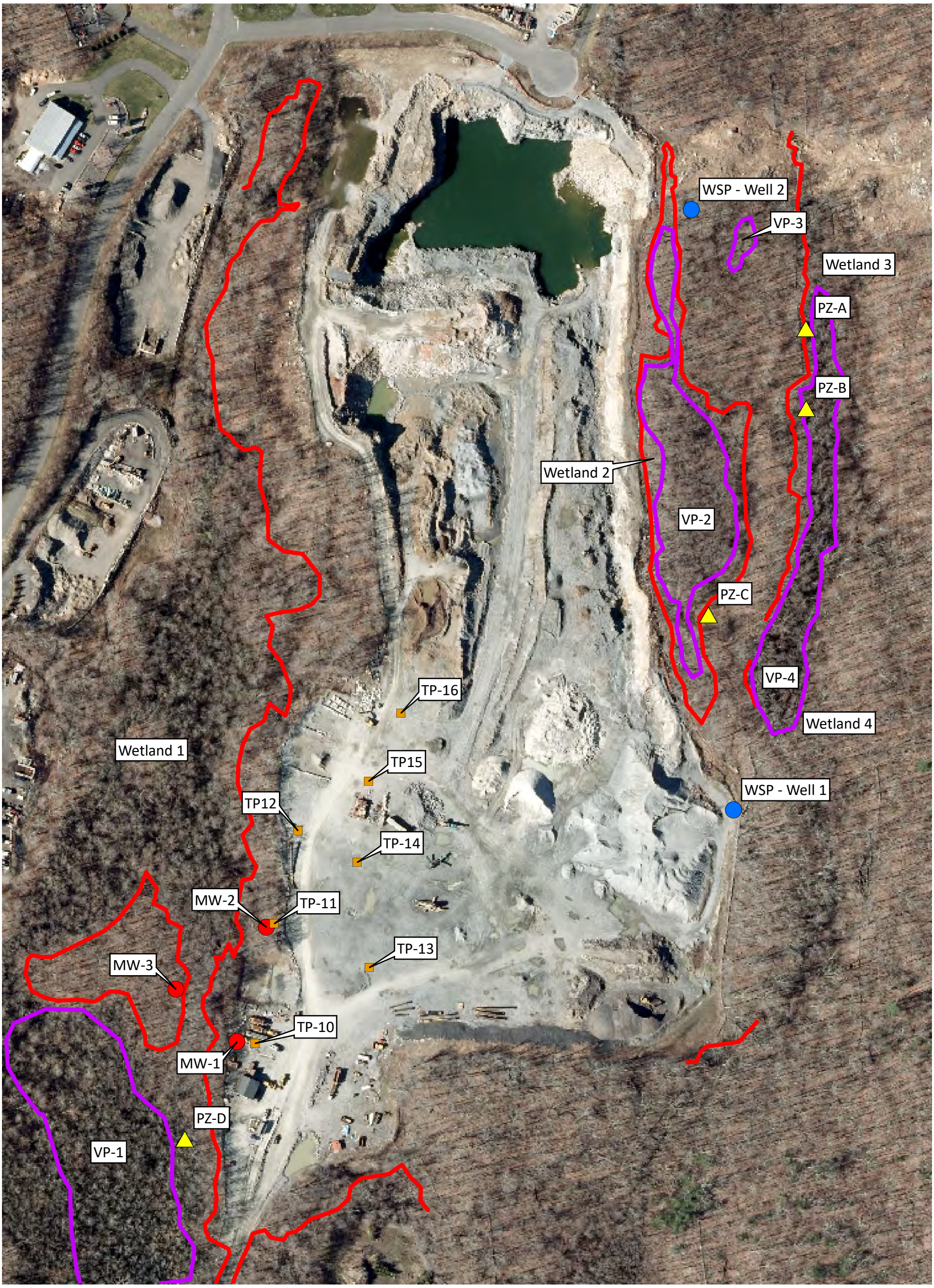
Kenneth Taylor, CPG
Supervising Hydrogeologist

Reviewed by:

Thomas P. Cusack, CPG, PG(NY)
Senior Supervising Hydrogeologist

KT:cmm
Enclosures
H:\Solli Eng\64 Cambridge - analysis.docx

FIGURES



Existing Well
Piezometers
WSP Well
Approximate Location of Fuss & O'Neill Test Pit
Wetland
Vernal Pool

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W
E
S

CONNECTICUT
SITE LOCATION

0 100 200
SCALE IN FEET

SOLLI ENGINEERING
523 PEPPER STREET
MONROE, CT 06468

MONITORING LOCATION MAP

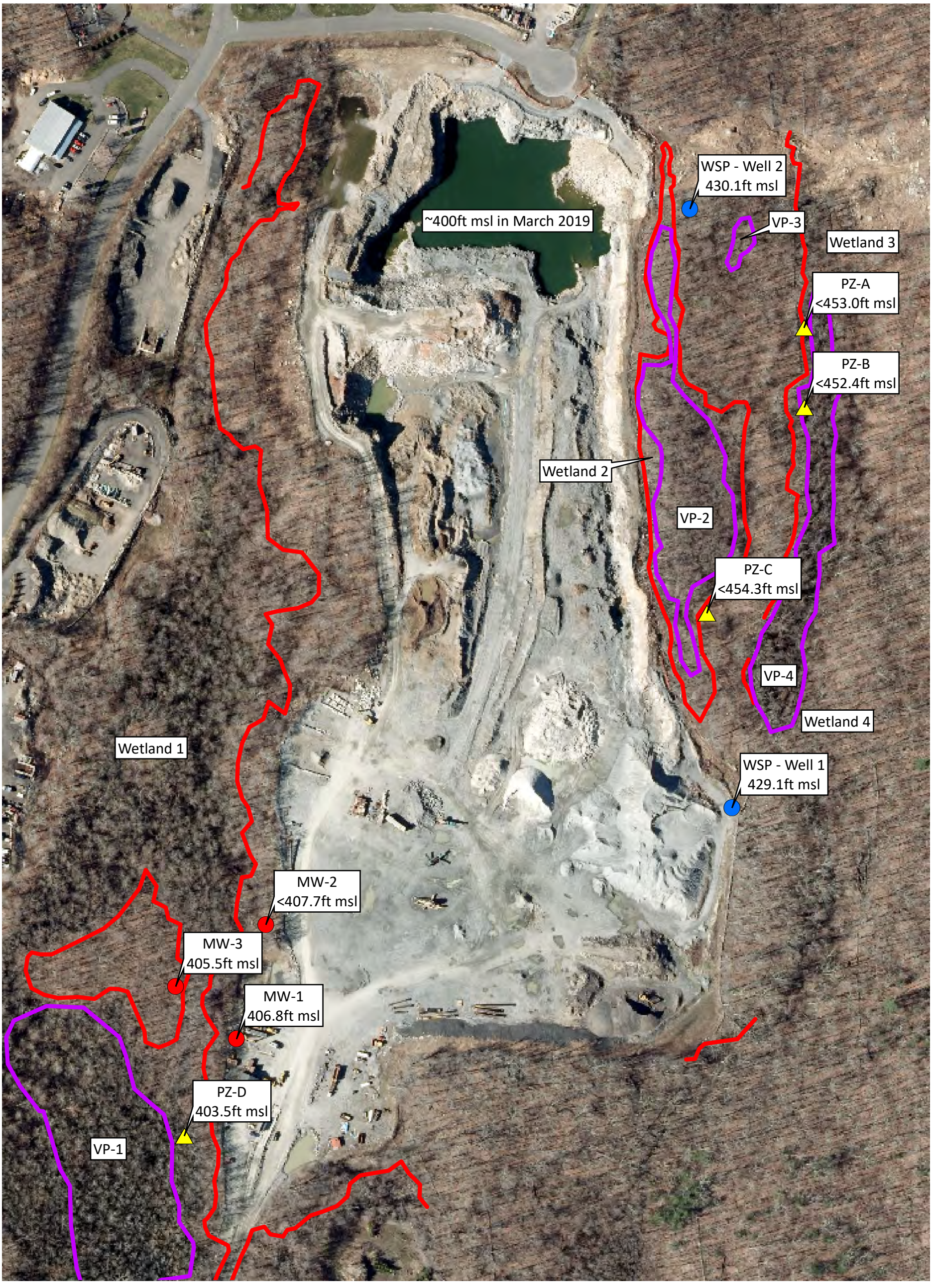
DATE	REVISED

PREPARED BY:

WSP USA
4 RESEARCH DRIVE
SUITE 204
SHELTON, CT 06484
TEL: (203) 929-8555

DRAWN: BM	CHECKED: KT	DATE: 10/16/20	FIGURE: 1

WSP Office: Shelton, CT | Source: C:\Users\mccob\Documents\WSP\Local_Working\Monroe\Figure 1 - Monitoring Location Map.mxd | Coordinate System: NAD 1983 2011 StatePlane Connecticut FIPS 0600 Ft US



Existing Well
Piezometers
WSP Well
Wetland
Vernal Pool

N
W
E
S

CONNECTICUT
SITE LOCATION

0 100 200
SCALE IN FEET

SOLLI ENGINEERING
523 PEPPER STREET
MONROE, CT 06468

GROUNDWATER ELEVATION MAP
OCTOBER 2020

DATE	REVISED

PREPARED BY:

WSP USA
4 RESEARCH DRIVE
SUITE 204
SHELTON, CT 06484
TEL: (203) 929-8555

DRAWN:	CHECKED:	DATE:	FIGURE:
BM	KT	10/23/20	2

WSP Office: Shelton, CT | Source: C:\Users\mcoit\Documents\WSP\Local_Working\Maps\Figure 2 - Groundwater Elevation Map.mxd | Coordinate System: NAD 1983 2011 StatePlane Connecticut FIPS 0600 FEET US

APPENDIX I

WSP MONITORING WELL LOGS

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Solli Engineering **BORING NO:** WSP-MW-1 **PAGE** 1 **OF** 1 **PAGE**

SITE LOCATION: 64 Cambridge Drive, Monroe CT	**SCREEN SIZE & TYPE:** 2"PVC **SLOT NO:** **10** **SETTING:** 26-36 ft bg
DATE COMPLETED: 10/2/20	**SAND PACK SIZE & TYPE:** Filpro #1
DRILLING COMPANY: Soiltesting, Inc.	**SETTING:** 10-36 ft bg
	CASING SIZE & TYPE: 2" PVC
DRILLING METHOD: HSA/air rotary	**SETTING:** 10 ft bg – 2 ft ag
SAMPLING METHOD: Split Spoon	**SEAL TYPE:** Bentonite Chips
OBSERVER: P. Staub	**SETTING:** 8-10 ft bg
REFERENCE POINT (RP): grade	**BACKFILL TYPE:** native
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP: 2'	**DEVELOPMENT METHOD:**
SURFACE COMPLETION: Green Stick up	**DURATION:** **YIELD:**
REMARKS: Dry fracture observed at 18 ft bg	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	1	C	--	1	--	Wood Chips
1	5	C	--	4	--	SAND, fine; and gravel, fine to medium, subangular; dry
5	7	SS	14-61-50/2"	0.8	--	SAND, fine; and gravel, fine to medium, subangular; semicompact; dry
10	12	SS	50/2"	NR	--	No Recovery
10	15	C	--	5	--	SAND, fine; and gravel, fine to medium, subangular; compact; dry
15	17	SS	50/2"	NR	--	No Recovery
15	16	C	--	1	--	SAND, fine; and gravel, fine to medium, subangular; compact; dry
						Refusal on rock at 16 ft bg
16	36	C	--	20	--	Gneiss

GEOLOGIC LOG
WSP USA
SHELTON, CONNECTICUT

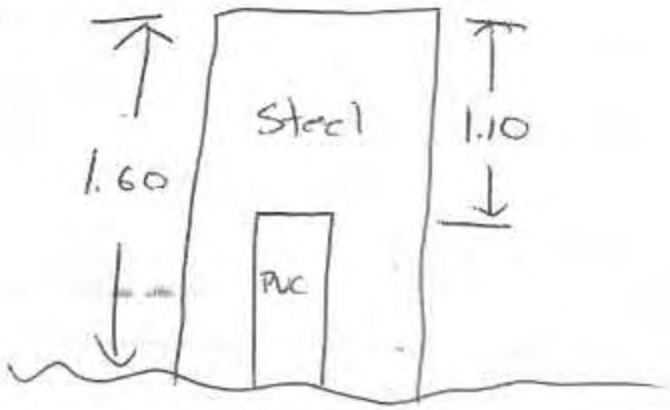
OWNER: Solli Engineering

BORING NO: WSP-MW-2

PAGE 1 **OF** 1 **PAGE**

SITE LOCATION: 64 Cambridge Drive, Monroe CT	**SCREEN SIZE & TYPE:** PVC **SLOT NO:** 10 **SETTING:** 30-40 ft bg
DATE COMPLETED: 10/6/20	**SAND PACK SIZE & TYPE:** Filpro #1 sand
DRILLING COMPANY: Soiltesting, Inc.	**SETTING:** 40-10 ft bg
	CASING SIZE & TYPE: PVC
DRILLING METHOD: air rotary	**SETTING:** 30-0
SAMPLING METHOD:	**SEAL TYPE:** Bentonite Chips
OBSERVER: Brian Mocci	**SETTING:** 10-5 ft bg
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:** none/natural
ELEVATION OF RP: unknown	**STATIC WATER LEVEL:** 25.63
STICK-UP: 0.5	**DEVELOPMENT METHOD**: N/A
SURFACE COMPLETION: concrete stick up	**DURATION:** **YIELD:**
REMARKS: TD 39.66 ft bg	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
5	7	SS	26-50-15	2		SAND, medium to fine, some gravel, medium, dry.
10	12	SS	50/3	0.25		SAND, medium, some gravel, fine, dry.
11						Rock.
	~25					Possible water-bearing fracture.
	40					End of borehole.


Steel
1.60
1.10
PVC

EXISTING MONITORING/PUMPING WELLS

MONITORING WELL MW-1

CPR-9 Rev. 7/95

STATE OF CONNECTICUT
DEPARTMENT OF CONSUMER PROTECTION
REAL ESTATE & PROFESSIONAL TRADES DIVISION
WELL DRILLING COMPLETION REPORT
165 Capitol Avenue, Hartford, Connecticut 06106

Do NOT fill in
STATE WELL NO.
OTHER NO.

OWNER — NAME: Paul Mary Ellis (No. & Street) (Town) ADDRESS: 61 Chauncey Woods (Lot Number)

LOCATION OF WELL: 61 Chauncey Woods

PROPOSED USE OF WELL: ☐ DOMESTIC ☐ BUSINESS ESTABLISHMENT ☐ FARM ☐ TEST WELL ☐ PUBLIC SUPPLY ☐ INDUSTRIAL ☐ AIR CONDITIONING ☒ OTHER (Specify) Dust Control

DRILLING EQUIPMENT: ☐ ROTARY ☒ COMPRESSED AIR PERCUSSION ☐ CABLE PERCUSSION ☐ OTHER (Specify)

CASING DETAILS

LENGTH (feet)	DIAMETER (inches)	WEIGHT PER FOOT			DRIVE SHOE	WAS CASING GROUTED?
20	6	17	☒ THREADED	☐ WELDED	☐ YES ☐ NO	☐ YES ☐ NO

YIELD TEST: ☐ BAILED ☐ PUMPED ☒ COMPRESSED AIR — HOURS: 4 — YIELD (GPM): 6

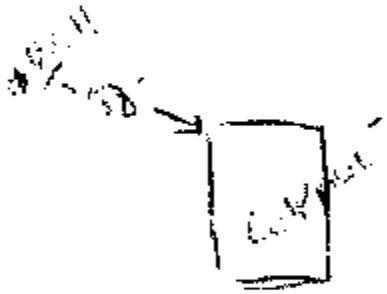
WATER LEVEL: MEASURE FROM LAND SURFACE - STATIC (Specify feet): 162' — DURING YIELD TEST (feet): 600 — Depth of Completed Well in feet: 505

SCREEN DETAILS

MAKE					LENGTH OPEN TO AQUIFER (feet)	
SLOT SIZE	DIAMETER (inches)	IF GRAVEL PACKED:	Diameter of well including gravel pack (inches)	GRAVEL SIZE (inches)	FROM (feet)	TO (feet)

DEPTH FROM LAND TO SURFACE FEET TO FEET		FORMATION DESCRIPTION
0	6	Overburden
6	505	Granite Rock

Sketch exact location of well with distances, to at least two permanent landmarks



If yield was tested at different depths during drilling, list below

FEET	GALLONS PER MINUTE

RECEIVED
DEC 7 2011
By MAIL

DATE WELL COMPLETED	PERMIT NO.	REGISTRATION NO.	DATE OF REPORT	WELL DRILLER (Signature)
5/11/11	7113	60	12/1/11	

LOCAL DIRECTOR OF HEALTH

MONITORING WELL MW-2

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-11
SHEET 1 OF 1
PROJECT NO: 2002.187.S10

DRILLING CO.: Soil Testing
DRILLER: Phil
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lb. HAMMER FALL (IN): 30
BORING LOCATION:
GROUND ELEVATION: —
DATE STARTED: 03-26-02 DATE FINISHED: 03-26-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-26-02	CL	∨ 7'	1315

Time and Date of Completion: 03-26-02

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
—	—	—	—	—	Auger to 5'	/	—	—
5-7	-35	5.0-5.7	0.5/0.7	6 50/2 —	F-SAND little silt Dark yellowish brown 10YR 4/4	—	SM	—
					Auger refusal @ 7.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-7.5
2"	Split Spoon	5-5.7

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

REMARKS
Field Instrument = —

If refusal is encountered, describe all efforts used to confirm:

Auger refusal @ 7.5'

Reviewed by Staff:

FUSS&O'NEILL,INC.

MONITORING WELL MW-3

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-10 / MW-10
SHEET 2 OF 2
PROJECT NO: 20021875.10

DRILLING CO.: Soil Testing
DRILLER:
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 170 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-25-02 DATE FINISHED: 03-25-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-25-02	GL	3-4'	1025

Time and Date of Completion: 03-25-02 1200

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
					Auger to 35' Clay reference F-SANDS.	35'	-	
35-37	-S4	35.0-36.2	0.8/1.2	36 48 5/2 =	F-M SAND AND Gravel. (Reworked till) Dark yellowish brown (10YR 4/2		GP	
					Auger refusal @ 37.5'	-	-	-
					Finish on MW-06 @ 37.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4 1/4"	Hollow Stem Auger	0-37.5'
2"	Split Spoon	0-37

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
Auger refusal @ 37.5'

MONITORING WELL MW-3

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG
PROJECT: Kimball
LOCATION: Monroe, CT

SITE ID: SB-10 / MW-10
SHEET 1 OF 2
PROJECT NO: 2002187.S10

DRILLING CO.: Soil Testing
DRILLER: Louie and Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-25-02 DATE FINISHED: 03-25-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-25-02	GL	~3'	1025

Time and Date of Completion: 03-25-02 1100

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
-2	-27	0.0 2.0	1.0 2.0	1 2 2 2	Top Soil - F. SAND and SILT some organics F-M sand little gravel trace silt Med yellowish brown 10YR 4/6	1.0	SM GP	
-	-	-	-	-	Auger to 5' - sand and gravel wet strat. drift	-	-	-
-7	-28	5.0- 7.0	2.0 2.0	8 31 25 22	F-C SAND some F-C gravel. WET Dark yellowish brown 10YR 4/2 very dense Auger to 10' no boulders	~8'	GP	
-	-	-	-	-		-	-	-
10-12	-29	10.0- 12.0	1.5 2.0	10 10 7 7	F-VFSAND little silt Dark yellowish brown 10YR 4/2	-	SP-SM	
-	-	-	-	-	Auger to 15' - very dense F. SAND	-	-	-
15-17	-30	15.0- 17.0	1.5 2.0	7 14 30 31	F-VF SAND little silt Dark yellowish brown 10YR 4/2	-	SP-SM	
					Auger to 20' very dense F-SAND (FLOWING SAND)	-	-	-
20-22	-31	20.0- 22.0	2.0 2.0	2 4 4 4	SAME AS ABOVE (FLOWING SAND) Light olive gray 5Y 6/1	-	SP-SM	
-	-	-	-	-	Auger to 27' - very dense F-SAND (FLOWING SAND)	-	-	-
25-27	-32	25.0- 27.0	2.0 2.0	2 3 3 4	F-VF SAND with silt STRINGERS Light olive gray 5Y 6/1	-	SP-SM	
-	-	-	-	-	Augered 30' - very dense F-SAND	-	-	-
30-31	-33	30.0- 32.0	2.0 2.0	6 9 12 12	VF-SAND Little silt Light olive gray 5Y 6/1	~35.0'	SP-SM	

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-37.5'
2"	Split Spoon	0-37

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
auger refusal @ 37.5' possible bedrock

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

FUSS & O'NEILL INC. TEST BORING LOGS

Test Pit #4
0-4" Topsoil and leaf litter
4-35" Orange brown silt loam
35-42" Grey fine sand and some silt
42-58" Fine gray sand with some nested rocks (up to 8" diameter)
58-75" Compact gray fine-medium sand w/ some gravel
No groundwater, No bedrock
Sieve samples at 58" depth (fine sand) and 71" depth (sand & gravel)
Permeability samples at 52" depth and 71" depth
Existing standpipe nearby

Test Pit #5
0-6" Topsoil
6-38" Orange brown fine sandy loam, some silt
38-93" Compact gray fine sand
No groundwater, No bedrock, Roots to 52"
Sieve sample at 52" depth
Permeability sample at 59" depth

Test Pit #6
0-5" Topsoil
5-17" Orange brown fine sandy loam with some silt
27-90" Compact gray fine sand with small layers coarse sand and gravel
Possible bedrock at 59" at south end of hole
No groundwater, No apparent mottling, Roots to 37"
Sieve samples at 27" depth and 48" depth
Permeability sample at 18" depth
Existing standpipe nearby

Test Pit #7
0-8" Topsoil
8-36" Orange brown fine sandy loam with some silt
36-96" Very compact gray fine-medium sand with angular gravel and boulders
No Groundwater, No apparent mottling, No bedrock
Roots to 37"
Sieve samples at 41" depth and 57" depth
Permeability samples at 41" depth and 57" depth

Test Pit #8
0-9" Topsoil
9-34" Orange brown fine sandy loam with some silt
34-48" Grey very fine-fine sand
48-54" Orange fine sand (possible mottling)
54-106" Grey fine-medium sand with some gravel
No groundwater, Possible mottling at 48", No bedrock
Roots to 54"
Sieve samples at 51" depth and 74" depth
Permeability samples at 47" depth and 74" depth
Existing standpipe nearby

Test Pit #9
0-9" Topsoil
9-51" Orange brown fine sandy loam with some silt
51-53" Bright orange fine sand w/ some silt (possible mottling)
53-96" Grey fine to coarse sand with some gravel and large stones (up to 3' diameter)
No groundwater, Possible mottling @ 51", No bedrock
Roots to 38"
Sieve samples at 28" depth and 72" depth
Permeability samples at 52" depth and 62" depth
Standpipe installed

Test Pit #10
0-11" Topsoil
11-26" Orange brown fine sandy loam
26-72" Compact gray fine-medium sand with trace cobbles and stones
No groundwater, Possible bedrock at 72"
Roots to 36"
Sieve samples at 22" depth and 42" depth
Permeability samples at 22" depth and 42" depth

Test Pit #11
0-9" Topsoil
9-32" Orange brown fine sandy loam
32-68" Compact Mottled fine-medium sand and silt compact
68-100" Gray fine to medium sand little gravel, sat. compact
Groundwater at 74", No bedrock
Sieve samples at 32" depth, 57" depth, and 76" depth
Permeability sample at 76" depth
Existing standpipe nearby

Test Pit #12
0-9" Topsoil
9-38" Dark orange brown fine sandy loam
38-106" Compact gray fine to medium sand with some cobbles
Groundwater at 106", Saturated at 75", Mottling at 39", No bedrock
Sieve samples at 26" depth and 71" depth
Permeability samples at 26" depth and 71" depth
Existing standpipe nearby

Test Pit #13
0-5" Topsoil and leaf litter
5-50" Orange brown sandy loam with some silt, with large nested rocks (up to 30" dia.)
50-60" Fine-medium gray sand and some gravel
No groundwater, No apparent mottling, Bedrock stepped 36" minimum & 60" maximum
Roots to 50"

Test Pit #14
0-5" Topsoil and leaf litter
5-34" Orange brown find sandy loam with some silt
34-108" Compact gray fine sand and some gravel only a few large nested stones-fewer than other holes
No groundwater, No apparent mottling, No bedrock
Roots to 42"
Standpipe installed

Test Pit #15
0-10" Topsoil and leaf litter
10-32" Orange brown fine sandy loam with some silt
32-58" Fine gray sand with trace of gravel
58-68" Very compact, mottled fine sand and silt- very compact, mottled
68-108" Very compact, gray fine sand and silt with many nested stones (up to 3" dia.)
Large flat rocks 4 to 5' long, 2 to 3' wide, and 8" thick found in topsoil & subsoil
No groundwater, Mottling at 38", No bedrock
Permeability samples at 50" depth, 63" depth, and 84" depth
Sieve samples at 39" depth and 83" depth

Test Pit #16
0-8" Topsoil and leaf litter
8-31" Orange brown fine sandy loam with little silt
31-110" Gray moderately compact-compact fine sand with trace gravel
No groundwater, No apparent mottling, No bedrock
Roots to 31"
Permeability samples at 46" depth and 88" depth
Sieve sample at 79"
Standpipe installed

FUSS & O'NEILL INC. TEST BORING LOGS

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-01 / BSC
SHEET 1 OF 1
PROJECT NO: 20021873.10

DRILLING CO.: Soil Testing
DRILLER: Rudy + Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Augers
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lbs. HAMMER FALL (IN): 30
BORING LOCATION: Area 1
GROUND ELEVATION: —
DATE STARTED: 03-21-02 DATE FINISHED: 03-21-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-21-02	GL	~3' ~~Wash~~	0855

Time and Date of Completion: 03-21-02 1030

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	-01	0.0-2.0	1.0/2.0	2 2 3 6	F-SAND some silt - topsoil	~1.0	SM	-
-	-	-	-	-	F-C SAND some GRAVEL little cobbles trace silt Mod Yellowish brown 10YR5/4	-	GP	-
5-7	-02	5.0-7.0	1.5/2.0	32 37 38 34	F-C SAND AND SUB-ROUNDED F-C GRAVEL Trace silt - wet Dark yellowish brown 10YR4/2	-	GP	-
10-12	-03	10.0-12.0	1.0/2.0	20 29 35 40	F-C sub-rounded gravel some F-C SAND Dark yellowish brown 10YR4/2	~14.0'	GP	
15-17	-04	15.0-16.6	1.6/1.6	5 6 14 50/4	F-SAND little to some silt Dark Yellowish brown 10YR4/4	~16.2	SP/SM	-
-	-	-	-	-	F-C sub-rounded gravel and F-C SAND Dark Yellowish brown 10YR4/2		GP	-
~~Cobble~~	-	-	~~0.8~~/	-	TOUGH AUGERING ~16.5 - 18' cobble	-	-	-
20-22	-05	20.0-20.9	0.9/0.9	45 50/4	F-M SAND AND weathered ~~SCHIST~~ SCHIST cobbles (decomposed) little silt Dark Yellowish brown 10YR4/2	-	GM	—
					Auger refusal @ 22.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
6 1/4"	Hollow Stem Auger	0-22.5
~~2~~ 2"	Split Spoon	0-20.9

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm

Auger refusal

FUSS&O'NEILL.INC.

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-CIA/MW-01
SHEET 1 OF 1
PROJECT NO: 2002.187.510

DRILLING CO.: Soil Testing
DRILLER: Rainey
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 170 lbs HAMMER FALL (IN): 30
BORING LOCATION:
GROUND ELEVATION: —
DATE STARTED: 03-21-02 DATE FINISHED:

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-21-02	GL	3'	1235

Time and Date of Completion: 03-21-02

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/ PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
					Augers to 15'			
					big cobbles @ 10'-			
					finish as well MW-01 @ 14.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
	Hollow Stem Auger	
	Split Spoon	

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = —

If refusal is encountered, describe all efforts used to confirm:

FORMT SOIL.DOC 4/97

FUSS&O'NEILL,INC.

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): MW-01
Project Location: Monroe, CT
Project No.: 20021873.10
Fuss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation: —
Date of Completion: 03-21-02
Permit #: —
Boring Location: Area 1
El Top of Steel Casing: —
Drilling Contractor: Soil Testing
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5' ft.

Sump (below screen)
Diameter: 2" in.
Type: Cap - Flat, threaded
Length: 0.2 ft.

Protective Casing
Diameter: 4" in.
Type: black steel pipe
Stick-up: 2.5' ft.
Depth to Bottom: 2.5' ft.
Seal Material: Concrete

Screen Intervals
Screen Interval: 14.5 4.5 ft.
Diameter: 2" in.
Slot Size: 10 in.
Description: (PVC) / Other:
Type: Perforated / (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal
Interval: 1.0 0.0 ft.
Tremied: Y / (N)
(Approximate volumes if available)
Volume: 1 bag (50 lbs) ft.³
Description: (Concrete) / Other:

Backfill
Interval: 2.0 1.0 ft.
Tremied: Y / (N)
Volume: ~1' ft.³
Description: Bentonite Grout / Fill / Other: NATIVE FILL

Lower Seal
Interval: 3.0 2.0 ft.
Tremied: Y / (N)
Volume: 1/2 bag ft.³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 14.5 3.0 ft.
Tremied: Y / (N)
Volume: 6 bags ft.³
Description: Sand Filter (type: #1 Silica) / Other:

Lower Backfill
Interval: — ft.
Tremied: Y / N
Volume: ft.³
Description: Bentonite Grout / Fill / Other:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-03 (MW-03)
SHEET 1 OF 1
PROJECT NO: 20021878.10

DRILLING CO.: Soil Testing
DRILLER: Rowley
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 170 lb HAMMER FALL (IN): 30
BORING LOCATION: —
GROUND ELEVATION: —
DATE STARTED: 03-21-02 DATE FINISHED: 03-21-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-21-02	GL	~4'	1430

Time and Date of Completion: 03-21-02 1530

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS/6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	-06	0.0-2.0	0.5/2.0	6 8 8 15	TOP SOIL: F-SAND AND SILT, COBBLE IN TOP Dusky Yellowish Brown 10YR 2/2	~1	SM	-
-	-	-	-	-	Auger to 5' - cobbles.	-	-	-
5-7	-07	5.0-6.2	1.0/1.2	17 23 50/2"	F-C SAND AND F-C SUB-ROUNDED GRAVEL, trace silt Mod. Yellowish Brown	-	GP	-
					Auger to 10'	-	-	-
10-11'	-08	10.0-12.0	0.8/2.0	11 23 23 18	F-C SAND AND F-C GRAVEL, little silt, little weathered cobbles Mod. Yellowish Brown 10YR 5/4	-	GP/GM	-
					Auger to 15' - cobbles, muddy cuttings	-	-	-
15-17	-09	15.0-17.0	0.8/2.0	24 23 33 NR	F-M SAND, some F-M gravel, trace silt Mod. Yellowish Brown 10YR 5/4	~18.5	GP/GM	-
-	-	-	-	-	slow - steady - cobbles + ISS auger to (no sampling) auger from 15.5 to 20'	-	-	-
20-22	-10	20.-21.5	1.0/1.5	25 37 50/1"	F-C SAND AND weathered schist cobbles, some silt Dark Yellowish Brown 10YR 4/2	-	GM	-
					EOB Finish as MW-02 15' of screen set @ 19.7'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
6 1/4"	Hollow Stem Auger	0 - 20'
2"	Split Spoon	0 - 21.5

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:

EOB finished as MW-02

Reviewed by Staff:

FUSS&O'NEILL.INC.

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): SB-03 / MW-03
Project Location: Monroe, CT
Project No.: 2002127
Fuss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation: —
Date of Completion: 03-21-02
Permit #: —
Boring Location: Area 2
El Top of Steel Casing: —
Drilling Contractor: Soil Testing
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5' ft.

Sump (below screen)
Diameter: 2" in.
Type: plug
Length: FLUSH ft.

Protective Casing
Diameter: 4" in. Type: black steel pipe
Stick-up: 2.5 ft. Depth to Bottom: 2.5' ft.
Seal Material: concrete

Screen Intervals
Screen Interval: ~~19.7~~ 20.0 - 4.7' ft. Diameter: 2" in. Slot Size: .10 in.
Description: (PVC) / Other:
Type: Perforated / (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 1.0 - 0.0 ft. Tremied: Y / (N) Volume: 1.5 cy ft³
Description: (Concrete) / Other:

Backfill
Interval: — ft. Tremied: Y / N Volume: — ft³
Description: Bentonite Grout / Fill / Other:

Lower Seal
Interval: 2.0 - 1.0 ft. Tremied: Y / (N) Volume: ½ bag ft³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 20.0 - 2.0 ft. Tremied: Y / (N) Volume: ~6 bags ft³
Description: Sand Filter (type: #1 Silica) / Other:

Lower Backfill
Interval: — ft. Tremied: Y / N Volume: — ft³
Description: Bentonite Grout / Fill / Other:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-04
SHEET 1 OF 1
PROJECT NO: 20021875.10

DRILLING CO.: Soil Testing
DRILLER: Ralph & Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 1
GROUND ELEVATION: —
DATE STARTED: 03-21-02 DATE FINISHED: 03-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-21-02	GL	~8'	0830

Time and Date of Completion: 03-22-02 0845

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	—	—	02/2.0	2 1 1 1	No recovery (Top soil)	~1.0	SM	—
—	—	—	—	—	Auger to 5' cobbly	—	—	—
5-7	-11		1.0/2.0	40 86 48 40	F-C sand and F-C gravel (dry)		GP	—
					Auger slow grinding cobbles & boulders	—	—	—
10-12	-12	10.0-10.4	0.4/0.4	50/4"	F-C sand and gravel Some silt		GM	
					Auger refusal @ 10'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0 - 10'
1"	Split Spoon	0 - 10.4'

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

Reviewed by Staff:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-04A
SHEET 1 OF 1
PROJECT NO: 2002.187.S10

DRILLING CO.: Soil Testing
DRILLER: Gavlick
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lb HAMMER FALL (IN): 30
BORING LOCATION: Area 1
GROUND ELEVATION:
DATE STARTED: 03.22.02 DATE FINISHED: 03.22.02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03.22.02	—	—	—

Time and Date of Completion: 03-27-02 0940

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/ PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
					Auger down to 7'			
					cobbles/boulders			
					refusal @ 7'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-7'
—	Split Spoon	—

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:

refusal - & boulders 5-7'

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-05
SHEET 1 OF 1
PROJECT NO: 20021871510

DRILLING CO.: Soil Testing
DRILLER: Laughlin
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 03-22-02 DATE FINISHED: 03-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-22-02	CAVE	—	—

Time and Date of Completion: 03-22-02 1055

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	S-1	0.0-2.0	2.0/2.0	1 2 3 4	F-[illegible] SAND and SILT/TOPSOIL - Dark yellowish brown 10YR 4/2 0-1'	~1.0	SM	—
—	—	—	—	—	Light brown, 5YR 6/4 1-2' Auger to 5' - boulder @ 5' no sample w/ split spoon.		—	—
5'	S-2	5.0	—	—	grab soil from auger flight @ 5'		-	—
					DRY - F-M SAND little silt, some fine gravel. Moderate yellowish brown 10YR 5/4		SP	—
					Auger cobbles 5'-7.5'			—
					refusal @ 8.0' (possible bedrock)			
					groundwater not encountered			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-8.0
2"	Split Spoon	0-2

PROPORTIONS USED:
TRACE 0 TO 10% SOME 10 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

REMARKS
Field Instrument = —

If refusal is encountered, describe all efforts used to confirm:
refusal @ 8.0

Reviewed by Staff:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SS-05A
SHEET 1 OF 1
PROJECT NO: 20021875.10

DRILLING CO.: Soil Testing
DRILLER: Raulpa
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lb HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 03-22-02 DATE FINISHED: 03-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
—	—	—	—

Time and Date of Completion: 03-22-02 1110

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/ PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
					Auger cuttings - cobbles and boulders -			
					Refusal @ 4'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
6¼"	Hollow Stem Auger	0-4
—	Split Spoon	—

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = —

If refusal is encountered, describe all efforts used to confirm:

Refusal @ 4'
auger

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-05 B
SHEET 1 OF 1
PROJECT NO: 2002187.S10

DRILLING CO.: Soil Testing
DRILLER: Humphrey-Jet
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 03-22-02 DATE FINISHED: 03-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. FT.	WATER AT	TIME
03-22-02	CVL	—	—

Time and Date of Completion: 03-22-02

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
—	—	—	—	—	use 2¼" Augers	—	—	—
					boulders/cobbles @ 5'			
					refusal @ 7'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
2¼"	Hollow Stem Auger	0-7'
—	Split Spoon	—

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

REMARKS
Field Instrument = —

If refusal is encountered, describe all efforts used to confirm:
auger refusal w/ 2¼" augers.

Reviewed by Staff:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-06 / MW-06
SHEET 1 OF 1
PROJECT NO: 20021875.10

DRILLING CO.: Soil Terra
DRILLER: Dwight + Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lb HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 5-22-02 DATE FINISHED: 5-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
05-22-02	GL	~9'	1300

Time and Date of Completion: 05-22-02

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	-15	0-2	0.5/2.0	1 2 1 3	TOPSOIL: F-M SAND AND SILT Dark Yellowish brown 10YR 4/2	~5	SM	-
				PUSH	F-M SAND AND SILT Dark Yellowish brown 10YR 3/4	~2.0	SM	-
5-7	-16	5.0-6.9	1.0/1.9	19 40 47 50/4	F-M SAND AND COBBLES LITTLE SILT Dark Yellowish brown 10YR 4/2	-	GP/GM	-
-	-	-	-	-	Advance Auger - refusal	-	-	
10 12	-17	10.0-12.0	1.4/2.0	15 17 31 52	FM SAND AND weathered cobbles Dark Yellowish brown 10YR 4/2 ~~weathered schist~~ Highly weathered schist possible weathered bedrock	11'	GM SM	
					refusal @ 12'			
					Finish as MW-03			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
2 1/4"	Hollow Stem Auger	0-12
2"	Split Spoon	0-12

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
Refusal @ 12', possible weathered bedrock @ 12'

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-07 / MW-07
SHEET 1 OF 1
PROJECT NO: 2002187.S10

DRILLING CO.: Soil Testing
DRILLER: Ralph & Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lb HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 03-22-02 DATE FINISHED: 03-22-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-22-02	GL	8.5'	1400

Time and Date of Completion: 03-22-02 1560

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2	-18	0.0-2.0	1.6/2.0		TOPSOIL F-C SAND AND SILT some organic mat Dark Yellowish brown	0.5'	GM	
-	-	-	-	-	F-M SAND AND COBBLES little silt Dark Yellowish brown 10YR 4/2	~2.0	GM	-
-	-	-	-	-	Auger to 5'	-	-	-
5-7	-19	5.0-5.5	0.5/0.5	50/6	F-M SAND AND COBBLES some silt cobbles to 3" Dark Yellowish brown 10YR 4/2	~5.5'	GP	
-	-	-	-	-	Auger to 10' wet @ 5.5'	-	-	-
10-12	-20	10.0-12.0	0.1/2.0	15 27 55 44	F-C SAND AND GRAVEL little silt little cobbles Dark yellowish orange 10YR 6/6	-	GP/GM	-
-	-	-	-	-	Auger to 15'	-	-	-
15-17	-21	15.0-17.0	1.0/2.0	14 17 22 27	F-C SAND AND GRAVEL/COBBLES little silt Mix Yellowish brown 10YR 5/4	-	GP-GM	-
-	-	-	-	-	Auger to 20'	-	-	-
20-22	-22	20.0-20.7	0.7/0.7	50/4 50/3	SAMPLE AT 1750 hrs	~22'	GP-GM	-
-	-	-	-	-	Auger to 25'	-	-	-
25-27	-23	25.0-25.4	0.3/0.4	50/4	F-C SAND AND COBBLES little silt Dark Yellowish brown	~	GM	-
-	-	-	-	-	EOB SET well @ -24 (MW-07)			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-25'
2"	Split Spoon	0-25.4

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:

NO REFUSAL
@ EOB

Reviewed by Staff:

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): SB-07 / MW-07
Project Location: Monroe, CT
Project No.: 2002-187
Foss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation:
Date of Completion: 03-22-02
Permit #:
Boring Location: Area 2
El Top of Steel Casing: —
Drilling Contractor: Soil Testing
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5 ft.

Sump (below screen)
Diameter: 2" in.
Type: threaded cap
Length: 0.25 ft.

Protective Casing
Diameter: 4" in. Type: black steel
Stick-up: 2.5 ft. Depth to Bottom: 2.5 ft.
Seal Material: concrete

Screen Intervals
Screen Interval: 2404.2 Diameter: 2" in. Slot Size: 10 in.
Description: (PVC) / Other:
Type: Perforated / (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 10.0.0 ft. Tremied: Y (N) Volume: 1 bag ft.³
Description: (Concrete) / Other:

Backfill
Interval: — ft. Tremied: Y / N Volume: ft.³
Description: Bentonite Grout / Fill / Other:

Lower Seal
Interval: 30' 1.9' ft. Tremied: Y / (N) Volume: 1/2 bag ft.³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 24.0' 3.0' ft. Tremied: Y / (N) Volume: 10 bags ft.³
Description: Sand Filter (type: #1 Silica) / Other:

Lower Backfill
Interval: — ft. Tremied: Y / N Volume: ft.³
Description: Bentonite Grout / Fill / Other:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-09 / MW-09
SHEET 1 OF
PROJECT NO: 20021873.10

DRILLING CO.: Soil Testing
DRILLER: Ralph + Joe
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lb HAMMER FALL (IN): 30
BORING LOCATION: Area 2
GROUND ELEVATION: —
DATE STARTED: 03-25-02 DATE FINISHED: 03-25-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03 25-02	CL	~7-8'	0920

Time and Date of Completion: 03-25-02 0945

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
0-2'	-23	0.0-2.0	1.0/2.0	3 2 2 5	F-SAND some silt Med. Yellowish brown 10YR 5/4	~2.0	SM	—
-	-	-	-	-	Auger to 5' cobbles + boulders	-	5	-
5-7	-24	5.0 7.0	1.0/1.0	22 20 41 46	F-M Sand and Gravel some cobbles, little silt moist Dark yellowish brown 10YR		GP-GM	-
-	-	-		-	Auger to 10' - nothing to measure			-
10-12	-25	10.0-12.0	1.0/2.0	30 25 35 41	F-M sand some F-C gravel some cobbles little silt wet dark yellowish brown 10YR		GP-GM	—
					Auger to 12.5 - refusal			
					Finish as MW-05			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4 1/4"	Hollow Stem Auger	0 - 12.5
2"	Split Spoon	0 - 12

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm
Auger refusal @ 12.5'
possible bedrock.

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

Reviewed by Staff:

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): SB-09 / MW-09
Project Location: Monroe, CT
Project No.: 2002.187
Fuss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation: —
Date of Completion: 03-25-02
Permit #: —
Boring Location: Area 2
El Top of Steel Casing: —
Drilling Contractor: Soil Testing
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5' ft.

Sump (below screen)
Diameter: 2" in.
Type: threaded cap
Length: 0.25' ft.

Protective Casing
Diameter: 4" in. Type: black steel pipe
Stick-up: 2.5' ft. Depth to Bottom: 2.5' ft.
Seal Material: concrete

Screen Intervals
Screen Interval: 12.5 - 2.5 ft. Diameter: 2" in. Slot Size: 10 in.
Description: (PVC) / Other:
Type: Perforated / (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 1.0 - 0.0 ft. Tremied: Y / N Volume: 1/2 bag ft.³
Description: (Concrete) / Other:

Backfill
Interval: — ft. Tremied: Y / N Volume: ft.³
Description: Bentonite Grout / Fill / Other:

Lower Seal
Interval: 2.0 - 1.0 ft. Tremied: Y / (N) Volume: 1/2 bag ft.³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 12.5 - 2.0' ft. Tremied: Y / (N) Volume: 5 bags ft.³
Description: Sand Filter (type: #1 Silica) / Other:

Lower Backfill
Interval: — ft. Tremied: Y / N Volume: ft.³
Description: Bentonite Grout / Fill / Other:

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BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-10 / MW-10
SHEET 2 OF 2
PROJECT NO: 20021875.10

DRILLING CO.: Soil Testing
DRILLER:
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 170 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-25-02 DATE FINISHED: 03-25-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-25-02	GL	3-4'	1025

Time and Date of Completion: 03-25-02 1200

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC / PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
					Auger to 35' Clay reference F-SANDS.	35'	-	
35-37	-34	35.0 - 36.2	0.8 / 1.2	36 48 5/2 =	F-M SAND AND Gravel. (Reworked till) Dark yellowish brown (10YR 4/2		GP	
					Auger refusal @ 37.5'	-	-	-
					Finish on MW-06 @ 37.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4 1/4"	Hollow Stem Auger	0-37.5'
2"	Split Spoon	0-37

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
Auger refusal @ 37.5'

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-10 / MW-10
SHEET 1 OF 2
PROJECT NO: 2002.187.S10

DRILLING CO.: Soil Testing
DRILLER: Louis and Jose
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-25-02 DATE FINISHED: 03-25-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-25-02	GL	~3'	1025

Time and Date of Completion: 03-25-02 1100

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
-2	-27	0.0 2.0	1.0 2.0	1 2 2 2	Top Soil - F. SAND and SILT some c SAND	1.0	SM	
					F-M sand little gravel trace silt Med yellowish brown 10YR 4/6		SP	
					Auger to 5' - sand and gravel wet strat. drift			
-7	-28	5.0 7.0	2.0 2.0	8 31 25 22	F-C SAND some F-C gravel. WET Dark yellowish brown 10YR 4/2	~8'	SP	
					Auger to 10' - very difficult no boulders			
-12	-29	10.0 10.0	1.5 2.0	10 10 7 7	F-VF SAND little silt Dark yellowish brown 10YR 4/2		SP-SM	
					Auger to 15' - easy advance F. SANDS			
15-17	-30	15.0 17.0	1.5 2.0	7 14 30 31	F-VF SAND little silt Dark yellowish brown 10YR 4/2		SP-SM	
					Auger to 20' - easy advance F-SANDS (FLOWING SANDS)			
20-22	-31	20.0 22.0	2.0 2.0	2 4 4 4	SAME AS ABOVE (FLOWING SANDS) Light olive gray 5Y 6/1		SP-SM	
					Auger to 27' - easy advance (FLOWING SANDS) F-SANDS			
25-27	-32	25.0 27.0	2.0 2.0	2 3 3 4	F-VF SAND with silt STRINGERS Light olive gray 5Y 6/1		SP-SM	
					Augered 30' - easy advance F-SANDS			
30-31	-33	30.0 32.0	2.0 2.0	6 9 12 12	VF-SAND Little silt Light olive gray 5Y 6/1	-35.0'	SP-SM	

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-37.5'
2"	Split Spoon	0-37

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
auger refusal @ 37.5' possible bedrock

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

Reviewed by Staff:

FUSS&O'NEILL,INC.

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): SB-10 / MW-10
Project Location: Monroe, CT
Project No.: 2002.187
Fuss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation: —
Date of Completion: 03-27-02
Permit #: —
Boring Location: Area 3
El Top of Steel Casing: —
Drilling Contractor: SOIL TESTING
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2 in.
Type: PVC
Stick-up: 2.5 ft.

Sump (below screen)
Diameter: 2" in.
Type: threaded cap
Length: 0.45 ft.

Protective Casing
Diameter: 4" in. Type: black steel pipe
Stick-up: 2.5 ft. Depth to Bottom: 2.5 ft.
Seal Material: concrete

Screen Intervals
Screen Interval: 37.5 - 72.5 ft. Diameter: 2" in. Slot Size: 10 in.
Description: PVC/Other:
Type: Perforated (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 0.0 - 0.0 ft. Tremied: Y (N) Volume: 1 bag ft.³
Description: (Concrete) / Other:

Backfill
Interval: 6.0 - 6.0 ft. Tremied: Y / (N) Volume: ~3 ft.³
Description: Bentonite Grout / (Fill) / Other: NATIVE FILL

Lower Seal
Interval: 7.0 - 6.0 ft. Tremied: Y / N Volume: 1 bag ft.³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 37.5 - 9.0 ft. Tremied: Y / (N) Volume: 10 bags ft.³
Description: Sand Filter (type: #1 silica) / Other: (9.0 - 7.0 NATIVE SANDS)

Lower Backfill
Interval: — - — ft. Tremied: Y / N Volume: ft.³
Description: Bentonite Grout / Fill / Other:

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CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-11
SHEET 1 OF 1
PROJECT NO: 2002.187.S10

DRILLING CO.: Soil Testing
DRILLER: Phil
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 140 lb. HAMMER FALL (IN): 30
BORING LOCATION:
GROUND ELEVATION: —
DATE STARTED: 03-26-02 DATE FINISHED: 03-26-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-26-02	GL	~7'	1315

Time and Date of Completion: 03-26-02

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
—	—	—	—	—	Auger to 5'	/	—	—
S-7	-35	5.0-5.7	0.5/0.7	6 50/2 —	F-SAND little silt Dark yellowish brown 10YR 4/4	—	SM	—
					Auger refusal @ 7.5'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-7.5
2"	Split Spoon	5-5.7

PROPORTIONS USED:
TRACE 0 TO 10% SOME 20 TO 35%
LITTLE 10 TO 20% AND 35 TO 50%

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:

Auger refusal @ 7.5'

Reviewed by Staff:

FUSS & O'NEILL, INC.
CONSULTING ENGINEERS
MANCHESTER, CT 06040

BORING LOG

PROJECT: Kimball

LOCATION: Monroe, CT

SITE ID: SB-11-A / MW-11
SHEET 1 OF 1
PROJECT NO: 2002.187.510

DRILLING CO.: Soil Testing
DRILLER: Phil
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lb. HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-26-02 DATE FINISHED: 03-26-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-26-02	CL	17-8'	1500

Time and Date of Completion:

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
—	—	—	—	—	Auger to 10'		—	—
10-12	-36	10.0-10.7'	0.5/0.7	62 50/2 — —	F-M SAND AND SUB-ROUNDED GRAVEL LITTLE silt Dark yellowish brown 10YR 4/2	—	GM-GP	
—	—	—	—	—	Auger to 15' ~~Auger refusal @ 15~~ @16	—	—	—
15-17	-37	15-16.5	1.0/1.5	13 16 50/2 —	F-M SAND SOME Gravel and weathered cobbles LITTLE silt	—	GM-GP	—
—	—	—	—	—	auger refusal @ 17'			
					Finish as well MW-07			
					pass. 36 bedrock/weathered			
					bedrock @ 17'			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4¼"	Hollow Stem Auger	0-17
2"	Split Spoon	0-16.5'

REMARKS
Field Instrument = ——→

If refusal is encountered, describe all efforts used to confirm
Auger refusal @ 17'

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

Reviewed by Staff:

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Site ID (Boring/Well ID): SB-11B/MW-11
Project Location: Monroe, CT
Project No.: 2002 187.540
Fuss & O'Neill Engineer/Geologist: RSK
Ground Surface Elevation: —
Date of Completion: 03-26-02
Permit #: —
Boring Location: Area 3
El Top of Steel Casing: —
Drilling Contractor: Soil Testing
El Top of PVC Casing: —
Drilling Method: Hollow Stem Auger
Measuring Point: TPS / PVC —
Well Cover (see codes):

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5' ft.

Sump (below screen)
Diameter: 2" in.
Type: PVC sump
Length: 0 ft.

Protective Casing
Diameter: 4" in. Type: black steel pipe
Stick-up: 2.5' ft. Depth to Bottom: 2.5' ft.
Seal Material: concrete

Screen Intervals
Screen Interval: 17.0 - 27.0 ft. Diameter: 2" in. Slot Size: 10 in.
Description: (PVC) / Other:
Type: Perforated / (Slotted) / Wire-Wrap / Other:

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 0.0 - 0.2 ft. Tremied: Y (N) Volume: 1 bag ft³
Description: Concrete / Other:

Backfill
Interval: 3.0 - 10.0 ft. Tremied: Y / N Volume: 1 ft³
Description: Bentonite Grout / (Fill) / Other: Native

Lower Seal
Interval: 30.0 - 33.0 ft. Tremied: Y / N Volume: 1/2 bag ft³
Description: Bentonite / (Bentonite Pellets) / Grout / Other:

Filter
Interval: 17.0 - 30.0 ft. Tremied: Y / N Volume: 5 bags ft³
Description: Sand Filter (type: #1 Sand) / Other:

Lower Backfill
Interval: — ft. Tremied: Y / N Volume: ft³
Description: Bentonite Grout / Fill / Other:

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MANCHESTER, CT 06040

BORING LOG
PROJECT: Kimball
LOCATION: Monroe, CT

SITE ID: SB-13 / MW-13
SHEET 1 OF 1
PROJECT NO: 2002 187 S10

DRILLING CO.: Soil Testing
DRILLER: Phil D.
F & O REPRESENTATIVE: RSK
DRILLING METHOD: Hollow Stem Auger
SAMPLING METHOD: Split Spoon
HAMMER WT.: 120 lbs HAMMER FALL (IN): 30
BORING LOCATION: Area 3
GROUND ELEVATION: —
DATE STARTED: 03-26-02 DATE FINISHED: 03-26-02

WATER LEVEL MEASUREMENTS

DATE	MS. PT.	WATER AT	TIME
03-26-02	GL	~7'	1430

Time and Date of Completion: 03-26-02 1500

DEPTH (FT)	SAMPLE NO.	SAMPLE DEPTH (FT)	REC/PEN	BLOWS 6"	SAMPLE DESCRIPTION	STRATA CHANGE	USCS CODE	FIELD TESTING (ppm)
—	~~S-1~~	—	—	—	Auger to 5'	—	—	—
5-7	S-2	5.0-7.9	1.2/1.9	20 22 / 38 50/5"	F-M SAND AND Silt weathered gravel and cobbles little silt	—	GM-GP	—
—	—	—	—	—	Auger to 10'	—	—	—
10-12	S-3	10.0-11.2	0.3/1.3	33 32 / 50/3"	F-M SAND AND weathered - decomposed cobbles little silt; moist	—	GM-GP	—
—	—	—	—	—	Auger to 15'	—	—	—
15-17	S-4	15.0-16.0	1.0/1.0	38 50/5" / — —	F-M SAND AND weathered cobbles Possibly weathered bedrock	—	GM-GP	—
					EOB Auger refusal @ 16.5' Finish as MW-13			

BORING SIZE (O.D.)	BORING METHOD	DEPTH
4 1/4"	Hollow Stem Auger	0-16.5
2"	Split Spoon	0-16

PROPORTIONS USED:
TRACE 0 TO 10%
LITTLE 10 TO 20%
SOME 20 TO 35%
AND 35 TO 50%

REMARKS
Field Instrument = ——

If refusal is encountered, describe all efforts used to confirm:
Auger refusal

Reviewed by Staff:

FUSS&O'NEILL,INC.

MONITORING WELL COMPLETION REPORT

GENERAL INFORMATION

Project Name: Kimball
Project Location: Monroe, CT
Fuss & O'Neill Engineer/Geologist: RSK
Date of Completion: 03-26-02
Boring Location: Area 3
Drilling Contractor: Soil Testing
Drilling Method: Hollow Stem Augers

Site ID (Boring/Well ID): SB-13 / MW-13
Project No.: 20021875.10
Ground Surface Elevation: —
Permit #: —
El Top of Steel Casing: —
El Top of PVC Casing: —
Measuring Point: TPS / PVC —
Well Cover (see codes): —

WELL CONSTRUCTION

Well Casing/Riser
Diameter: 2" in.
Type: PVC
Stick-up: 2.5' ft.

Sump (below screen)
Diameter: 2 in.
Type: Pvc cap
Length: 0.10 ft.

Protective Casing
Diameter: 4" in. Type: black steel pipe
Stick-up: 2.5' ft. Depth to Bottom: 2.5' ft.
Seal Material: concrete

Screen Interval
Screen Interval: 16.5-6.5 ft. Diameter: 2" in. Slot Size: 10 in.
Description: (PVC) / Other: —
Type: Perforated / (Slotted) / Wire-Wrap / Other: —

ANNULAR FILL

Surface Seal (Approximate volumes if available)
Interval: 1.0-0.0 ft. Tremied: Y / (N) Volume: 1 bag ft³
Description: (Concrete) / Other: —

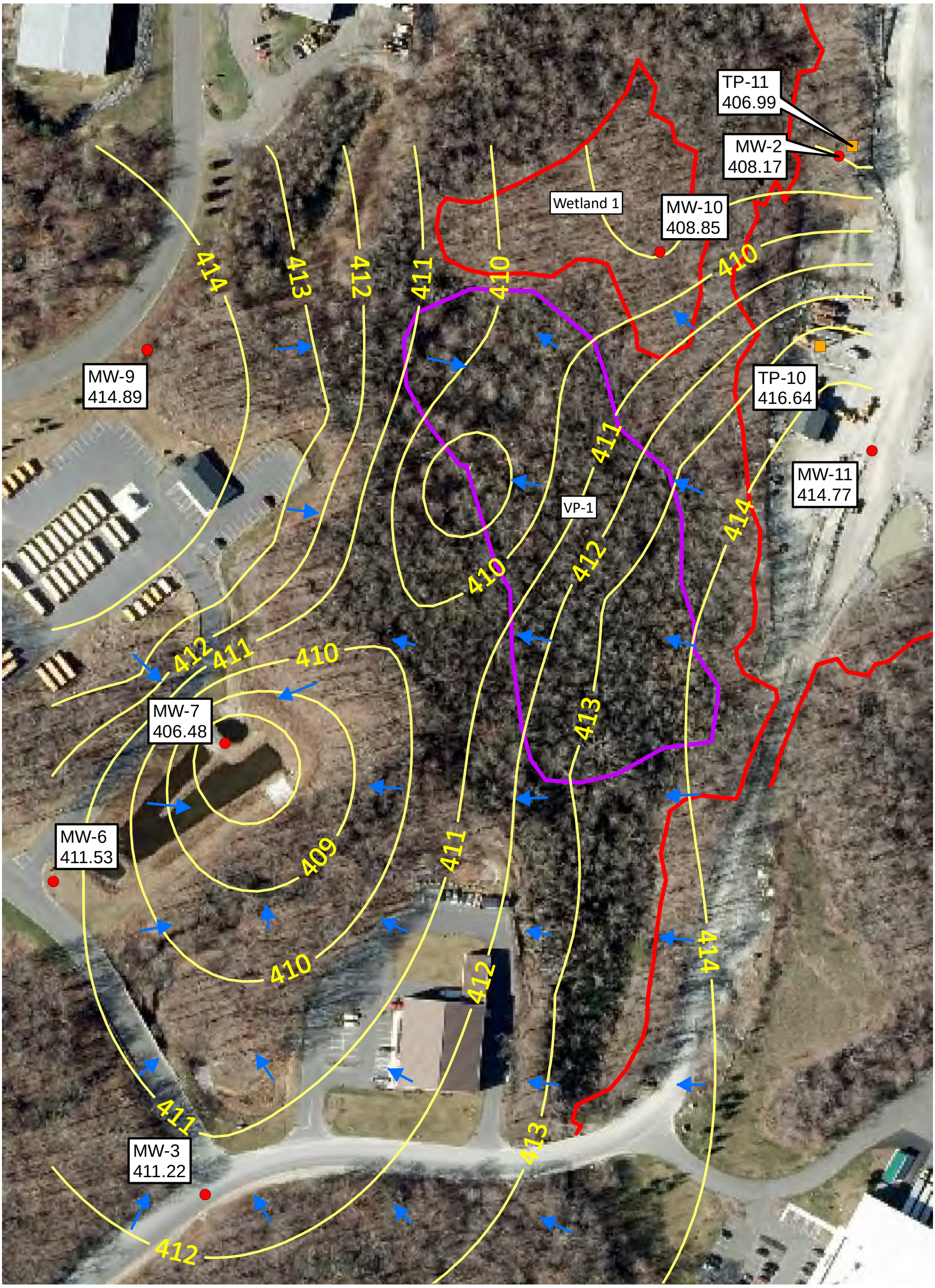
Backfill
Interval: 3.0-1.0 ft. Tremied: Y / (N) Volume: 2' ft³
Description: Bentonite Grout / (Fill) Other: native material

Lower Seal
Interval: 5.0-3.0 ft. Tremied: Y / (N) Volume: ½ bag ft³
Description: Bentonite / (Bentonite Pellets) / Grout / Other: —

Filter
Interval: 16.5-5.0 ft. Tremied: Y / (N) Volume: 5 bags ft³
Description: Sand Filter (type: #1 Silica) / Other: —

Lower Backfill
Interval: — ft. Tremied: Y / N Volume: — ft³
Description: Bentonite Grout / Fill / Other: —

APPENDIX II



Existing Well

Approximate Location of Fuss & O'Neill Test Pit

Groundwater Contours

Groundwater Flow Direction

Wetland

N
W E
S

CONNECTICUT

SITE LOCATION

0 120 240

SCALE IN FEET

SOLLI ENGINEERING
523 PEPPER STREET
MONROE, CT 06468

2002 OVERBURDEN CONTOUR MAP
MARCH 2002

DATE	REVISED

PREPARED BY:

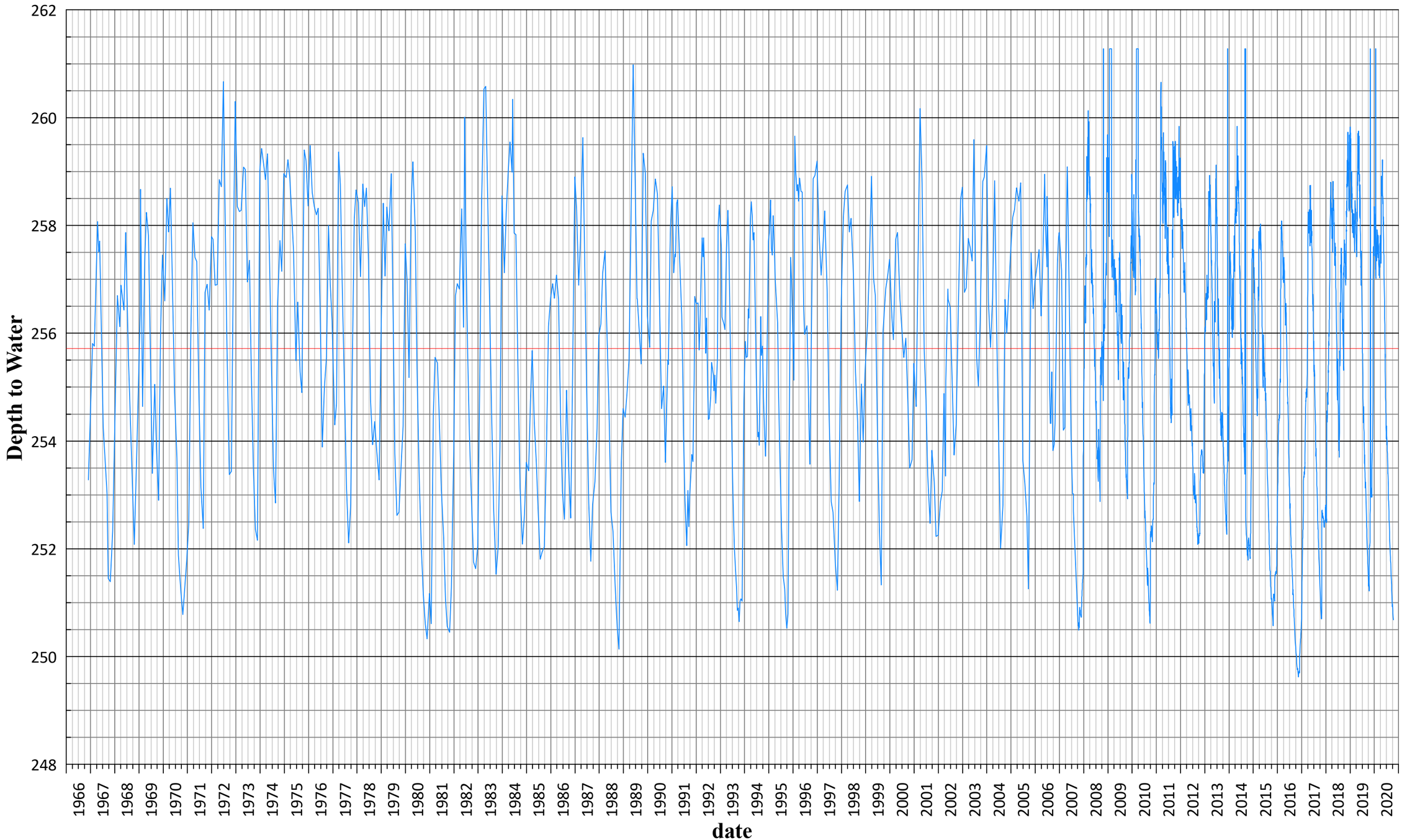
WSP USA
4 RESEARCH DRIVE
SUITE 204
SHELTON, CT 06484
TEL: (203) 929-8555

DRAWN:	CHECKED:	DATE:	FIGURE:
BM	KT	10/16/20	A2 F1

WSP Office: Shelton, CT | Source: C:\Users\mxc\db\Documents\WSP\Local_Working\Monroe\Appendix II - Figure 1 - 2002 Overburden Groundwater Contour Map March 2002.mxd | Coordinate System: NAD 1983 2011 StatePlane Connecticut FIPS 0600 FEET US

APPENDIX III

USGS 412429073165101 CT-NT 15 NEWTOWN, CT
HYDROGRAPH
DECEMBER 1966 - OCTOBER 2020



WSP USA

SUBSURFACE AND STOCKPILE INVESTIGATION
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE MONROE, CONNECTICUT

ROCKHEAD LLC

PROJECT NO.: 31402701.000
DATE: DECEMBER 2020

WSP USA
4 RESEARCH DRIVE, SUITE 204
SHELTON, CT 06484

PHONE: +1 (203) 929-8555
FAX: +1 (203) 926-9140
wsp.com

SIGNATURES

PREPARED BY:



Darrick F. Jones, LEP
Senior Supervising Hydrogeologist

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1.0 INTRODUCTION

WSP USA, Inc, (WSP) performed a Subsurface Investigation of the property located at 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut (the "Site"). This investigation was completed on behalf of Rockhead LLC, to address the concerns of Southwest Conservation District (SWDC) regarding the potential for the Site activities to cause contamination to the groundwater and thereby the on-site wetlands. We have also addressed similar concerns presented by Alta Environmental Corp.

The Site is occupied by the Rockhead Quarry. Site operations formerly included soil and rock mining operations including the screening of native materials to manufacture various types of processed gravels and fill. Quarrying operations have been terminated and plans have been developed to fill the Site in an effort to restore the drainage area to nearby wetland areas and to construct a commercial building.

Our Subsurface Investigation program was designed to address concerns of the SWCD that were identified within its August 2020 Review of Inland Wetlands Application and in Alta's August 26,2020 Memorandum of Preliminary Questions Regarding Soil Waste and DEEP Matters. Specifically, the SWCD and Alta indicate that fill used at the Site by the previous owner has cause concern for potential environmental impacts. The SWCD and Alta recommended the completion of soil borings and the collection and analyses of material samples to evaluate the fill quality. SWCD and Alta also recommended an evaluation of groundwater quality at the Site to determine if pollution from the fill is impacting the downgradient wetland areas.

Our investigation program included: 1) shallow hand tool investigations in six locations of imported material stockpiles; 2) the advancement of 10 soil borings to equipment refusal; 3) the completion of nine test pit excavations; and 4) the collection and laboratory analyses of 31 soil samples, one surface water, and two groundwater samples. The investigations were performed under the supervision of a State of Connecticut Licensed Environmental Professional (LEP).

2.0 SITE LOCATION AND DESCRIPTION

The Site is located at the end of the cul-de-sac on Cambridge Drive in Monroe, Connecticut (Figure 1). The surrounding area is generally comprised of industrial and commercial properties.

The Site consists of approximately 71.9 acres of land that is situated at 64 Cambridge Drive and 4 Independence Drive. A quarry is situated across a significant portion of the Site. The quarry area has undergone filling with various types of materials that have been characterized as clean fill. These materials have been placed in various stockpiles at the Site, which includes screenings from on-site quarrying operations, manufactured processed materials for export, and imported materials from area development projects. A low-lying surface water ponding area is situated at northern portions of the quarry, where historical materials removal has extended below the apparent water

table, which is evident within rock cut walls of the pond. Stormwater from northern portions of the quarry also feeds the pond. Site features are depicted in Figure 2.

3.0 SITE HISTORY

3.1 SUMMARY OF COMMERCIAL HISTORY

The Site consisted of vacant woodland until approximately 2005 when construction of Cambridge Drive and Enterprise Drive was initiated, and southern portions of the Site were cleared for quarry operations. These quarry operations expanded to northern portions of the Site by 2010. The transition of Site operations to include the import of fill and processing of demolition materials was initiated by the prior Site owner in 2018. Since that time approximately 100,000 cubic yards of fill have been placed at the Site. Stockpiles of processed concrete and asphalt are also staged at the Site for eventual off-site recycling. Several native materials stockpiles are also present at the Site that consist of quarry screenings and rock dust, manufactured processed materials, and overburden that has been relocated by the quarrying operations.

3.2 History of Hazardous Substances and Petroleum Products

Hazardous substance and petroleum products used at the Site have been limited to diesel fuel and various maintenance products associated with the operation of quarry machinery.

3.3 Regulatory Setting

The Site is not entered into a Connecticut Department of Energy & Environmental Protection (CTDEEP) Remediation Division program (e.g., Property Transfer Program, Voluntary Remediation Program) and is not the subject of a CTDEEP Order. Accordingly, the Site is not subject to the CTDEEP Remediation Standard Regulations (RSRs). Regardless, the regulatory criteria within the RSRs are risk based cleanup standards promulgated to protect human health and the environment. Therefore, we have presented the soil and groundwater investigation dataset relative to the RSRs. The relevant regulatory criteria are discussed further in Section 6.1.

4.0 ENVIRONMENTAL SETTING

4.1 Regional Physiography

The Site is located on the U.S. Geological Survey (USGS), Long Hill, Connecticut topographical quadrangle. The Site is depicted on the USGS mapping as having significant topographic relief with a ridgeline trending north to south through central portions of the Site. Elevations range from approximately 410 to 490 feet above mean sea level. Site topography formerly sloped down to

wetland areas situated at northeastern and southwestern portions of the Site and toward an off-site wetland located to the north of Independence Drive to the north of the Site. The quarrying operations at the Site have altered topography significantly with the northern portion of Site graded to an on-site pond and southern portions sloping down to the southwest. Area topography grades down to the south and southwest toward the West Branch of the Pequonnock River.

4.2 Geologic Conditions

The surficial geology at the Site is mapped on the Surficial Material Map of Connecticut (Stone et al. USGS 1992) primarily as glacial till indicating a dense matrix of sand, silt and gravel. The Bedrock Geologic Map of Connecticut (Rodgers, 1985) maps the underlying bedrock as Brookfield Gneiss, which is described as a dark to light, medium- to coarse-grained dioritic gneiss.

4.3 Hydrologic Characteristics and Known Groundwater Uses

The groundwater beneath the Site is classified by the CTDEEP primarily as Class "GAA_S," indicating that the groundwater is presumed to be suitable for direct human consumption without pretreatment (CTDEEP, 2011). Further the groundwater provides baseflow to a surface water tributary to a public water supply. A narrow lens of overburden groundwater was encountered at portions of the Site at depths of 4 to 9 feet below grade in the south and absent at northeastern portions. Groundwater within the footprint of the quarry was inferred to flow toward the on-site pond at northern portions of the Site and toward the southwestern wetlands area at southern portions of the Site. Localized flow variations may exist as a result of irregular topography, underground utilities and/or heterogeneous subsurface conditions.

The closest downgradient surface water body is the West Branch of the Pequonnock River which is located approximately 300 feet south of the Site. This water body is mapped as Class AA (CTDEEP, 2006). This designation indicates that the surface waters are designated for existing or proposed drinking water supplies; habitat for fish and other aquatic life and wildlife; recreation; and water supply for industrial and agriculture.

The State of Connecticut Department of Public Health (DPH) GIS mapping identifies that a majority of the Site is situated within watershed of the Easton Reservoir, which is located approximately 4.6 miles southwest of the Site. No other regulated public water supply sources were mapped within a one-quarter mile radius of the Site. The DPH mapping indicates that the Aquarion Water Company provides public water service to areas south and west of the Site. Private potable wells are presumed to be in-use at developed properties east of the Site.

The CTDEEP Aquifer Protection Program web-based mapping does not identify an aquifer protection area within one half-mile radius of the Site.

5.0 SCOPE OF INVESTIGATION

WSP completed our Subsurface Investigation subsurface investigations between August and December 2020. Details pertaining to our investigation methods are presented below.

5.1 Sampling Rationale

Our subsurface investigation program was intended to address the concerns of Southwest Conservation District and Alta regarding the potential for the Site activities to cause contamination to the groundwater and thereby the on-site wetlands. Our investigation primarily included an evaluation of the environmental quality of imported fill materials, on-site surface water, and groundwater quality. More limited investigation was completed in stockpiles of native materials.

The constituents of concern that were selected for analyses included a wide range of common potential contaminants including volatile organic compounds (VOCs), extractable total petroleum hydrocarbons (ETPH), polynuclear aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and metals. The various samples were analyzed for some or all of these constituents of concern depending on the nature of the materials. In general, stockpiles and fill that contained mixed debris including asphalt were not analyzed for the heavy-end petroleum constituents (namely ETPH and PAHs) that are present in the binder used to manufacture asphalt. Other analyses were selected to evaluate for specific constituents that are common contaminates to certain types of materials. For example, total and leachable lead analyses were conducted on all types of mixed debris, concrete and brick to evaluate for the presence of contamination associated with lead base paint.

5.2 Hand Tool Sampling

Materials samples were collected from freshly exposed materials using a decontaminated shovel at a total of six locations of imported stockpiles or exposed imported fill. The samples were collected from depths of up to 1-foot below grade. Samples were labeled with a letter that designates the type of material (c = concrete; m = mixed debris; br = brick; and s = soil) followed by the sequential sample number. Figure 2 depicts these sampling locations.

5.3 Soil Borings

WSP completed 10 direct push soil borings (B1 through B10) at the Site with Complete Environmental Services LLC and Ground H2O LLC using track mounted direct push drill rigs within areas of imported fill placement. Soil samples were collected using dedicated 5-foot acetate liners. A WSP hydrogeologist visually classified and logged each soil boring for characterization purposes. The soil borings were advanced to equipment refusal at depths of 8 to 43 feet below grade. In general, subsurface soils consisted largely of silty sand with varying amounts of gravel

and debris including concrete, asphalt, and brick with no field indications of a release. Figure 2 depicts the locations of the soil borings.

Each soil sample was field screened for total VOCs with a photoionization detector (PID). The soil type, color, field estimation of moisture content, field instrument readings, evidence of soil contamination (staining, odors, etc.) and sampling intervals are provided in the geologic logs included as Appendix I.

5.4 Test Pit Excavations

WSP completed eight test pit excavations (TP-1 through TP-8) at the Site using a track mounted excavator operated by Rockhead personnel within areas of imported fill placement. An area of recent excavation for an on-site roadway was identified as a ninth test pit (TP-9). A WSP hydrogeologist visually inspected and photo logged each test pit. Soil samples were collected from select the test pit walls. Samples were not collected from test pits TP-5 and TP-6 as these materials consisted of native overburden and screenings that were consistent with the materials at test pit TP-4. No field indications of a release were identified. Figure 2 depicts the locations of the test pit excavations.

5.5 Soil Sampling/Analyses

A total of 31 soil samples were submitted for laboratory analyses from the shallow hand tool sampling locations, soil borings, and test pit excavations. The sampling locations and depths were selected to be representative of the range of materials encountered. The geologic logs completed for the soil borings identifying the sampling intervals are included in Appendix I.

Sample collection methodology for VOCs consisted of a direct sample collection immediately after exposing the sample in accordance with procedures established by the "Guidance for Collecting and Preserving Soil and Sediment Samples for Laboratory Determination of Volatile Organic Compounds" (CTDEEP 2006). Sample containers were pre-labeled and, after adding the sampling time to the label, were immediately placed in an iced cooler. The collected soil samples were transported under chain of custody to Phoenix Environmental Laboratories, Inc. (Phoenix) for laboratory analysis.

5.6 Groundwater Sampling

Three preexisting monitoring wells were identified at southeastern portions of the Site. The monitoring wells were identified as MW-1 through MW-3. The wells were constructed of 2-inch PVC. On October 1, 2020 depth to groundwater was measured in the three monitoring wells. Low flow sampling procedures were completed using a peristaltic pump with dedicated Tygon tubing and low-density polyethylene tubing at wells MW-2 and MW-3. Well MW-2 was found to contain less than 1-foot of water and went dry during low flow pumping. Well MW-1 was used as a dust

suppression well and was sampled using the submersible pump installed within the well. The groundwater sample was collected from well MW-1 under a flow rate of approximately 5 gallons per minute. The table below provides the well construction details.

Summary of Available Well Completion Information

Well Name	Total Depth	Depth to Rock	Casing Length	Top Screen	Bottom Screen	Screen length	Construction Date
	(feet below grade)					(feet)	
MW-1	505.0	6	20	no screen			May-11
MW-2	8.5	Unknown	2.5	2.5	7.5	5	Mar-02
MW-3	37.5	37.5	7.5	7.5	37.5	30	Mar-02

Groundwater samples were collected and preserved for laboratory analyses for VOCs, ETPH, PAHs and metals. The groundwater samples were placed in laboratory cleaned sample bottles, stored on ice, and transported under chain of custody to Phoenix for laboratory analyses. Low flow sampling logs are provided in Appendix II.

5.7 Surface Water Sampling

Surface water samples were collected using a peristaltic pump with dedicated Tygon tubing and low-density polyethylene tubing along the perimeter of the pond area. Sample containers were pre-labeled and, after adding the sampling time to the label, were immediately placed in an iced cooler. The collected soil samples were transported under chain of custody to Phoenix for laboratory analysis for VOCs, ETPH, PAHs, and metals.

5.8 Quality Assurance/Quality Control Procedures

The CTDEEP Quality Assurance/Quality Control (QA/QC) Work Group finalized Reasonable Confidence Protocols (RCPs) in August 2006. These RCPs are guidelines for enhanced QA/QC procedures for analytical methods and reporting. The CTDEEP currently recommends that environmental professionals request that the laboratory follow the RCPs when producing data that is used as the basis of decisions regarding compliance with the RSRs. Our QA/QC data validation consisted of a review of Laboratory QA/QC Certification Form and confirmation of attainment of data quality objectives (i.e., applicable regulatory criteria).

The laboratory analyses and reporting relied upon in making this work product were conducted and produced by Phoenix in Manchester, Connecticut. Phoenix is a Connecticut Department of Public Health Certified Laboratory (Registration No. PH-0618). The Phoenix laboratory data report indicates compliance with the RCPs and the QA/QC procedures outlined in EPA 600/4-79-

019, “Handbook for Analytical Quality in Water and Waste Water” and method QA/QC procedures from SW 846.

The results of our QA/QC procedures and analyses of the laboratory compliance with the RCPs have not identified any issues that would qualify the use of the environmental data generated by this investigation.

6.0 SUMMARY OF INVESTIGATION RESULTS

The following summarizes the environmental conditions encountered at the Site and the results of our comparison of the Site conditions to the RSRs. Section 6.1 presents some specific conditions for applying the RSRs at the Site. Section 6.2 provides a summary of detections of tetrahydrofuran within our hand sampling dataset, which is attributed to cross-contamination. Sections 6.3 through 6.7 discuss the conditions at the individual sampling locations. Sections 6.8 and 6.9 presents a discussion of surface water and groundwater sampling results, respectively. The sampling locations are identified on Figure 2. A summary of the investigation analytical data is presented in Tables 1 through 3. Copies of the laboratory analytical reports are presented in Appendix III.

6.1 Applying the Remediation Standard Regulations (RSRs)

The regulatory criteria for soil and groundwater within the RSRs are risk based cleanup standards promulgated to protect human health and the environment. The regulatory criteria apply to polluted soil at a release area and a related groundwater plume. The regulatory criteria are not applicable to naturally occurring constituents such as metals or to construction materials such as asphalt that are manufactured with heavy-end petroleum binder as the presence of these materials does not constitute a release. Furthermore, most construction materials, which contain metals and many other chemicals are not regulated environmental media as they are virtually inert due to relative insolubility and solidification and would also not represent a direct exposure or ingestion hazard. Based on the environmental setting of the Site, the relevant criteria are summarized in the subsections below.

Direct Exposure Criteria

Mass-based concentrations of contaminants in soil are used to evaluate compliance with the Direct Exposure Criteria (DEC). The purpose of the DEC standards is to protect human health from risks associated with direct contact/ingestion of soil contaminants. The DEC are applicable to soil within 15 feet of the ground surface. Separate criteria are established for residential (R-DEC) and industrial/commercial (I/C-DEC) areas; however, use of the less stringent industrial/commercial standards requires recording an Environmental Land Use Restriction (ELUR) on the land records prohibiting residential use of the property. The DEC standards do not apply to “inaccessible soils”, which are defined as soils more than four feet below ground surface, two feet below qualifying pavement, or below an existing building, provided an ELUR is in effect for the whole parcel or

the area of the release. We have compared contaminant concentrations to both the R-DEC and I/C-DEC.

GA Pollutant Mobility Criteria (GA-PMC)

Concentrations of contaminants in soil are also evaluated relative to the Pollutant Mobility Criteria (PMC). The purpose of the PMC standard is to evaluate the potential for contaminants to migrate from the soil and degrade the underlying groundwater. For most constituents, this evaluation can be performed by either: 1) using samples analyzed for total mass concentrations and comparing directly to PMC values presented in the RSRs; or 2) subjecting soil samples to the Synthetic Precipitation Leaching Procedure (SPLP) and comparing the concentrations of contaminants in the extracts directly to GWPC. For inorganic compounds, the PMC are not applicable to mass analyses and SPLP testing is necessary. As a conservative screening approach, based on the underlying methodology, the maximum potential SPLP concentrations can be estimated by dividing total mass concentrations by twenty; actual leachable concentrations are generally well below this calculated maximum.

Separate PMC standards are contained within the RSRs for sites located within Class GA groundwater areas versus those located within Class GB groundwater areas. Based on the Site location, compliance with the PMC was evaluated using the GA-PMC. The GA-PMC applies to soils located above the seasonal low groundwater table. In addition, the PMC are not applicable to some contaminated soils that are "environmentally isolated" (e.g., below a building) as long as an appropriate ELUR is in place prohibiting the demolition of the building.

Groundwater Protection Criteria (GWPC)

The purpose of the Groundwater Protection Criteria (GWPC) is for the protection of human health from the consumption of untreated groundwater. These standards are generally consistent with the U.S. Environmental Protection Agency (U.S. EPA) National Primary Drinking Water Standards (Maximum Contaminant Level) and the Connecticut Department of Health Water Quality Standards. The GWPC are applicable as a result of the location of the Site in an area classified by the CTDEEP as Class GAA.

Volatilization Criteria (VC)

The purpose of the Volatilization Criteria (VC) standard is to protect human health from risks associated with inhalation of volatile vapors which may migrate through building slabs into occupied spaces. Separate criteria are established for residential (R-VC) and industrial/commercial (I/C-VC) areas; however, use of the less stringent industrial/commercial standards requires recording an ELUR on the land records. We have presented site contaminants relate to both the R-VC and I/C-VC.

Surface Water Protection Criteria (SWPC)

The purpose of the SWPC standard is to evaluate if contaminated groundwater that discharges to a surface water body interferes with the attainment of surface water quality standards in that water body. The default SWPC were derived using the CTDEP Water Quality Standards multiplied by a conservative estimation of dilution as the groundwater plume enters the receiving water body. A self-implementing alternative SWPC can be calculated based on the low flow conditions of the receiving surface water body. We have compared the detected constituents of concern with the default SWPC; however, compliance with the SWPC is demonstrated on a site-wide basis by comparing the average plume concentrations or the plume concentration directly upgradient of the point of discharge to the receiving surface water body to the SWPC. Given that the receiving water body may be at a distant off-site location, the practical application of the SWPC typically involves the comparison of the detected constituents of concern with the numeric SWPC at the downgradient property line or the most downgradient Site monitoring wells.

6.2 Tetrahydrofuran Detections

Tetrahydrofuran is volatile organic compound (VOC) that is present in PVC cement. Tetrahydrofuran was detected in 5 of 6 samples that were collected on August 26, 2020 at concentrations ranging from 0.016 to 0.038 milligrams per kilogram (mg/kg). Tetrahydrofuran is not a constituent of concern associated with the current or former Site operations. WSP has experienced widespread detections of tetrahydrofuran during multiple recent subsurface investigations when using Phoenix Laboratories. These detections are at similarly low concentrations and span extensive areas. Based on these findings, we have concluded that these trace tetrahydrofuran detections were the result of cross contamination within our equipment and sample storage room and not indicative of a release to the environment.

6.3 Imported Soil Stockpile

A stockpile of soil imported from a local construction project was situated southeast of the entrance to the Site on Cambridge Drive. The stockpile was largely free of debris; however, test pits resulted in the observation of limited amounts of asphalt and debris. Field evidence of soil impacts were not identified. One surficial soil sample (S1) and two test pit samples (TP-2 and TP-3) were collected from test pit excavation within the base of the stockpile. These three samples were preserved for laboratory analyses for VOCs, ETPH, PAHs, PCBs, and select metals

VOCs and PCBs were not detected.

Low concentrations of ETPH and PAHs were detected within the test pit samples at concentrations that were below the R-DEC and GA-PMC. These detections were attributed to asphalt fragments that were observed within the stockpiled soils.

Metals were detected in the soil samples at concentrations that were consistent with typical naturally occurring concentrations.

6.4 Concrete Stockpiles

Crushed concrete without other debris was identified within a large centrally located stockpile area and at northern portions of the Site. Field evidence of impacts were not identified. Two samples (C1 and C2) were collected from the distinct stockpiles. A third sample (TP-1) was collected from a test pit that was excavated within the base of the southern concrete stockpile. These samples were submitted for analyses for VOCs, ETPH, PCBs, and total and leachable lead.

VOCs and PCBs were not detected.

ETPH was detected at 57 mg/kg within the test pit sample. This trace detection is at the laboratory detection threshold and is well below the R-DEC and GA-PMC.

Total lead was detected at a concentration that is consistent with natural materials. Leachable lead was not detected.

6.5 Brick Fill Area

Brick and brick fragments were identified as a component of mixed debris piles and also in discrete areas of predominantly segregated brick. The brick was mixed in with some soil materials and limited amounts of asphalt. Field evidence of impacts were not identified. One sample (Br1) of crush brick and brick fragments was collected and submitted for analyses for VOCs, ETPH, PCBs, and total and leachable lead.

VOCs, ETPH, and PCBs were not detected.

Total lead was detected at a concentration that is consistent with natural materials. Leachable lead was not detected.

6.6 Mixed Debris Fill Area

Mixed debris stockpiles were identified along northwestern portions of the quarry area. The materials consisted of concrete, brick, asphalt, concrete blocks, and soil. The mixed debris area was initially evaluated using two shallow hand tool sampling locations (M1 and M2), three test pit excavation (TP-7, TP-8 and TP-9), and four soil borings (B1 through B4). The debris was found to have been placed on presumed bedrock and was up to 43 feet in thickness. Field evidence of a release were not identified. A total of 13 samples were collected from these initial sampling locations and were submitted for analyses for VOCs, PCBs, and total and leachable lead.

VOCs and PCBs were not detected.

Lead was largely detected at background concentrations with the exception of the sample from test pit TP-7. This sample was found to contain total lead at 235 mg/kg. Leachable lead was also detected in this sample at 0.022 milligrams per liter. The total lead detection was below the R-DEC but the leachable lead exceeded the numerical GA-PMC.

Based on the anomalously elevated detection of lead in test pit TP-7, an additional five soil borings (B6 through B10) were completed within the mixed debris in the area of this test pit. These borings were advanced to refusal and several samples were collected at depths that generally corresponded to the elevation of the test pit sample as well as bounding depth intervals. A total of eight soil samples were collected from these borings for analyses for total and leachable lead. Total lead was detected in each of the samples at concentrations ranging from 2.95 to 141 mg/kg with the highest detection at boring B10, which was adjacent to TP-7. Leachable lead was not detected in any of these soil samples. The lead detections were well below the R-DEC and GA-PMC.

Compliance with the GA-PMC was evaluated statistically for the entire area of mixed debris consistent with Section 22a-133k-2(e)(2)(A). The leachable lead analyses for a total of 21 samples of the mixed debris were used to calculate the 95% upper confidence limit (UCL) of the arithmetic mean. The 95% UCL for the leachable lead using the detection limit for non-detections was calculated to be 0.01 mg/l, which is below the GA-PMC. Accordingly, the anomalous detection of elevated lead in the area of test pit TP-7 does not represent a regulatory exceedance. The statistical analysis is presented in Appendix IV.

6.7 Native Overburden Stockpile and Screenings

Test pit TP-4 was complete within a stockpile of native overburden soils and screening and rock dust from the processing of the quarried stone. Field evidence of impacts were not identified. One sample was collected and submitted for analyses for VOCs, ETPH, PAHs, PCBs, and metals.

VOCs, ETPH, PAHs, and PCBs were not detected.

Metals were detected in the soil sample at concentrations that were consistent with typical naturally occurring concentrations.

6.8 Surface Water

The surface water was clear and did not exhibit any field evidence of impacts. Samples of the raw pond water were collected and submitted for analyses for VOCs, ETPH, PAHs, and select metals.

VOCs, ETPH, and PAHs were not detected.

A trace concentration (1 part per billion) of chromium was detected. None of the other target metals were detected. The trace chromium is consistent with typical background conditions and not indicative of a release. Notably, the trace chromium is well below the GWPC.

6.9 Summary of Groundwater Sampling Analyses

Three preexisting monitoring wells were identified at southeastern portions of the Site. The monitoring wells were identified as MW-1 through MW-3. Low flow sampling procedures were completed using a peristaltic pump with dedicated Tygon tubing and low-density polyethylene tubing at wells MW-2 and MW-3. Well MW-2 was found to contain less than 1-foot of water and went dry during low flow pumping. Well MW-1 was used as a dust suppression well and was sampled using the submersible pump installed within the well. The groundwater sample was collected from well MW-1 under a flow rate of approximately 5 gallons per minute. The groundwater samples were preserved and submitted for laboratory analyses for VOCs, ETPH, PAHs, and metals.

VOCs, ETPH, and PAHs were not detected.

Metals were not detected in the overburden groundwater sample collected from well MW-3 using low flow sampling methods. Several naturally occurring metals were detected at trace concentrations within the groundwater from well MW-1, which was sampled using the in-place submersible high flow pump. We anticipate that these metals detections in groundwater from well MW-1 were the result of the high-flow turbid water conditions and not representative of the aquifer conditions. This conclusion could be confirmed by removing the wellhead and submersible pump and conducting low-flow sampling of water from the well.

7.0 FINDINGS AND CONCLUSIONS

This report represents our Subsurface Investigation of the property located at as 64 Cambridge Drive and 4 Independence Drive in Monroe, Connecticut (the "Site"). This investigation was completed on behalf of Rockhead LLC, to address the concerns of Southwest Conservation District (SWDC) regarding the potential for the Site activities to cause contamination to the groundwater and thereby the on-site wetlands. We have also addressed similar concerns presented by Alta Environmental Corp.

The Site is occupied by the Rockhead Quarry. Site operations formerly included soil and rock mining operations including the screening of native materials to manufacture various types of processed gravels and fill. Quarrying operations have been terminated and plans have been developed to fill the Site in an effort to restore the drainage area to nearby wetland areas and to construct a commercial building.

Our Subsurface Investigation program was designed to address concerns of the SWCD that were identified within its August 2020 Review of Inland Wetlands Application and in Alta's August 26,2020 Memorandum of Preliminary Questions Regarding Soil Waste and DEEP Matters. Specifically, the SWCD and Alta indicate that fill used at the Site by the previous owner has cause concern for potential environmental impacts. The SWCD and Alta recommended the completion of soil borings and the collection and analyses of material samples to evaluate the fill quality.

SWCD and Alta also recommended an evaluation of groundwater quality at the Site to determine if pollution from the fill is impacting the downgradient wetland areas.

The Site consists of approximately 71.9 acres of land that is situated at 64 Cambridge Drive and 4 Independence Drive. A quarry is situated across a significant portion of the Site. The quarry area has undergone filling with various types of materials that have been characterized as clean fill. These materials have been placed in various stockpiles at the Site, which includes screenings from on-site quarrying operations, manufactured processed materials for export, and imported materials from area development projects. A low-lying surface water ponding area is situated at northern portions of the quarry, where historical materials removal has extended below the apparent water table, which is evident within rock cut walls of the pond. Stormwater from northern portions of the quarry also feeds the pond.

The groundwater beneath the Site is classified by the CTDEEP primarily as Class "GAA$_S$," indicating that the groundwater is presumed to be suitable for direct human consumption without pretreatment (CTDEEP, 2011). Further the groundwater provides baseflow to a surface water tributary to a public water supply. A narrow lens of overburden groundwater was encountered at portions of the Site at depths of 4 to 9 feet below grade in the south, 40 feet below grade in central fill areas, and absent at northeastern portions. Apparent groundwater was observed emerging from bedrock fractures at depths of 5 to 10 feet below surrounding grades in areas of exposed rock cuts at northern portions of the Site. Groundwater within the footprint of the quarry was inferred to flow toward the on-site point at northern portions of the Site and toward the southwestern wetlands area at southern portions of the Site.

Our subsurface investigation program was intended to address the concerns of Southwest Conservation District regarding the potential for the Site activities to cause contamination to the groundwater and thereby the on-site wetlands. Our investigation primarily included an evaluation of the environmental quality of imported fill materials, on-site surface water, and groundwater quality. More limited investigation was completed in stockpiles of native materials. Two stockpiles that exclusively contained segregated asphalt were not sampled as these materials are staged for eventual shipment off-site for recycling and will not be used as clean fill at the Site.

Our investigation program included: 1) shallow hand tool investigations in six locations of imported material stockpiles; 2) the advancement of 10 soil borings to equipment refusal; 3) the completion of nine test pit excavations; and 4) the collection and laboratory analyses of 31 soil samples, one surface water, and two groundwater samples. The findings of our subsurface investigation area are as follows:

- Imported Soil Stockpile: A stockpile of soil imported from a local construction project was identified southeast of the entrance to the Site on Cambridge Drive. The stockpile was largely free of debris; however, test pits resulted in the observation of limited amounts of asphalt and debris. Field evidence of a release was not identified. Laboratory analyses of these materials resulted in the detection of low concentrations of asphalt constituents at concentrations that are well below the R-DEC and GA-PMC.

- Concrete Stockpiles: Crushed concrete without other debris was identified within a large centrally located stockpile area and at northern portions of the Site. Field evidence of impacts were not identified. A trace concentration of ETPH was detected in one of three samples of the concrete. This detection is well below the R-DEC and GA-PMC.

- Brick Fill: Brick and brick fragments were identified as a component of mixed debris piles and also in discrete areas of predominantly segregated brick. The brick was mixed in with some soil materials and limited amounts of asphalt. Field evidence of impacts were not identified. Constituents of concern were not detected within the brick fill.

- Mixed Debris Fill: Mixed debris stockpiles were identified along northwestern portions of the quarry area. The materials consisted of concrete, brick, asphalt, concrete blocks, and soil. Field indications of a release were not identified. A discrete area of anomalously elevated lead was detected in the area of one test pit sample. Regardless, the lead was found to be in compliance with the R-DEC and GA-PMC. No other constituents of concern were detected.

- Native Overburden Stockpile and Screenings: Test pit TP-4 was complete within a stockpile of native overburden soils and screening and rock dust from the processing of the quarried stone. Field evidence of impacts were not identified. Constituents of concern were not detected.

- Surface Water: Groundwater from northern portions of the Site was inferred to flow to the on-site pond. Constituents of concern were not detected with samples of the pond water.

- Groundwater: Existing wells situated at southwestern portions of the Site, which are downgradient of southern portions of the Site, were sampled and analyzed for the constituents of concern. Impacts to the overburden and bedrock aquifer were not identified.

WSP did not identify conditions at the Site that are indicative of the presence of a source of contamination to groundwater or thereby the on-site wetlands. Evidence of the presence of contaminated materials was not identified within discrete stockpiles. In addition, the stormwater and groundwater fed surface water body at the Site did not exhibit any evidence of impacts.

REFERENCES

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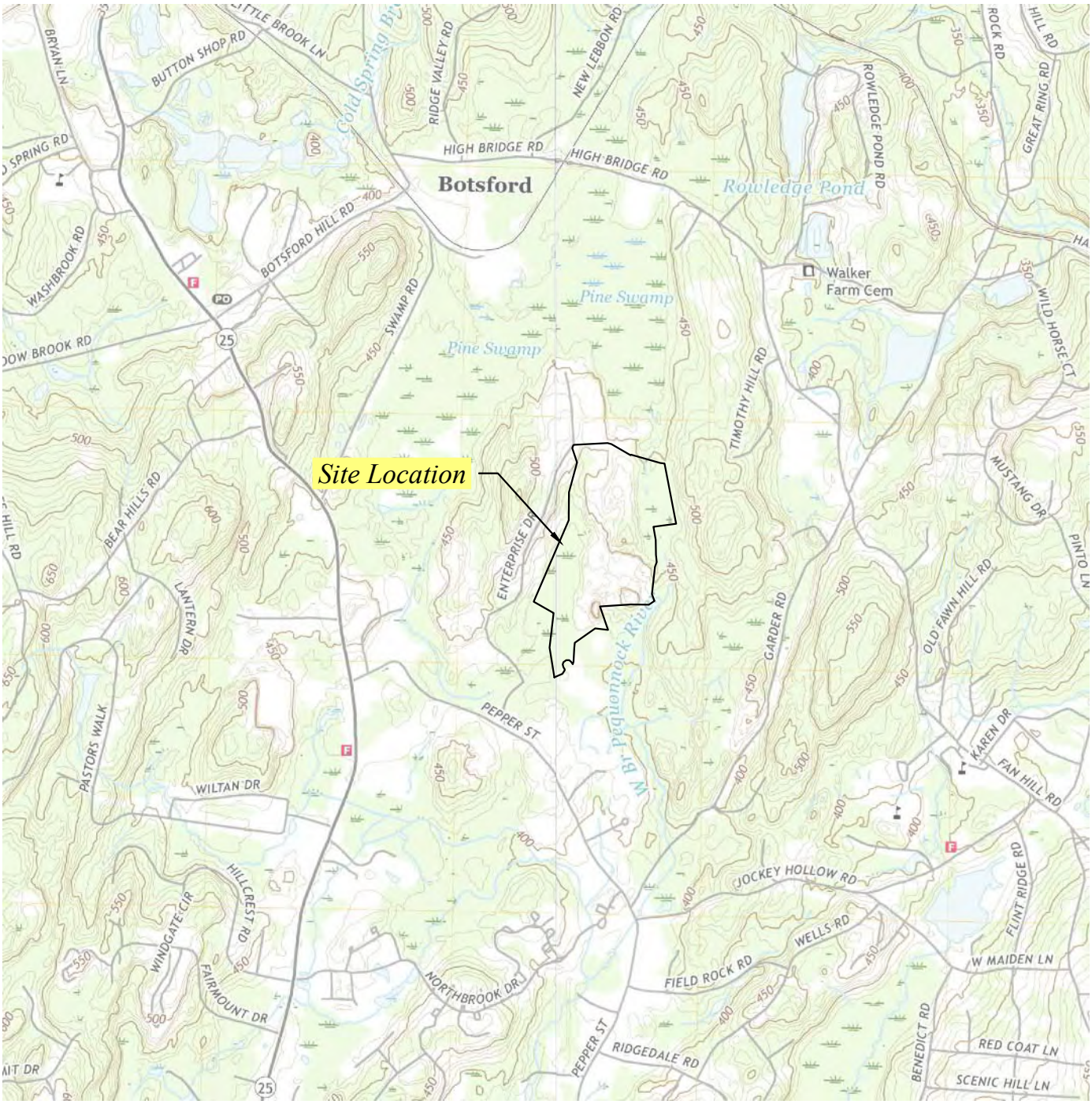
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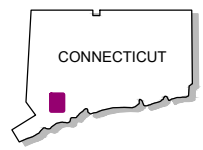
WSP USA (WSP) 2020. Hydrogeologic Investigation, 64 Cambridge Drive and 4 Independence Drive, Monroe, Connecticut.

FIGURES



SOURCE: USGS TOPOGRAPHC QUADRANGLES BOTSFORD AND LONG HILL, CONNECTICUT (2018).





QUADRANGLE LOCATION

0 2000

SCALE IN FEET

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

SITE LOCATION MAP

DATE	REVISED

PREPARED BY:

WSP USA
4 Research Drive
Suite 204
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	RAC	CHECKED:	DJ	DATE:	09/03/20	FIGURE:	1



LEGEND

- PROPERTY BOUNDARY
- STOCKPILE SAMPLING LOCATION
- MONITORING WATER SAMPLING LOCATION
- SURFACE WATER SAMPLING LOCATION

0 400

SCALE IN FEET

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

SITE PLAN

DATE	REVISED

PREPARED BY:

WSP USA
4 Research Drive
Suite 204
Shelton, Connecticut 06484
(203) 929-8555

DRAWN:	RAC	CHECKED:	DJ	DATE:	11/11/20	FIGURE:	2

TABLES

Table 1

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

Summary of Soil Analytical Data

	Units	Regulatory Criteria GA-PMC	Regulatory Criteria R-DEC	C1 8/26/20	C2 8/26/20	M1 8/26/20	M2 8/26/20	Br1 8/26/20	S1 8/26/20	TP-1 10/7/20	TP-2 10/7/20	TP-3 10/7/20	TP-4 10/7/20	TP-7 10/7/20	TP-8 10/7/20	TP-9 10/7/20	B1 (26-28) 10/7/20
Total Metals																	
Arsenic	mg/kg	N/A	10	NA	NA	NA	NA	NA	2.66	NA	3.3	3.78	2.95	NA	NA	NA	NA
Cadmium	mg/kg	N/A	34	NA	NA	NA	NA	NA	1.3	NA	1.03	1.11	1.58	NA	NA	NA	NA
Chromium	mg/kg	N/A	100	NA	NA	NA	NA	NA	25	NA	23.4	26.3	34.8	NA	NA	NA	NA
Copper	mg/kg	N/A	2,500	NA	NA	NA	NA	NA	22	NA	25.5	27	12.5	NA	NA	NA	NA
Lead	mg/kg	N/A	400	5.61	5.5	14.4	65.6	18.5	8.77	21.6	14.7	15.9	3.45	235	4.99	29.4	3.99
Nickel	mg/kg	N/A	1,400	NA	NA	NA	NA	NA	ND<0.03	NA	16.6	17.9	15.5	NA	NA	NA	NA
SPLP Lead	mg/L	0.015	N/A	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	NA	ND<0.010	NA	NA	NA	0.022	ND<0.010	ND<0.010	ND<0.010
Extractable Total Petroleum Hydrocarbons (ETPH)	mg/kg	500	500	ND<270	ND<58	NA	NA	ND<260	ND<51	57	72	ND<270	ND<53	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)	mg/kg	N/A	1	ND<0.37	ND<0.39	NA	NA	ND<0.34	ND<0.34	ND<0.37	ND<0.36	ND<0.36	ND<0.35	ND<0.37	ND<0.35	ND<0.4	ND<0.36
Volatile Organic Compounds (VOCs)																	
Naphthalene	mg/kg	5.6	1,000	ND<0.0056	ND<0.0065	ND<0.0078	ND<0.0078	ND<0.0086	ND<0.005	ND<0.0059	ND<0.0048	ND<0.0055	ND<0.0064	ND<0.0061	ND<0.0055	ND<0.006	ND<0.0076
Polynuclear Aromatic Hydrocarbons (PAHs)																	
Anthracene	mg/kg	40	1,000	NA	NA	NA	NA	NA	ND<0.24	NA	0.32	ND<0.25	ND<0.25	NA	NA	NA	NA
Benz(a)anthracene	mg/kg	1	1	NA	NA	NA	NA	NA	ND<0.24	NA	0.86	ND<0.25	ND<0.25	NA	NA	NA	NA
Benzo(a)pyrene	mg/kg	1	1	NA	NA	NA	NA	NA	ND<0.24	NA	0.77	ND<0.25	ND<0.25	NA	NA	NA	NA
Benzo(b)fluoranthene	mg/kg	1	1	NA	NA	NA	NA	NA	ND<0.24	NA	0.65	ND<0.25	ND<0.25	NA	NA	NA	NA
Benzo(ghi)perylene	mg/kg	1	8.4	NA	NA	NA	NA	NA	ND<0.24	NA	0.34	ND<0.25	ND<0.25	NA	NA	NA	NA
Benzo(k)fluoranthene	mg/kg	1	8.4	NA	NA	NA	NA	NA	ND<0.24	NA	0.64	ND<0.25	ND<0.25	NA	NA	NA	NA
Chrysene	mg/kg	1	84	NA	NA	NA	NA	NA	ND<0.24	NA	0.83	ND<0.25	ND<0.25	NA	NA	NA	NA
Fluoranthene	mg/kg	5.6	1,000	NA	NA	NA	NA	NA	ND<0.24	NA	1.8	0.47	ND<0.25	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	1	1	NA	NA	NA	NA	NA	ND<0.24	NA	0.46	ND<0.25	ND<0.25	NA	NA	NA	NA
Phenanthrene	mg/kg	4	1,000	NA	NA	NA	NA	NA	ND<0.24	NA	0.94	ND<0.25	ND<0.25	NA	NA	NA	NA
Pyrene	mg/kg	4	1,000	NA	NA	NA	NA	NA	ND<0.24	NA	1.4	0.4	ND<0.25	NA	NA	NA	NA

mg/kg: milligrams per kilogram
mg/L: milligrams per liter
GA-PMC: GA Pollutant Mobility Criteria
R-DEC: Residential Direct Exposure Criteria
SPLP: Synthetic Precipitation Leaching Procedure
N/A: Not applicable
ND<: Not detected above laboratory reporting criteria
NA: Not analyzed

Table 1

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

Summary of Soil Analytical Data

	Units	Regulatory Criteria GA-PMC	Regulatory Criteria R-DEC	B1 (36-38) 10/7/20	B2 (17-19) 10/7/20	B2 (22-24) 10/7/20	B2 (30-32) 10/7/20	B3 (11-13) 10/7/20	B4 (16-18) 10/7/20	B4 (20-22) 10/7/20	B5 (16-18) 10/7/20	B5 (25-27) 10/7/20	B6 (10-11) 11/10/20	B6 (25-26) 11/10/20	B8 (10-12) 11/10/20	B8 (20-21) 11/10/20	B9 (11-13) 11/10/20
Total Metals																	
Arsenic	mg/kg	N/A	10	NA	NA	NA	NA	NA	NA	NA	2.05	1.91	NA	NA	NA	NA	NA
Cadmium	mg/kg	N/A	34	NA	NA	NA	NA	NA	NA	NA	1.29	1.27	NA	NA	NA	NA	NA
Chromium	mg/kg	N/A	100	NA	NA	NA	NA	NA	NA	NA	17.7	16.9	NA	NA	NA	NA	NA
Copper	mg/kg	N/A	2,500	NA	NA	NA	NA	NA	NA	NA	6.1	8.5	NA	NA	NA	NA	NA
Lead	mg/kg	N/A	400	5.65	7.05	7.39	9.97	7.95	38.6	15.9	2.41	3.01	16.1	4.6	2.95	78.2	4.77
Nickel	mg/kg	N/A	1,400	NA	NA	NA	NA	NA	NA	NA	7.36	7.48	NA	NA	NA	NA	NA
SPLP Lead	mg/L	0.015	N/A	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010	NA	NA	ND<0.010	ND<0.010	ND<0.010	ND<0.010	ND<0.010
Extractable Total Petroleum Hydrocarbons (ETPH)	mg/kg	500	500	NA	NA	NA	NA	NA	NA	NA	ND<52	ND<51	NA	NA	NA	NA	NA
Polychlorinated Biphenyls (PCBs)	mg/kg	N/A	1	ND<0.37	ND<0.35	ND<0.36	ND<0.38	ND<0.35	ND<0.37	ND<0.37	ND<0.35	ND<0.35	NA	NA	NA	NA	NA
Volatile Organic Compounds (VOCs)																	
Naphthalene	mg/kg	5.6	1,000	ND<0.0076	4.2	ND<0.0071	0.032	ND<0.0046	ND<0.0077	0.46	ND<0.0067	ND<0.0044	NA	NA	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (PAHs)																	
Anthracene	mg/kg	40	1,000	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Benz(a)anthracene	mg/kg	1	1	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Benzo(a)pyrene	mg/kg	1	1	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	mg/kg	1	1	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Benzo(ghi)perylene	mg/kg	1	8.4	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	mg/kg	1	8.4	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Chrysene	mg/kg	1	84	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Fluoranthene	mg/kg	5.6	1,000	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	1	1	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Phenanthrene	mg/kg	4	1,000	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA
Pyrene	mg/kg	4	1,000	NA	NA	NA	NA	NA	NA	NA	ND<0.24	ND<0.24	NA	NA	NA	NA	NA

mg/kg: milligrams per kilogram
mg/L: milligrams per liter
GA-PMC: GA Pollutant Mobility Criteria
R-DEC: Residential Direct Exposure Criteria
SPLP: Synthetic Precipitation Leaching Procedure
N/A: Not applicable
ND<: Not detected above laboratory reporting criteria
NA: Not analyzed

Table 1

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

Summary of Soil Analytical Data

	Units	Regulatory Criteria GA-PMC	Regulatory Criteria R-DEC	B9 (16-18) 11/10/20	B10 (0-2) 11/10/20	B10 (5-7) 11/10/20
Total Metals						
Arsenic	mg/kg	N/A	10	NA	NA	NA
Cadmium	mg/kg	N/A	34	NA	NA	NA
Chromium	mg/kg	N/A	100	NA	NA	NA
Copper	mg/kg	N/A	2,500	NA	NA	NA
Lead	mg/kg	N/A	400	4.84	141	32.6
Nickel	mg/kg	N/A	1,400	NA	NA	NA
SPLP Lead	mg/L	0.015	N/A	ND<0.010	ND<0.010	ND<0.010
Extractable Total Petroleum Hydrocarbons (ETPH)	mg/kg	500	500	NA	NA	NA
Polychlorinated Biphenyls (PCBs)	mg/kg	N/A	1	NA	NA	NA
Volatile Organic Compounds (VOCs)						
Naphthalene	mg/kg	5.6	1,000	NA	NA	NA
Polynuclear Aromatic Hydrocarbons (PAHs)						
Anthracene	mg/kg	40	1,000	NA	NA	NA
Benz(a)anthracene	mg/kg	1	1	NA	NA	NA
Benzo(a)pyrene	mg/kg	1	1	NA	NA	NA
Benzo(b)fluoranthene	mg/kg	1	1	NA	NA	NA
Benzo(ghi)perylene	mg/kg	1	8.4	NA	NA	NA
Benzo(k)fluoranthene	mg/kg	1	8.4	NA	NA	NA
Chrysene	mg/kg	1	84	NA	NA	NA
Fluoranthene	mg/kg	5.6	1,000	NA	NA	NA
Indeno(1,2,3-cd)pyrene	mg/kg	1	1	NA	NA	NA
Phenanthrene	mg/kg	4	1,000	NA	NA	NA
Pyrene	mg/kg	4	1,000	NA	NA	NA

mg/kg: milligrams per kilogram
mg/L: milligrams per liter
GA-PMC: GA Pollutant Mobility Criteria
R-DEC: Residential Direct Exposure Criteria
SPLP: Synthetic Precipitation Leaching Procedure
N/A: Not applicable
ND<: Not detected above laboratory reporting criteria
NA: Not analyzed

Table 2

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

Summary of Surface Water Analytical Data

	Units	W1 8/26/2020
Total Metals		
Arsenic	mg/l	ND<0.004
Cadmium	mg/l	ND<0.001
Chromium	mg/l	0.001
Copper	mg/l	ND<0.005
Lead	mg/l	ND<0.002
Mercury	mg/l	ND<0.0002
Nickel	mg/l	ND<0.001
Extractable Total Petroleum Hydrocarbons (ETPH)	mg/L	ND
Polynuclear Aromatic Hydrocarbons (PAHs)	ug/l	ND
Volatile Organic Compounds (VOCs)	ug/L	ND

mg/L: milligrams per liter
ug/L: micrograms per liter
ND / ND<: Not detected above laboratory reporting criteria

Table 3

ROCKHEAD LLC
64 CAMBRIDGE DRIVE
MONROE, CONNECTICUT

Summary of Groundwater Analytical Data

	Units	Regulatory Criteria R-VC	Regulatory Criteria GWPC	MW-1 10/1/2020	MW-3 10/1/2020
Total Metals					
Arsenic	mg/L	N/A	0.05	0.005	ND<0.004
Chromium	mg/L	N/A	0.05	0.001	ND<0.001
Copper	mg/L	N/A	1.3	0.019	ND<0.005
Nickel	mg/L	N/A	0.1	0.002	ND<0.001
Zinc	mg/L	N/A	5	0.006	ND<0.004
Extractable Total Petroleum Hydrocarbons (ETPH)	mg/L	N/A	0.25	ND<0.069	ND<0.066
Volatile Organic Compounds (VOCs)	ug/L	various	various	ND	ND
Polyaromatic Hydrocarbons (PAHs)	ug/L	various	various	ND	ND

R-VC: Residential Volatilization Criteria
GWPC: Groundwater Protection Criteria
mg/L: milligrams per liter
ug/L: micrograms per liter
N/A: not applicable
ND or ND<: Not detected above laboratory criteria

APPENDIX I

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B1 **PAGE** 1 **OF** 2 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:** **SETTING:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**CASING SIZE & TYPE:** **SETTING:**
DRILLING METHOD: Direct Push Geoprobe	
SAMPLING METHOD: Macrocore	**SEAL TYPE:** **SETTING:**
OBSERVER: M. Sheperd	
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: Soil samples collected @ (26-28') and (36-38')	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET) FROM	DEPTH (FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	5	MC	----------	0.8	ND	SAND, fine; little silt; brown, very dense; moist; trace asphalt.
5	10	MC	----------	3	ND	5-6.5 ft: similar to above 6.5-8 ft: SAND, fine to medium; some/little silt; some f-m gravel (in lenses); brown, gray, white; dense; moist/dry; concrete and asphalt.
10	15	MC	----------	3	ND	Alternating lenses of SAND, fine; little/some silt; brown; compact; dry and GRAVEL, fine to medium (crushed); crushed concrete; white; semi-compact/compact; dry.
15	20	MC	----------	1.5	ND	CONCRETE, crushed/powdered; little fine sand and silt; gray and brown; compact; dry.
20	25	MC	----------	3.6	ND	20-22.6 ft: SAND, fine; some/little silt; little f-m gravel (in lenses); brown to gray; compact; moist/dry. 22.6-23.6 ft: CONCRETE, crushed; lense of silt mixed with asphalt and red brick.
						First 25 ft sampled with DT (1-inch macrocore liner) – switched to 2-inch macrocore liner at 25 ft as subsurface very dense, smaller liners were melting/crushed

OWNER: ROCKHEAD LLC

BORING NO.: B1 **PAGE 2 OF 2 PAGES**

DEPTH (FEET) FROM	DEPTH (FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
25	30	MC	----------	5	ND	25-27.1 ft: CONCRETE and ROCK, crushed/powdered; some/little fine sand and silt; white/light gray; very dense; dry. 27.1-27.3 ft: RED BRICK. 27.3-30 ft: lenses of CONCRETE/CRUSHED ROCK and SAND, fine to medium; some silt; some fine to coarse gravel, tan; very dense; moist; trace red brick, concrete and asphalt throughout; lense of asphalt at 29. 5 ft
30	35	MC	----------	5	ND	30-31 ft: SAND, fine to medium; some/little fine to coarse gravel; little silt; brown; semi-compact; dry. 31-33.5 ft: SAND, fine to medium; some silt; little/some fine to coarse gravel; dark brown; compact; moist; trace/little asphalt and red brick throughout. 33.5-34 ft: RED BRICK and CONCRETE. 34-35 ft: SAND, fine to medium; little silt; little fine to coarse gravel; brown to tan; semi-compact; dry; concrete.
35	40	MC	----------	5	ND	35-39.4 ft: SAND, fine to medium; some fine to coarse gravel; some/little silt; brown to gray; very dense; dry. 39.4 to 40 ft: ASPHALT.
40	43	MC	----------	3	ND	40-40.5 ft: RED BRICK; wet. 40.5-42.5 ft: ASPHALT; wet. 42.5-43 ft: GRAVEL, fine to medium, angular; gray and black; compact; wet; mica-rich. Refusal on rock at 43 ft bg.
						End of boring at 43 ft bg.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B2 **PAGE** 1 **OF** 2 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Direct Push Geoprobe	**SETTING:**
SAMPLING METHOD: Macrocore	**SEAL TYPE:**
OBSERVER: M. Sheperd	**SETTING:**
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: Soil samples collected @ (17-19'), (22-24') and (30-32')	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	MC	----------	2	ND	0-0.8 ft: CONCRETE. 0.8- 2 ft: SAND, fine; little silt; little fine to medium gravel; dark brown and black, semi-compact; moist; asphalt.
5	10	MC	----------	3.5	ND	5-7 ft: similar to above. 7-8.5 ft: CONCRETE AND ROCK crushed; some red brick; lenses of fine sand; white and tan; compact; dry.
10	15	MC	----------	4.5	ND	Similar to 5 to 7 ft with lenses of concrete and asphalt.
15	20	MC	----------	4.5	ND	SAND, fine to medium; some fine to coarse gravel; little silt; gray and dark gray; compact; dry; lenses of concrete at ~16.5 ft and ~19 ft; asphalt lense at ~19.5 ft; asphalt throughout.
20	25	MC	----------	3.6	ND	Drill action indicates very dense materials. SAND, fine and silt; some fine to coarse gravel; tan and gray; very dense; moist; lense of concrete at ~ 21 ft and lense of asphalt at ~22.5 ft.

OWNER: ROCKHEAD LLC

BORING NO.: B1 **PAGE 2 OF 2 PAGES**

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
25	30	MC	----------	5	ND	SAND, fine to medium; little silt; some fine to coarse gravel; dark brown to black; very compact; dry; asphalt throughout with significant asphalt ~25-28 ft; red brick.
30	33	MC	----------	3	ND	30-32 ft: SILT; little fine sand; little fine gravel; gray brown compact; moist/wet. 32-33 ft: similar to above with some fine to coarse gravel; rock refusal (noted as abrupt by driller) at 33 ft bg. Refusal on rock at 33 ft.
						End of boring at 33 ft bg.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B3 **PAGE** 1 **OF** 1 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Direct Push Geoprobe	**SETTING:**
SAMPLING METHOD: Macrocore	**SEAL TYPE:**
OBSERVER: M. Sheperd	**SETTING:**
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: Soil samples collected @ (11-13')	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	MC	----------	2.5	ND	SAND, fine to medium; some/little fine to coarse gravel; little silt; brown; compact; dry.
5	10	MC	----------	2	ND	Similar to above with hardened red clay and concrete in tip
10	15	MC	----------	3	ND	SAND, fine to medium; some fine to coarse gravel; little silt; brown; compact; moist.
15	17.5	MC	----------	0.5	ND	Similar to above. Refusal at 17.5 ft. Abrupt stop; driller indicates on rock.
						End of boring at 17.5 ft bg.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B4 **PAGE** 1 **OF** 1 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Direct Push Geoprobe	**SETTING:**
SAMPLING METHOD: Macrocore	**SEAL TYPE:**
OBSERVER: M. Sheperd	**SETTING:**
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: no samples collected – see B4 offset	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	MC	----------	3.5	ND	SAND, fine to medium; some fine to coarse gravel; little silt; brown to dark brown; semi-compact; moist; lense of asphalt at ~0.2 ft; silty material lenses between ~2 to 3 ft bg; asphalt in tip.
5	10	MC	----------	3.5	ND	Sand, fine and silt; some fine to coarse gravel; dark brown, tan, brown; compact; moist; asphalt throughout; lense of red brick ~3-3.5 ft.
10	15	MC	----------	1	ND	10-10.5 ft: similar to above. 10.5-11 ft: GRAVEL and CONCRETE.
15	20	MC	----------	2	ND	RED BRICK and GRAVEL (mostly ~2 inch pieces); some fine sand and silt; some asphalt; red/tan/black/brown; semi-compact; dry.
20	22	MC	----------	1.5	ND	RED BRICK; little asphalt; trace fine to coarse gravel; red; compact; dry. Metal fragment in shoe. Refusal at 22 ft – likely on rubble/not rock. Offset location to the south.
						End of boring at 22 ft bg.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B4 (offset) **PAGE** 1 **OF** 1 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Direct Push Geoprobe	**SETTING:**
SAMPLING METHOD: Macrocore	**SEAL TYPE:**
OBSERVER: M. Sheperd	**SETTING:**
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: soil samples collected @ (16-18') and (20-22')	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	MC	----------	3	ND	SAND, fine to medium; some fine to coarse gravel; little silt; brown and tan; semi-compact; dry; concrete and asphalt throughout; red brick in tip.
5	10	MC	----------	3	ND	Similar to above with lense of asphalt at ~ 2 ft; crushed rock/concrete in tip.
10	15	MC	----------	3	ND	10-10.5 ft: similar to above. 10.5-12 ft: CONCRETE. 12-13 ft: SAND, fine to medium; little fine to medium gravel; little silt; brown; semi-compact; lense of red brick at ~12.4 ft bg.
15	20	MC	----------	3	ND	SAND, fine to medium; some fine to coarse gravel; little/some silt; rown; semi-compact; dry; concrete, trace asphalt and red brick throughout.
20	25	MC	----------	3.5	ND	20-21 ft: similar to above. 21-23 ft: SAND, fine to medium; some fine to coarse gravel; little silt; dark brown; very dense; dry; asphalt throughout; lense of gravel at ~21 ft. 23-23.5 ft: CONCRETE.

OWNER: ROCKHEAD LLC

BORING NO.: B4 (offset) **PAGE** 2 **OF** 2 **PAGES**

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
25	27.5	2	----------	2	ND	CONCRETE and GRAVEL; little asphalt; metal fragments. Equipment refusal at 27.5 ft bg.
						End of boring at 27.5 ft bg.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER: ROCKHEAD LLC** **BORING NO:** B5 **PAGE** 1 **OF** 1 **PAGES**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: October 7, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Complete Environmental Services LLC **Bethany, CT**	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Direct Push Geoprobe	**SETTING:**
SAMPLING METHOD: Macrocore	**SEAL TYPE:**
OBSERVER: M. Sheperd	**SETTING:**
REFERENCE POINT (RP): Grade	**BACKFILL TYPE:**
ELEVATION OF RP: ---	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: Soil samples collected @ (16-18') and (25-27')	
GPS COORDINATES:	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	MC	----------	3.5	ND	SAND, fine to medium; gray; semi-compact; moist; loose gravel at surface.
5	10	MC	----------	4.5	ND	SAND, fine to medium; little silt; trace fine gravel; gray; semi-compact; dry.
10	15	MC	----------	4	ND	Similar to above except little fine to medium gravel and very compact.
15	20	MC	----------	4	ND	Similar to 10 to 15 ft bg.
20	25	MC	----------	4.5	ND	Similar to 10 to 15 ft bg.
25	29	MC	----------	4	ND	SAND, fine to medium; little silt; little to some fine to coarse gravel; gray; very dense; dry/moist. Refusal at 29 ft on probable rock.
						End of boring at 29 ft.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Rockhead LLC
	BORING NO: B6
	PAGE 1 **OF** 1 **PAGE**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: November 10, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Ground H2O LLC	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Geoprobe	**SETTING:**
SAMPLING METHOD: DT (1" sampler)	**SEAL TYPE:**
OBSERVER: Melanie Sheperd	**SETTING:**
REFERENCE POINT (RP):	**BACKFILL TYPE:**
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: Collected soil @ (10-11') 0925 and (25-26') @ 0925	
GPS COORDINATES: First location refusal on concrete at 7 feet.	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	DT	--	--	ND	Did not see sample.
5	10	DT	--	2.5	ND	5-5.5 ft: SAND, fine and GRAVEL, fine to coarse, angular; tan/ compact; moist. 5.5-6.5 ft: Sand, fine and silt; brown; semi; dry; red brick. 6.5-8 ft: GRAVEL, crushed mixed with asphalt and red brick.
10	15	DT	--	2	ND	10-11 ft: SAND, fine to medium; some fine to coarse gravel, angular; tan; compact; moist; concrete; red brick. 11-12 ft: crushed rock/concrete.
15	20	DT	--	0.8	ND	CRUSHED ROCK; some fine sand; little asphalt; white/tan/brown semi; moist.
20	25	DT	--	1	ND	SAND, fine to coarse; some fine to medium gravel, angular; little silt; tan; compact; moist.
25	30	DT	--	2	ND	Sand, find and silt; some fine to coarse gravel, angular; compact; moist; black/gray/tan; asphalt and concrete. Refusal at 27 feet.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Rockhead LLC **BORING NO:** B7 **PAGE** 1 **OF** 1 **PAGE**

SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: November 10, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Ground H2O LLC	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Geoprobe	**SETTING:**
SAMPLING METHOD: DT	**SEAL TYPE:**
OBSERVER: Melanie Sheperd	**SETTING:**
REFERENCE POINT (RP):	**BACKFILL TYPE:**
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS: No soil samples collected.	
GPS COORDINATES: Refusal x 2 8'.	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET) FROM	DEPTH (FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	5	DT	--	2	ND	GRAVEL, fine to coarse and sand; little silt; tan/white; semi-dry; asphalt; brick.
5	8	DT	--	1	ND	Similar to above. Refusal at 8 feet (x2) End of boring at 8 feet

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Rockhead LLC
	BORING NO: B8
	PAGE 1 **OF** 1 **PAGE**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: November 10, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Ground H2O LLC	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Geoprobe	**SETTING:**
SAMPLING METHOD: DT (1" sampler)	**SEAL TYPE:**
OBSERVER: Melanie Sheperd	**SETTING:**
REFERENCE POINT (RP):	**BACKFILL TYPE:**
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: Collected soil samples at (10-12) @ 1045 (20-21) @ 1100	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET) FROM	DEPTH (FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	5	DT	--	3.5	ND	SAND, fine to medium; some fine to coarse gravel, angular; little/some silt; tan to dark-brown, very compact; moist asphalt and concrete.
5	10	DT	--	2	ND	Sand, fine and silt; little fine to coarse gravel, angular, dark gray; loose/semi; moist.
10	15	DT	--	2.5	ND	SAND, fine to medium; little/some fine to coarse gravel, angular to sub-rounded (in lenses), dark-gray; compact; moist.
15	20	DT	--	2	ND	15-15.5 ft: similar to above. 15.5-17 ft: crushed red brick and concrete.
20	23	DT	--	2	ND	Similar to 10-15 ft with red brick; asphalt and concrete. Refusal at 23 feet.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Rockhead LLC
	BORING NO: B9
	PAGE 1 **OF** 1 **PAGE**
SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: November 10, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Ground H2O LLC	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Geoprobe	**SETTING:**
SAMPLING METHOD: DT	**SEAL TYPE:**
OBSERVER: Melanie Sheperd	**SETTING:**
REFERENCE POINT (RP):	**BACKFILL TYPE:**
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: Collected soil samples at (11-13) @ 1150 (16-18) @ 1200	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET)		SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
FROM	TO					
0	5	DT	--	2	ND	Sand, fine and silt; little fine to medium gravel, angular; gray; semi; moist.
5	10	DT	--	2	ND	Similar to above except compact.
10	15	DT	--	3	ND	Lenses of sand, fine and silt; dark-gray; semi; moist and sand, fine to medium; some silt little fine to medium gravel, angular; compact; moist.
15	20	DT	--	3	ND	Similar to above.
20	21	DT	--	0.3	ND	GRAVEL, crushed; little fine sand; gray. Refusal at 21 ft. End of boring.

GEOLOGIC LOG **WSP USA** **SHELTON, CONNECTICUT**	**OWNER:** Rockhead LLC **BORING NO:** B10 **PAGE** 1 **OF** 1 **PAGE**

SITE LOCATION: 64 Cambridge Drive Monroe, CT	**SCREEN SIZE & TYPE:** **SLOT NO:** **SETTING:**
DATE COMPLETED: November 10, 2020	**SAND PACK SIZE & TYPE:**
DRILLING COMPANY: Ground H2O LLC	**SETTING:**
	CASING SIZE & TYPE:
DRILLING METHOD: Geoprobe	**SETTING:**
SAMPLING METHOD: DT	**SEAL TYPE:**
OBSERVER: Melanie Sheperd	**SETTING:**
REFERENCE POINT (RP):	**BACKFILL TYPE:**
ELEVATION OF RP:	**STATIC WATER LEVEL:**
STICK-UP:	**DEVELOPMENT METHOD:**
SURFACE COMPLETION:	**DURATION:** **YIELD:**
REMARKS:	
GPS COORDINATES: Collected soil samples at (0-2) @ 1230 (5-7) @ 1235	
ABBREVIATIONS: SS = split spoon W = wash C = cuttings G = grab ST = shelby tube REC = recovery PPM = parts per million	

DEPTH (FEET) FROM	DEPTH (FEET) TO	SAMPLE TYPE	BLOW COUNT	REC. (FEET)	PID READING (PPM)	DESCRIPTION
0	5	DT	--	2	ND	SAND, fine to medium; some fine to coarse gravel, angular little silt; brown; semi-compact; moist; asphalt; red brick.
5	9	DT	--	1	ND	Crushed concrete/crushed rock, little fine to medium sand; brick and asphalt. Refusal at 9 feet. End of boring at 9 feet.

APPENDIX II

64 Cambridge 10/1/20
Monroe sunny 70s

onsite 1100 – 1440
- comm w/ DJ - call [redacted] to locate 2 of 3 wells to GWS - walked to wells w/him
- Cal'd WSP Itanba CO/o not working

MW-1 sampled @ 1140 potable well

MW-3 DTW 5.68 rate ~150
time pump on @ 1221

time	DTW	pH	K	NTU	temp	ORP
1229	5.79	5.47	0.346	0.0	19.47	197
1232	5.81	5.05	0.345	0.0	19.12	210
1235	5.81	4.77	0.345	3.9	18.86	221

↑ emptied cell / rinsed sonde as NTUs were increasing

1241	5.81	4.84	0.340	2.9	18.74	287
1244	↓	4.76	0.339	0.0	18.72	280
1247		4.68	0.341	0.0	18.71	277
1250		4.66	0.340	0.0	18.70	276

MW-2 DTW 8.9 DTB 9.7
went dry - waited to see if recharge - water orange / turbid iron bacteria. Did not recharge water filled tubing - then dry.
@ office @ 1510 - samples to CoC / Cooler
decon equip & put away
left @ 1535

APPENDIX III

PHOENIX
Environmental Laboratories, Inc.

Wednesday, September 02, 2020

Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Project ID: **ROCKHEAD**
SDG ID: **GCG63133**
Sample ID#s: **CG63133**

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

SDG Comments

September 02, 2020

SDG I.D.: GCG63133

Volatile 8260 analysis:
1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane do not meet GWP criteria, these compounds are analyzed by GC/ECD to achieve this criteria.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

September 02, 2020

SDG I.D.: GCG63133

Project ID: ROCKHEAD

Client Id	Lab Id	Matrix
W1	CG63133	SURFACE WATER

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 02, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SURFACE WATER	Collected by:		08/26/20	12:35
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63133
Phoenix ID: CG63133

Project ID: ROCKHEAD
Client ID: W1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	< 0.004	0.004	mg/L	1	08/28/20	CPP	SW6010D
Cadmium	< 0.001	0.001	mg/L	1	08/28/20	CPP	SW6010D
Chromium	0.001	0.001	mg/L	1	08/28/20	CPP	SW6010D
Copper	< 0.005	0.005	mg/L	1	08/28/20	CPP	SW6010D
Mercury	< 0.0002	0.0002	mg/L	1	08/28/20	MGH	SW7470A
Nickel	< 0.001	0.001	mg/L	1	08/28/20	CPP	SW6010D
Lead	< 0.002	0.002	mg/L	1	08/28/20	CPP	SW6010D
Extraction of CT ETPH	Completed				08/27/20	P/AK	SW3510C/SW3520C
Mercury Digestion	Completed				08/28/20	VT/AW	SW7470A
Semi-Volatile Extraction	Completed				08/27/20	P/AK	SW3520C
Total Metals Digestion	Completed				08/27/20	AG/BF	
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	0.067	mg/L	1	08/31/20	JRB	CTETPH 8015D
Identification	ND		mg/L	1	08/31/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	51		%	1	08/31/20	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,1,1-Trichloroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,1,2,2-Tetrachloroethane	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
1,1,2-Trichloroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,1-Dichloroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,1-Dichloroethene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,1-Dichloropropene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,2,3-Trichlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,2,3-Trichloropropane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C

Project ID: ROCKHEAD
Client ID: W1

Phoenix I.D.: CG63133

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,2,4-Trichlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,2,4-Trimethylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
1,2-Dibromoethane	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
1,2-Dichlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,2-Dichloroethane	ND	0.60	ug/L	1	08/27/20	MH	SW8260C
1,2-Dichloropropane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,3,5-Trimethylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,3-Dichlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,3-Dichloropropane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
1,4-Dichlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
2,2-Dichloropropane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
2-Chlorotoluene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
2-Hexanone	ND	5.0	ug/L	1	08/27/20	MH	SW8260C
2-Isopropyltoluene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
4-Chlorotoluene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
4-Methyl-2-pentanone	ND	5.0	ug/L	1	08/27/20	MH	SW8260C
Acetone	ND	25	ug/L	1	08/27/20	MH	SW8260C
Acrylonitrile	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
Benzene	ND	0.70	ug/L	1	08/27/20	MH	SW8260C
Bromobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Bromochloromethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Bromodichloromethane	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
Bromoform	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Bromomethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Carbon Disulfide	ND	5.0	ug/L	1	08/27/20	MH	SW8260C
Carbon tetrachloride	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Chlorobenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Chloroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Chloroform	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Chloromethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
cis-1,2-Dichloroethene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
cis-1,3-Dichloropropene	ND	0.40	ug/L	1	08/27/20	MH	SW8260C
Dibromochloromethane	ND	0.50	ug/L	1	08/27/20	MH	SW8260C
Dibromomethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Dichlorodifluoromethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Ethylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Hexachlorobutadiene	ND	0.40	ug/L	1	08/27/20	MH	SW8260C
Isopropylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
m&p-Xylene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Methyl ethyl ketone	ND	5.0	ug/L	1	08/27/20	MH	SW8260C
Methyl t-butyl ether (MTBE)	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Methylene chloride	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Naphthalene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
n-Butylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
n-Propylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
o-Xylene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
p-Isopropyltoluene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
sec-Butylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C

Project ID: ROCKHEAD
Client ID: W1

Phoenix I.D.: CG63133

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Styrene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
tert-Butylbenzene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Tetrachloroethene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Tetrahydrofuran (THF)	ND	2.5	ug/L	1	08/27/20	MH	SW8260C
Toluene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Total Xylenes	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
trans-1,2-Dichloroethene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
trans-1,3-Dichloropropene	ND	0.40	ug/L	1	08/27/20	MH	SW8260C
trans-1,4-dichloro-2-butene	ND	5.0	ug/L	1	08/27/20	MH	SW8260C
Trichloroethene	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Trichlorofluoromethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Trichlorotrifluoroethane	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
Vinyl chloride	ND	1.0	ug/L	1	08/27/20	MH	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	101		%	1	08/27/20	MH	70 - 130 %
% Bromofluorobenzene	93		%	1	08/27/20	MH	70 - 130 %
% Dibromofluoromethane	103		%	1	08/27/20	MH	70 - 130 %
% Toluene-d8	101		%	1	08/27/20	MH	70 - 130 %

Semivolatiles by SIM, PAH

2-Methylnaphthalene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Acenaphthene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Acenaphthylene	ND	0.29	ug/L	1	08/28/20	WB	SW8270D (SIM)
Anthracene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Benz(a)anthracene	ND	0.05	ug/L	1	08/28/20	WB	SW8270D (SIM)
Benzo(a)pyrene	ND	0.19	ug/L	1	08/28/20	WB	SW8270D (SIM)
Benzo(b)fluoranthene	ND	0.07	ug/L	1	08/28/20	WB	SW8270D (SIM)
Benzo(ghi)perylene	ND	0.46	ug/L	1	08/28/20	WB	SW8270D (SIM)
Benzo(k)fluoranthene	ND	0.29	ug/L	1	08/28/20	WB	SW8270D (SIM)
Chrysene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	ND	0.10	ug/L	1	08/28/20	WB	SW8270D (SIM)
Fluoranthene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Fluorene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	1	08/28/20	WB	SW8270D (SIM)
Naphthalene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
Phenanthrene	ND	0.06	ug/L	1	08/28/20	WB	SW8270D (SIM)
Pyrene	ND	0.48	ug/L	1	08/28/20	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	56		%	1	08/28/20	WB	30 - 130 %
% Nitrobenzene-d5	81		%	1	08/28/20	WB	30 - 130 %
% Terphenyl-d14	62		%	1	08/28/20	WB	30 - 130 %

Project ID: ROCKHEAD
Client ID: W1

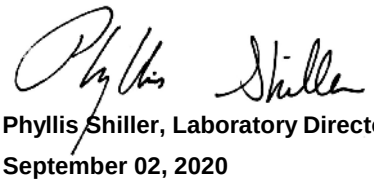
Phoenix I.D.: CG63133

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 02, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

September 02, 2020

QA/QC Data

SDG I.D.: GCG63133

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 543248 (mg/L), QC Sample No: CG63175 (CG63133)													
Mercury - Water	BRL	0.0002	<0.0002	<0.0002	NC	98.3			100	98.0	2.0	80 - 120	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 543181 (mg/L), QC Sample No: CG63175 (CG63133)													
ICP Metals - Aqueous													
Arsenic	BRL	0.004	<0.004	<0.004	NC	109	107	1.9	108	110	1.8	80 - 120	20
Cadmium	BRL	0.001	<0.001	<0.001	NC	107	107	0.0	104	106	1.9	80 - 120	20
Chromium	BRL	0.001	0.001	<0.001	NC	105	105	0.0	102	105	2.9	80 - 120	20
Copper	BRL	0.005	<0.0020	<0.005	NC	102	101	1.0	101	104	2.9	80 - 120	20
Lead	BRL	0.002	<0.002	<0.002	NC	102	100	2.0	99.1	101	1.9	80 - 120	20
Nickel	BRL	0.001	0.004	0.004	NC	107	106	0.9	104	107	2.8	80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

September 02, 2020

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SDG I.D.: GCG63133

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 543153 (mg/L), QC Sample No: CG62896 (CG63133)											
TPH by GC (Extractable Products) - Surface Water											
Ext. Petroleum H.C. (C9-C36)	ND	0.10	72	68	5.7	67	61	9.4	60 - 120	30	
% n-Pentacosane	68	%	75	70	6.9	64	59	8.1	50 - 150	20	
Comment:											
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.											
QA/QC Batch 543152 (ug/L), QC Sample No: CG62896 (CG63133)											
Semivolatiles by SIM, PAH - Surface Water											
2-Methylnaphthalene	ND	0.50	51	72	34.1	65	65	0.0	30 - 130	20	r
Acenaphthene	ND	0.50	46	41	11.5	64	64	0.0	30 - 130	20	
Acenaphthylene	ND	0.30	42	42	0.0	60	61	1.7	30 - 130	20	
Anthracene	ND	0.50	51	41	21.7	68	69	1.5	30 - 130	20	r
Benz(a)anthracene	ND	0.05	60	60	0.0	77	77	0.0	30 - 130	20	
Benzo(a)pyrene	ND	0.20	60	60	0.0	75	72	4.1	30 - 130	20	
Benzo(b)fluoranthene	ND	0.07	73	53	31.7	93	87	6.7	30 - 130	20	r
Benzo(ghi)perylene	ND	0.48	68	35	64.1	78	72	8.0	30 - 130	20	r
Benzo(k)fluoranthene	ND	0.30	42	42	0.0	50	48	4.1	30 - 130	20	
Chrysene	ND	0.50	57	43	28.0	72	71	1.4	30 - 130	20	r
Dibenz(a,h)anthracene	ND	0.10	56	49	13.3	65	58	11.4	30 - 130	20	
Fluoranthene	ND	0.50	55	38	36.6	77	75	2.6	30 - 130	20	r
Fluorene	ND	0.50	49	59	18.5	67	68	1.5	30 - 130	20	
Indeno(1,2,3-cd)pyrene	ND	0.10	58	58	0.0	65	61	6.3	30 - 130	20	
Naphthalene	ND	0.50	42	64	41.5	56	58	3.5	30 - 130	20	r
Phenanthrene	ND	0.06	48	56	15.4	66	66	0.0	30 - 130	20	
Pyrene	ND	0.50	57	57	0.0	80	79	1.3	30 - 130	20	
% 2-Fluorobiphenyl	50	%	37	51	31.8	54	55	1.8	30 - 130	20	r
% Nitrobenzene-d5	59	%	46	69	40.0	70	73	4.2	30 - 130	20	r
% Terphenyl-d14	80	%	58	35	49.5	79	78	1.3	30 - 130	20	r
Comment:											
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)											
QA/QC Batch 543311 (ug/L), QC Sample No: CG63175 (CG63133)											
Volatiles - Surface Water											
1,1,1,2-Tetrachloroethane	ND	1.0	88	91	3.4	95	93	2.1	70 - 130	30	
1,1,1-Trichloroethane	ND	1.0	82	84	2.4	95	95	0.0	70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	0.50	94	95	1.1	94	92	2.2	70 - 130	30	
1,1,2-Trichloroethane	ND	1.0	87	92	5.6	93	88	5.5	70 - 130	30	
1,1-Dichloroethane	ND	1.0	81	84	3.6	89	92	3.3	70 - 130	30	
1,1-Dichloroethene	ND	1.0	86	89	3.4	100	102	2.0	70 - 130	30	
1,1-Dichloropropene	ND	1.0	85	86	1.2	97	99	2.0	70 - 130	30	
1,2,3-Trichlorobenzene	ND	1.0	88	93	5.5	91	91	0.0	70 - 130	30	

QA/QC Data

SDG I.D.: GCG63133

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
1,2,3-Trichloropropane	ND	1.0	94	93	1.1	93	93	0.0	70 - 130	30
1,2,4-Trichlorobenzene	ND	1.0	88	92	4.4	93	90	3.3	70 - 130	30
1,2,4-Trimethylbenzene	ND	1.0	87	83	4.7	89	92	3.3	70 - 130	30
1,2-Dibromo-3-chloropropane	ND	1.0	94	104	10.1	95	92	3.2	70 - 130	30
1,2-Dibromoethane	ND	1.0	90	92	2.2	94	89	5.5	70 - 130	30
1,2-Dichlorobenzene	ND	1.0	85	86	1.2	89	89	0.0	70 - 130	30
1,2-Dichloroethane	ND	1.0	89	94	5.5	96	91	5.3	70 - 130	30
1,2-Dichloropropane	ND	1.0	87	90	3.4	95	92	3.2	70 - 130	30
1,3,5-Trimethylbenzene	ND	1.0	88	82	7.1	89	93	4.4	70 - 130	30
1,3-Dichlorobenzene	ND	1.0	87	84	3.5	87	90	3.4	70 - 130	30
1,3-Dichloropropane	ND	1.0	88	94	6.6	95	89	6.5	70 - 130	30
1,4-Dichlorobenzene	ND	1.0	85	84	1.2	87	89	2.3	70 - 130	30
2,2-Dichloropropane	ND	1.0	86	87	1.2	89	88	1.1	70 - 130	30
2-Chlorotoluene	ND	1.0	88	83	5.8	89	93	4.4	70 - 130	30
2-Hexanone	ND	5.0	96	106	9.9	101	98	3.0	70 - 130	30
2-Isopropyltoluene	ND	1.0	94	90	4.3	96	100	4.1	70 - 130	30
4-Chlorotoluene	ND	1.0	86	81	6.0	87	89	2.3	70 - 130	30
4-Methyl-2-pentanone	ND	5.0	96	108	11.8	101	95	6.1	70 - 130	30
Acetone	ND	5.0	98	111	12.4	110	103	6.6	70 - 130	30
Acrylonitrile	ND	5.0	95	106	10.9	102	91	11.4	70 - 130	30
Benzene	ND	0.70	85	87	2.3	95	95	0.0	70 - 130	30
Bromobenzene	ND	1.0	86	83	3.6	87	89	2.3	70 - 130	30
Bromochloromethane	ND	1.0	86	91	5.6	92	89	3.3	70 - 130	30
Bromodichloromethane	ND	0.50	91	95	4.3	97	95	2.1	70 - 130	30
Bromoform	ND	1.0	87	96	9.8	90	87	3.4	70 - 130	30
Bromomethane	ND	1.0	102	102	0.0	99	112	12.3	70 - 130	30
Carbon Disulfide	ND	1.0	88	89	1.1	99	101	2.0	70 - 130	30
Carbon tetrachloride	ND	1.0	87	89	2.3	102	102	0.0	70 - 130	30
Chlorobenzene	ND	1.0	83	85	2.4	92	90	2.2	70 - 130	30
Chloroethane	ND	1.0	90	91	1.1	101	100	1.0	70 - 130	30
Chloroform	ND	1.0	81	85	4.8	89	89	0.0	70 - 130	30
Chloromethane	ND	1.0	89	89	0.0	99	101	2.0	70 - 130	30
cis-1,2-Dichloroethene	ND	1.0	78	79	1.3	86	85	1.2	70 - 130	30
cis-1,3-Dichloropropene	ND	0.40	88	92	4.4	93	91	2.2	70 - 130	30
Dibromochloromethane	ND	0.50	93	98	5.2	99	95	4.1	70 - 130	30
Dibromomethane	ND	1.0	87	89	2.3	89	85	4.6	70 - 130	30
Dichlorodifluoromethane	ND	1.0	96	97	1.0	97	99	2.0	70 - 130	30
Ethylbenzene	ND	1.0	83	83	0.0	94	93	1.1	70 - 130	30
Hexachlorobutadiene	ND	0.40	88	85	3.5	90	95	5.4	70 - 130	30
Isopropylbenzene	ND	1.0	89	82	8.2	93	96	3.2	70 - 130	30
m&p-Xylene	ND	1.0	83	84	1.2	94	93	1.1	70 - 130	30
Methyl ethyl ketone	ND	5.0	98	102	4.0	103	96	7.0	70 - 130	30
Methyl t-butyl ether (MTBE)	ND	1.0	98	108	9.7	105	103	1.9	70 - 130	30
Methylene chloride	ND	1.0	80	83	3.7	85	84	1.2	70 - 130	30
Naphthalene	ND	1.0	96	104	8.0	101	99	2.0	70 - 130	30
n-Butylbenzene	ND	1.0	90	84	6.9	92	95	3.2	70 - 130	30
n-Propylbenzene	ND	1.0	86	81	6.0	90	93	3.3	70 - 130	30
o-Xylene	ND	1.0	87	88	1.1	96	95	1.0	70 - 130	30
p-Isopropyltoluene	ND	1.0	89	84	5.8	93	96	3.2	70 - 130	30
sec-Butylbenzene	ND	1.0	95	89	6.5	99	104	4.9	70 - 130	30
Styrene	ND	1.0	89	90	1.1	97	94	3.1	70 - 130	30
tert-Butylbenzene	ND	1.0	88	83	5.8	91	95	4.3	70 - 130	30
Tetrachloroethene	ND	1.0	85	86	1.2	97	96	1.0	70 - 130	30

QA/QC Data

SDG I.D.: GCG63133

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
Tetrahydrofuran (THF)	ND	2.5	96	107	10.8	101	95	6.1	70 - 130	30
Toluene	ND	1.0	86	87	1.2	95	95	0.0	70 - 130	30
trans-1,2-Dichloroethene	ND	1.0	90	92	2.2	102	103	1.0	70 - 130	30
trans-1,3-Dichloropropene	ND	0.40	91	95	4.3	94	89	5.5	70 - 130	30
trans-1,4-dichloro-2-butene	ND	5.0	114	116	1.7	99	96	3.1	70 - 130	30
Trichloroethene	ND	1.0	81	83	2.4	92	93	1.1	70 - 130	30
Trichlorofluoromethane	ND	1.0	89	91	2.2	99	101	2.0	70 - 130	30
Trichlorotrifluoroethane	ND	1.0	92	93	1.1	95	99	4.1	70 - 130	30
Vinyl chloride	ND	1.0	92	93	1.1	105	106	0.9	70 - 130	30
% 1,2-dichlorobenzene-d4	103	%	99	99	0.0	100	99	1.0	70 - 130	30
% Bromofluorobenzene	95	%	102	103	1.0	107	101	5.8	70 - 130	30
% Dibromofluoromethane	101	%	101	99	2.0	99	100	1.0	70 - 130	30
% Toluene-d8	100	%	101	100	1.0	102	101	1.0	70 - 130	30

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

r = This parameter is outside laboratory RPD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
September 02, 2020

Wednesday, September 02, 2020

Criteria: CT: GWP, SWP

State: CT

Sample Criteria Exceedances Report

GCG63133 - WSP

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CG63133	$8260GWR	1,2-Dibromo-3-chloropropane	CT / RSR GWPC (ug/l) / APS Organics	ND	0.50	0.2	0.2	ug/L
CG63133	$8260GWR	1,2-Dibromoethane	CT / RSR GWPC (ug/l) / Volatiles	ND	0.50	0.05	0.05	ug/L

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** WSP USA

Project Location: ROCKHEAD ***Project Number:***

Laboratory Sample ID(s): CG63133 ***Sampling Date(s):*** 8/26/2020

List RCP Methods Used (e.g., 8260, 8270, et cetera) 6010, 7470/7471, 8260, 8270, ETPH

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☑ Yes ☐ No ☐ NA
4	**Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents acheived? See Section: SVOASIM Narration.**	☐ Yes ☑ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?**	☑ Yes ☐ No
	b) Were these reporting limits met?	☐ Yes ☑ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☐ Yes ☑ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Wednesday, September 02, 202

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

RCP Certification Report

September 02, 2020

SDG I.D.: GCG63133

SDG Comments

Metals Analysis:
The client requested a site specific list of elements which is shorter than the 6010 RCP list.

8270 Semi-volatile Organics:
The client requested a short list for 8270 RCP Semivolatile. Only the PAH constituents are reported as requested on the chain-of-custody.

Volatile 8260 analysis:
1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane do not meet the GWP these compounds are analyzed by GC/ECD to achieve this criteria.

ETPH Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-XL1 08/31/20-1 Jeff Bucko, Chemist 08/31/20

CG63133 (1X)

The initial calibration (ETPH720I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (831A003) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

QC (Batch Specific):

Batch 543153 (CG62896)

CG63133

All LCS recoveries were within 60 - 120 with the following exceptions: None.
All LCSD recoveries were within 60 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Mercury Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

MERLIN 08/28/20 09:49 Mike Hornak, Chemist 08/28/20

CG63133

The method preparation blank, ICB, and CCBs contain all of the acids and reagents as the samples.
The initial calibration met all criteria including a standard run at or below the reporting level.
All calibration verification standards (ICV, CCV) met criteria.
All calibration blank verification standards (ICB, CCB) met criteria.
The matrix spike sample is used to identify spectral interference for each batch of samples, if within 85-115%, no interference is observed and no further action is taken.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.

QC (Batch Specific):

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Certification Report

September 02, 2020

SDG I.D.: GCG63133

Mercury Narration

Batch 543248 (CG63175)

CG63133

All LCS recoveries were within 80 - 120 with the following exceptions: None.
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

BLUE 08/28/20 08:00 Cindy Pearce, Chemist 08/28/20

CG63133

The initial calibration met criteria.
The continuing calibration standards met criteria for all the elements reported. The linear range is defined daily by the calibration range.
The continuing calibration blanks were less than the reporting level for the elements reported.
The ICSA and ICSAB were analyzed at the beginning and end of the run and were within criteria.The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 543181 (CG63175)

CG63133

All LCS recoveries were within 80 - 120 with the following exceptions: None.
All LCSD recoveries were within 80 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

SVOASIM Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 543152 (Samples: CG63133): -----

The LCS/LCSD RPD exceeds the method criteria for one or more analytes, but these analytes were not reported in the sample(s) so no variability is suspected. (2-Methylnaphthalene, Anthracene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Chrysene, Fluoranthene, Naphthalene)

The LCS/LCSD RPD exceeds the method criteria for one or more surrogates, therefore there may be variability in the reported result. (% 2-Fluorobiphenyl, % Nitrobenzene-d5, % Terphenyl-d14)

Instrument:

CHEM25 08/28/20-1 Wes Bryon, Chemist 08/28/20

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RCP Certification Report

September 02, 2020

SDG I.D.: GCG63133

SVOASIM Narration

CG63133 (1X)

For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM25/25_BNSIM18_0805):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM25/0828_03-25_BNSIM18_0805):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Batch Specific):

Batch 543152 (CG62896)

CG63133

All LCS recoveries were within 30 - 130 with the following exceptions: None.
All LCSD recoveries were within 30 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: % 2-Fluorobiphenyl(31.8%), % Nitrobenzene-d5(40.0%), % Terphenyl-d14(49.5%), 2-Methylnaphthalene(34.1%), Anthracene(21.7%), Benzo(b)fluoranthene(31.7%), Benzo(ghi)perylene(64.1%), Chrysene(28.0%), Fluoranthene(36.6%), Naphthalene(41.5%)
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

VOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

CHEM02 08/27/20-2 Michael Hahn, Chemist 08/27/20

CG63133 (1X)

Chem02 is a 25ml purge instrument. The laboratory minimum response factor is set at 0.01 instead of 0.05 for the 25ml purge instruments.
EPA method 8260D Table 4 supports this approach.

Initial Calibration Evaluation (CHEM02/VT-P082520):
99% of target compounds met criteria.
The following compounds had %RSDs >20%: trans-1,4-dichloro-2-butene 21% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Acetone 0.068 (0.1), Methyl ethyl ketone 0.096 (0.1)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM02/0827_26-VT-P082520):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.

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587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

RCP Certification Report

September 02, 2020

SDG I.D.: GCG63133

VOA Narration

100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

QC (Batch Specific):

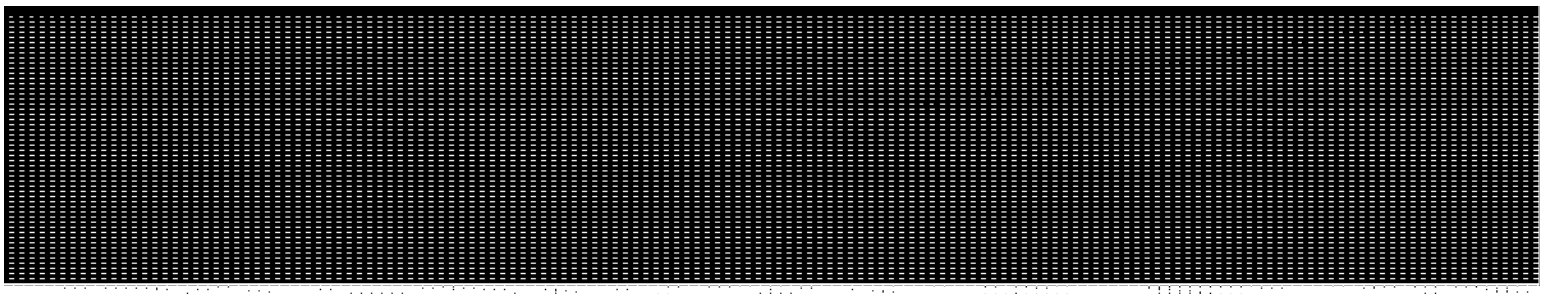
Batch 543311 (CG63175) CHEM02 8/27/2020-2

CG63133(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Temperature Narration

The samples were received at 1.7C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)



Tuesday, September 01, 2020

Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Project ID: **ROCKHEAD**
SDG ID: **GCG63127**
Sample ID#s: CG63127 - CG63132

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

September 01, 2020

SDG I.D.: GCG63127

Project ID: ROCKHEAD

Client Id	Lab Id	Matrix
C1	CG63127	SOLID
C2	CG63128	SOLID
M1	CG63129	SOLID
M2	CG63130	SOLID
B1	CG63131	SOLID
S1	CG63132	SOLID

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	12:45
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63127

Project ID: ROCKHEAD
Client ID: C1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	5.61	0.35	mg/Kg	1	08/28/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	08/28/20	CPP	SW6010D
SPLP Metals Digestion	Completed				08/28/20	VT/AW	SW3010A
Percent Solid	89		%		08/27/20	JJ	SW846-%Solid
Soil Extraction for PCB	Completed				08/27/20	L/A	SW3545A
Extraction of CT ETPH	Completed				08/27/20	G/M	SW3546
SPLP Extraction for Metals	Completed				08/27/20	VT	SW1312
Total Metals Digest	Completed				08/27/20	S/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	270	mg/Kg	5	08/28/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	5	08/28/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	60		%	5	08/28/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	08/28/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	79		%	10	08/28/20	SC	30 - 150 %
% DCBP (Confirmation)	72		%	10	08/28/20	SC	30 - 150 %

Ver 1

Project ID: ROCKHEAD
Client ID: C1

Phoenix I.D.: CG63127

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
% TCMX	72		%	10	08/28/20	SC	30 - 150 %
% TCMX (Confirmation)	73		%	10	08/28/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.4	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
2,2-Dichloropropane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	28	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	28	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	280	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	3.4	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: C1

Phoenix I.D.: CG63127

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Hexachlorobutadiene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Isopropylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
m&p-Xylene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Methyl Ethyl Ketone	ND	34	ug/Kg	1	08/28/20	JLI	SW8260C	
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	08/28/20	JLI	SW8260C	
Methylene chloride	ND	11	ug/Kg	1	08/28/20	JLI	SW8260C	
Naphthalene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
n-Butylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
n-Propylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
o-Xylene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
p-Isopropyltoluene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
sec-Butylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Styrene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
tert-Butylbenzene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Tetrachloroethene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	08/28/20	JLI	SW8260C	
Toluene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Total Xylenes	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichloroethene	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichlorofluoromethane	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	11	ug/Kg	1	08/28/20	JLI	SW8260C	
Vinyl chloride	ND	5.6	ug/Kg	1	08/28/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	93		%	1	08/28/20	JLI	70 - 130 %	
% Bromofluorobenzene	98		%	1	08/28/20	JLI	70 - 130 %	
% Dibromofluoromethane	62		%	1	08/28/20	JLI	70 - 130 %	3
% Toluene-d8	92		%	1	08/28/20	JLI	70 - 130 %	
Field Extraction	Completed				08/26/20		SW5035A	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

3 = This parameter exceeds laboratory specified limits.

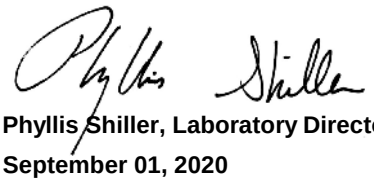
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
September 01, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	13:44
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63128

Project ID: ROCKHEAD
Client ID: C2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	5.50	0.38	mg/Kg	1	08/28/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	08/28/20	CPP	SW6010D
SPLP Metals Digestion	Completed				08/28/20	VT/AW	SW3010A
Percent Solid	85		%		08/27/20	JJ	SW846-%Solid
Soil Extraction for PCB	Completed				08/27/20	L/A	SW3545A
Extraction of CT ETPH	Completed				08/27/20	G/M	SW3546
SPLP Extraction for Metals	Completed				08/27/20	VT	SW1312
Total Metals Digest	Completed				08/27/20	S/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	58	mg/Kg	1	08/28/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	1	08/28/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	52		%	1	08/28/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1221	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1232	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1242	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1248	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1254	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1260	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1262	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1268	ND	390	ug/Kg	10	08/28/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	76		%	10	08/28/20	SC	30 - 150 %
% DCBP (Confirmation)	67		%	10	08/28/20	SC	30 - 150 %

Ver 1

Project ID: ROCKHEAD
Client ID: C2

Phoenix I.D.: CG63128

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
% TCMX	66		%	10	08/28/20	SC	30 - 150 %
% TCMX (Confirmation)	67		%	10	08/28/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.9	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	32	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	32	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	320	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	3.9	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: C2

Phoenix I.D.: CG63128

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Hexachlorobutadiene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Isopropylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
m&p-Xylene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Methyl Ethyl Ketone	ND	39	ug/Kg	1	08/28/20	JLI	SW8260C	
Methyl t-butyl ether (MTBE)	ND	13	ug/Kg	1	08/28/20	JLI	SW8260C	
Methylene chloride	ND	13	ug/Kg	1	08/28/20	JLI	SW8260C	
Naphthalene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
n-Butylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
n-Propylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
o-Xylene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
p-Isopropyltoluene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
sec-Butylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Styrene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
tert-Butylbenzene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Tetrachloroethene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Tetrahydrofuran (THF)	25	13	ug/Kg	1	08/28/20	JLI	SW8260C	
Toluene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Total Xylenes	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	13	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichloroethene	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichlorofluoromethane	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	13	ug/Kg	1	08/28/20	JLI	SW8260C	
Vinyl chloride	ND	6.5	ug/Kg	1	08/28/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	93		%	1	08/28/20	JLI	70 - 130 %	
% Bromofluorobenzene	100		%	1	08/28/20	JLI	70 - 130 %	
% Dibromofluoromethane	24		%	1	08/28/20	JLI	70 - 130 %	3
% Toluene-d8	93		%	1	08/28/20	JLI	70 - 130 %	
Field Extraction	Completed				08/26/20		SW5035A	

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

3 = This parameter exceeds laboratory specified limits.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
September 01, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	13:10
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63129

Project ID: ROCKHEAD
Client ID: M1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	14.4	0.36	mg/Kg	1	08/28/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	08/28/20	CPP	SW6010D
SPLP Metals Digestion	Completed				08/28/20	VT/AW	SW3010A
Percent Solid	91		%		08/27/20	JJ	SW846-%Solid
SPLP Extraction for Metals	Completed				08/27/20	VT	SW1312
Total Metals Digest	Completed				08/27/20	S/AG/BF	SW3050B
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.7	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: M1

Phoenix I.D.: CG63129

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
2,2-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	39	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	39	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	390	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	4.7	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Isopropylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
m&p-Xylene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	47	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Methylene chloride	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Naphthalene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
n-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
n-Propylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
o-Xylene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
p-Isopropyltoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
sec-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Styrene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
tert-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrachloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrahydrofuran (THF)	38	16	ug/Kg	1	08/28/20	JLI	SW8260C
Toluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Total Xylenes	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Trichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorofluoromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: M1

Phoenix I.D.: CG63129

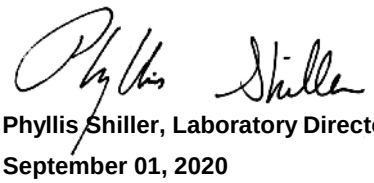
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Trichlorotrifluoroethane	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Vinyl chloride	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	92		%	1	08/28/20	JLI	70 - 130 %
% Bromofluorobenzene	95		%	1	08/28/20	JLI	70 - 130 %
% Dibromofluoromethane	93		%	1	08/28/20	JLI	70 - 130 %
% Toluene-d8	91		%	1	08/28/20	JLI	70 - 130 %
Field Extraction	Completed				08/26/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director

September 01, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	13:21
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63130

Project ID: ROCKHEAD
Client ID: M2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	65.6	0.33	mg/Kg	1	08/28/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	08/28/20	CPP	SW6010D
SPLP Metals Digestion	Completed				08/28/20	VT/AW	SW3010A
Percent Solid	97		%		08/27/20	JJ	SW846-%Solid
SPLP Extraction for Metals	Completed				08/27/20	VT	SW1312
Total Metals Digest	Completed				08/27/20	S/AG/BF	SW3050B
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.7	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: M2

Phoenix I.D.: CG63130

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
2,2-Dichloropropane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	39	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	39	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	390	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	4.7	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Isopropylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
m&p-Xylene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	47	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Methylene chloride	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Naphthalene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
n-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
n-Propylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
o-Xylene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
p-Isopropyltoluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
sec-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Styrene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
tert-Butylbenzene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrachloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrahydrofuran (THF)	24	16	ug/Kg	1	08/28/20	JLI	SW8260C
Toluene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Total Xylenes	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Trichloroethene	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorofluoromethane	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: M2

Phoenix I.D.: CG63130

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Trichlorotrifluoroethane	ND	16	ug/Kg	1	08/28/20	JLI	SW8260C
Vinyl chloride	ND	7.8	ug/Kg	1	08/28/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	92		%	1	08/28/20	JLI	70 - 130 %
% Bromofluorobenzene	91		%	1	08/28/20	JLI	70 - 130 %
% Dibromofluoromethane	89		%	1	08/28/20	JLI	70 - 130 %
% Toluene-d8	92		%	1	08/28/20	JLI	70 - 130 %
Field Extraction	Completed				08/26/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director

September 01, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	13:38
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63131

Project ID: ROCKHEAD
Client ID: B1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	18.5	0.33	mg/Kg	1	08/29/20	CPP	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	08/28/20	CPP	SW6010D
SPLP Metals Digestion	Completed				08/28/20	VT/AW	SW3010A
Percent Solid	96		%		08/27/20	JJ	SW846-%Solid
Soil Extraction for PCB	Completed				08/27/20	L/A	SW3545A
Extraction of CT ETPH	Completed				08/27/20	G/M	SW3546
SPLP Extraction for Metals	Completed				08/27/20	VT	SW1312
Total Metals Digest	Completed				08/28/20	B/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	260	mg/Kg	5	08/28/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	5	08/28/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	55		%	5	08/28/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1221	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1232	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1242	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1248	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1254	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1260	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1262	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1268	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	75		%	10	08/28/20	SC	30 - 150 %
% DCBP (Confirmation)	70		%	10	08/28/20	SC	30 - 150 %

Ver 1

Project ID: ROCKHEAD
Client ID: B1

Phoenix I.D.: CG63131

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
% TCMX	73		%	10	08/28/20	SC	30 - 150 %
% TCMX (Confirmation)	72		%	10	08/28/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	5.2	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
2,2-Dichloropropane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	43	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	43	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	430	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	5.2	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C

Project ID: ROCKHEAD
Client ID: B1

Phoenix I.D.: CG63131

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Hexachlorobutadiene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Isopropylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
m&p-Xylene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	52	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	17	ug/Kg	1	08/28/20	JLI	SW8260C
Methylene chloride	ND	17	ug/Kg	1	08/28/20	JLI	SW8260C
Naphthalene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
n-Butylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
n-Propylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
o-Xylene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
p-Isopropyltoluene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
sec-Butylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Styrene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
tert-Butylbenzene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrachloroethene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrahydrofuran (THF)	25	17	ug/Kg	1	08/28/20	JLI	SW8260C
Toluene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Total Xylenes	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	17	ug/Kg	1	08/28/20	JLI	SW8260C
Trichloroethene	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorofluoromethane	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	17	ug/Kg	1	08/28/20	JLI	SW8260C
Vinyl chloride	ND	8.6	ug/Kg	1	08/28/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	92		%	1	08/28/20	JLI	70 - 130 %
% Bromofluorobenzene	93		%	1	08/28/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	08/28/20	JLI	70 - 130 %
% Toluene-d8	91		%	1	08/28/20	JLI	70 - 130 %
Field Extraction	Completed				08/26/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

September 01, 2020

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Analysis Report

September 01, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOLID	Collected by:		08/26/20	13:53
Location Code:	WSP	Received by:	CP	08/27/20	12:59
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG63127
Phoenix ID: CG63132

Project ID: ROCKHEAD
Client ID: S1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	2.66	0.70	mg/Kg	1	08/29/20	CPP	SW6010D
Cadmium	1.30	0.35	mg/Kg	1	08/29/20	CPP	SW6010D
Chromium	25.0	0.35	mg/Kg	1	08/29/20	CPP	SW6010D
Copper	22.0	0.7	mg/kg	1	08/29/20	CPP	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	08/28/20	MGH	SW7471B
Nickel	18.2	0.35	mg/Kg	1	08/29/20	CPP	SW6010D
Lead	8.77	0.35	mg/Kg	1	08/29/20	CPP	SW6010D
Percent Solid	97		%		08/27/20	JJ	SW846-%Solid
Soil Extraction for PCB	Completed				08/27/20	L/A	SW3545A
Mercury Digestion	Completed				08/28/20	VT/AW	SW7471B
Extraction of CT ETPH	Completed				08/27/20	G/M	SW3546
Soil Extraction for SVOA PAH	Completed				08/27/20	/E	SW3546
Total Metals Digest	Completed				08/28/20	B/AG	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	51	mg/Kg	1	08/28/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	1	08/28/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	54		%	1	08/28/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1221	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1232	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1242	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1248	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1254	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1260	ND	340	ug/Kg	10	08/28/20	SC	SW8082A

Ver 1

Project ID: ROCKHEAD
Client ID: S1

Phoenix I.D.: CG63132

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
PCB-1268	ND	340	ug/Kg	10	08/28/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	77		%	10	08/28/20	SC	30 - 150 %
% DCBP (Confirmation)	66		%	10	08/28/20	SC	30 - 150 %
% TCMX	66		%	10	08/28/20	SC	30 - 150 %
% TCMX (Confirmation)	65		%	10	08/28/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloroethene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,1-Dichloropropene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dibromoethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,2-Dichloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,3-Dichloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
2,2-Dichloropropane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
2-Chlorotoluene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
2-Hexanone	ND	25	ug/Kg	1	08/28/20	JLI	SW8260C
2-Isopropyltoluene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
4-Chlorotoluene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	25	ug/Kg	1	08/28/20	JLI	SW8260C
Acetone	ND	250	ug/Kg	1	08/28/20	JLI	SW8260C
Acrylonitrile	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Benzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Bromobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Bromochloromethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Bromodichloromethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Bromoform	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Bromomethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon Disulfide	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Carbon tetrachloride	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Chlorobenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Chloroform	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Chloromethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromochloromethane	ND	3.0	ug/Kg	1	08/28/20	JLI	SW8260C
Dibromomethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Dichlorodifluoromethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Ethylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Hexachlorobutadiene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Isopropylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
m&p-Xylene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	30	ug/Kg	1	08/28/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	10	ug/Kg	1	08/28/20	JLI	SW8260C
Methylene chloride	ND	10	ug/Kg	1	08/28/20	JLI	SW8260C
Naphthalene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
n-Butylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
n-Propylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
o-Xylene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
p-Isopropyltoluene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
sec-Butylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Styrene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
tert-Butylbenzene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrachloroethene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Tetrahydrofuran (THF)	16	10	ug/Kg	1	08/28/20	JLI	SW8260C
Toluene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Total Xylenes	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	10	ug/Kg	1	08/28/20	JLI	SW8260C
Trichloroethene	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorofluoromethane	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	10	ug/Kg	1	08/28/20	JLI	SW8260C
Vinyl chloride	ND	5.0	ug/Kg	1	08/28/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	94		%	1	08/28/20	JLI	70 - 130 %
% Bromofluorobenzene	99		%	1	08/28/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	08/28/20	JLI	70 - 130 %
% Toluene-d8	93		%	1	08/28/20	JLI	70 - 130 %

Polynuclear Aromatic HC

2-Methylnaphthalene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Acenaphthene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Acenaphthylene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Anthracene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Benz(a)anthracene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Benzo(a)pyrene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Benzo(b)fluoranthene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Benzo(ghi)perylene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Benzo(k)fluoranthene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Chrysene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Fluoranthene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Fluorene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D

Project ID: ROCKHEAD
Client ID: S1

Phoenix I.D.: CG63132

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Naphthalene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Phenanthrene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
Pyrene	ND	240	ug/Kg	1	08/28/20	WB	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	80		%	1	08/28/20	WB	30 - 130 %
% Nitrobenzene-d5	75		%	1	08/28/20	WB	30 - 130 %
% Terphenyl-d14	87		%	1	08/28/20	WB	30 - 130 %
Field Extraction	Completed				08/26/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
September 01, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

September 01, 2020

QA/QC Data

SDG I.D.: GCG63127

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 543247 (mg/kg), QC Sample No: CG63087 2X (CG63132)													
Mercury - Soil	BRL	0.03	<0.03	<0.03	NC	101	113	11.2	96.0	97.8	1.9	70 - 130	30
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 543154 (mg/kg), QC Sample No: CG62950 (CG63127, CG63128, CG63129, CG63130)													
ICP Metals - Soil													
Lead	BRL	0.33	87.8	80.0	9.30	106	110	3.7	105			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													
QA/QC Batch 543252 (mg/L), QC Sample No: CG63127 (CG63127, CG63128, CG63129, CG63130, CG63131)													
ICP Metals - SPLP Extraction													
Lead	BRL	0.010	<0.010	<0.010	NC	95.0	93.9	1.2	92.9			80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													
QA/QC Batch 543310 (mg/kg), QC Sample No: CG63955 (CG63131, CG63132)													
ICP Metals - Soil													
Arsenic	BRL	0.67	3.42	4.56	NC	102	106	3.8	96.3			75 - 125	35
Cadmium	BRL	0.33	0.95	1.07	NC	101	103	2.0	97.7			75 - 125	35
Chromium	BRL	0.33	41.7	29.8	33.3	101	105	3.9	92.9			75 - 125	35
Copper	BRL	0.67	28.3	28.5	0.70	101	102	1.0	96.7			75 - 125	35
Lead	BRL	0.33	34.0	41.6	20.1	99.4	104	4.5	98.9			75 - 125	35
Nickel	BRL	0.33	13.9	15.1	8.30	107	111	3.7	101			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

September 01, 2020

QA/QC Data

SDG I.D.: GCG63127

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 543129 (mg/Kg), QC Sample No: CG63117 (CG63127, CG63128, CG63131, CG63132)										
TPH by GC (Extractable Products) - Solid										
Ext. Petroleum H.C. (C9-C36)	ND	50	75	62	19.0	63	64	1.6	60 - 120	30
% n-Pentacosane	59	%	85	68	22.2	64	62	3.2	50 - 150	30
Comment:										
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.										
QA/QC Batch 543138 (ug/Kg), QC Sample No: CG63132 2X (CG63127, CG63128, CG63131, CG63132)										
Polychlorinated Biphenyls - Solid										
PCB-1016	ND	33	75	65	14.3	45	42	6.9	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	88	71	21.4	50	48	4.1	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	87	%	100	77	26.0	53	51	3.8	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	86	%	97	81	18.0	58	55	5.3	30 - 150	30
% TCMX (Surrogate Rec)	73	%	84	79	6.1	55	52	5.6	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	73	%	84	92	9.1	66	61	7.9	30 - 150	30
QA/QC Batch 543176 (ug/kg), QC Sample No: CG63132 (CG63132)										
Polynuclear Aromatic HC - Solid										
2-Methylnaphthalene	ND	230	84	83	1.2	81	77	5.1	40 - 140	30
Acenaphthene	ND	230	91	89	2.2	86	82	4.8	30 - 130	30
Acenaphthylene	ND	230	89	87	2.3	85	81	4.8	40 - 140	30
Anthracene	ND	230	92	86	6.7	85	80	6.1	40 - 140	30
Benz(a)anthracene	ND	230	95	91	4.3	94	89	5.5	40 - 140	30
Benzo(a)pyrene	ND	230	99	97	2.0	98	91	7.4	40 - 140	30
Benzo(b)fluoranthene	ND	230	118	112	5.2	116	108	7.1	40 - 140	30
Benzo(ghi)perylene	ND	230	88	87	1.1	81	77	5.1	40 - 140	30
Benzo(k)fluoranthene	ND	230	76	78	2.6	74	70	5.6	40 - 140	30
Chrysene	ND	230	94	90	4.3	90	84	6.9	40 - 140	30
Dibenz(a,h)anthracene	ND	230	89	89	0.0	85	79	7.3	40 - 140	30
Fluoranthene	ND	230	91	87	4.5	85	79	7.3	40 - 140	30
Fluorene	ND	230	94	91	3.2	90	83	8.1	40 - 140	30
Indeno(1,2,3-cd)pyrene	ND	230	86	87	1.2	84	77	8.7	40 - 140	30
Naphthalene	ND	230	79	79	0.0	76	74	2.7	40 - 140	30
Phenanthrene	ND	230	93	87	6.7	85	80	6.1	40 - 140	30
Pyrene	ND	230	94	88	6.6	86	79	8.5	30 - 130	30
% 2-Fluorobiphenyl	71	%	83	84	1.2	79	76	3.9	30 - 130	30

Parameter	Blank	Blk RL		LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
% Nitrobenzene-d5	74	%		84	84	0.0	86	81	6.0	30 - 130	30	
% Terphenyl-d14	75	%		93	86	7.8	83	77	7.5	30 - 130	30	

Comment:

Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

QA/QC Batch 543269 (ug/kg), QC Sample No: CG63085 (CG63129, CG63130, CG63131, CG63132)

Volatiles - Solid (Low Level)

1,1,1,2-Tetrachloroethane	ND	5.0		109	107	1.9	103	108	4.7	70 - 130	30	
1,1,1-Trichloroethane	ND	5.0		111	110	0.9	107	117	8.9	70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0		101	99	2.0	101	114	12.1	70 - 130	30	
1,1,2-Trichloroethane	ND	5.0		97	96	1.0	91	93	2.2	70 - 130	30	
1,1-Dichloroethane	ND	5.0		100	99	1.0	98	104	5.9	70 - 130	30	
1,1-Dichloroethene	ND	5.0		107	105	1.9	105	110	4.7	70 - 130	30	
1,1-Dichloropropene	ND	5.0		101	100	1.0	97	103	6.0	70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0		98	97	1.0	51	44	14.7	70 - 130	30	m
1,2,3-Trichloropropane	ND	5.0		97	96	1.0	102	115	12.0	70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0		97	93	4.2	54	51	5.7	70 - 130	30	m
1,2,4-Trimethylbenzene	ND	1.0		96	93	3.2	78	91	15.4	70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0		112	109	2.7	96	104	8.0	70 - 130	30	
1,2-Dibromoethane	ND	5.0		99	95	4.1	92	95	3.2	70 - 130	30	
1,2-Dichlorobenzene	ND	5.0		96	95	1.0	77	83	7.5	70 - 130	30	
1,2-Dichloroethane	ND	5.0		105	105	0.0	104	106	1.9	70 - 130	30	
1,2-Dichloropropane	ND	5.0		95	96	1.0	93	95	2.1	70 - 130	30	
1,3,5-Trimethylbenzene	ND	1.0		96	93	3.2	84	100	17.4	70 - 130	30	
1,3-Dichlorobenzene	ND	5.0		94	91	3.2	76	85	11.2	70 - 130	30	
1,3-Dichloropropane	ND	5.0		97	96	1.0	95	100	5.1	70 - 130	30	
1,4-Dichlorobenzene	ND	5.0		95	92	3.2	76	86	12.3	70 - 130	30	
2,2-Dichloropropane	ND	5.0		110	108	1.8	103	109	5.7	70 - 130	30	
2-Chlorotoluene	ND	5.0		95	92	3.2	86	100	15.1	70 - 130	30	
2-Hexanone	ND	25		89	88	1.1	39	29	29.4	70 - 130	30	m
2-Isopropyltoluene	ND	5.0		102	99	3.0	83	99	17.6	70 - 130	30	
4-Chlorotoluene	ND	5.0		93	89	4.4	80	94	16.1	70 - 130	30	
4-Methyl-2-pentanone	ND	25		98	94	4.2	66	63	4.7	70 - 130	30	m
Acetone	ND	10		111	108	2.7	102	99	3.0	70 - 130	30	
Acrylonitrile	ND	5.0		101	102	1.0	78	74	5.3	70 - 130	30	
Benzene	ND	1.0		98	98	0.0	94	98	4.2	70 - 130	30	
Bromobenzene	ND	5.0		97	95	2.1	87	97	10.9	70 - 130	30	
Bromochloromethane	ND	5.0		103	101	2.0	100	105	4.9	70 - 130	30	
Bromodichloromethane	ND	5.0		108	108	0.0	105	107	1.9	70 - 130	30	
Bromoform	ND	5.0		114	113	0.9	99	101	2.0	70 - 130	30	
Bromomethane	ND	5.0		108	110	1.8	83	89	7.0	70 - 130	30	
Carbon Disulfide	ND	5.0		104	102	1.9	96	102	6.1	70 - 130	30	
Carbon tetrachloride	ND	5.0		119	120	0.8	115	121	5.1	70 - 130	30	
Chlorobenzene	ND	5.0		95	95	0.0	88	93	5.5	70 - 130	30	
Chloroethane	ND	5.0		106	104	1.9	99	106	6.8	70 - 130	30	
Chloroform	ND	5.0		104	102	1.9	102	107	4.8	70 - 130	30	
Chloromethane	ND	5.0		79	79	0.0	69	71	2.9	70 - 130	30	m
cis-1,2-Dichloroethene	ND	5.0		95	95	0.0	90	95	5.4	70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0		102	102	0.0	86	85	1.2	70 - 130	30	
Dibromochloromethane	ND	3.0		115	115	0.0	106	112	5.5	70 - 130	30	
Dibromomethane	ND	5.0		100	97	3.0	95	99	4.1	70 - 130	30	
Dichlorodifluoromethane	ND	5.0		92	90	2.2	76	82	7.6	70 - 130	30	

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Ethylbenzene	ND	1.0	97	95	2.1	88	97	9.7	70 - 130	30	
Hexachlorobutadiene	ND	5.0	104	100	3.9	50	63	23.0	70 - 130	30	m
Isopropylbenzene	ND	1.0	96	93	3.2	90	106	16.3	70 - 130	30	
m&p-Xylene	ND	2.0	94	92	2.2	83	91	9.2	70 - 130	30	
Methyl ethyl ketone	ND	5.0	98	99	1.0	72	62	14.9	70 - 130	30	m
Methyl t-butyl ether (MTBE)	ND	1.0	107	106	0.9	108	108	0.0	70 - 130	30	
Methylene chloride	ND	5.0	94	93	1.1	94	99	5.2	70 - 130	30	
Naphthalene	ND	5.0	106	104	1.9	59	52	12.6	70 - 130	30	m
n-Butylbenzene	ND	1.0	102	100	2.0	71	87	20.3	70 - 130	30	
n-Propylbenzene	ND	1.0	97	93	4.2	87	104	17.8	70 - 130	30	
o-Xylene	ND	2.0	96	93	3.2	85	90	5.7	70 - 130	30	
p-Isopropyltoluene	ND	1.0	99	96	3.1	77	93	18.8	70 - 130	30	
sec-Butylbenzene	ND	1.0	104	101	2.9	86	104	18.9	70 - 130	30	
Styrene	ND	5.0	95	93	2.1	76	81	6.4	70 - 130	30	
tert-Butylbenzene	ND	1.0	96	94	2.1	87	103	16.8	70 - 130	30	
Tetrachloroethene	ND	5.0	97	96	1.0	88	92	4.4	70 - 130	30	
Tetrahydrofuran (THF)	ND	5.0	97	94	3.1	93	99	6.3	70 - 130	30	
Toluene	ND	1.0	100	98	2.0	91	97	6.4	70 - 130	30	
trans-1,2-Dichloroethene	ND	5.0	110	108	1.8	109	114	4.5	70 - 130	30	
trans-1,3-Dichloropropene	ND	5.0	108	108	0.0	93	93	0.0	70 - 130	30	
trans-1,4-dichloro-2-butene	ND	5.0	129	123	4.8	98	103	5.0	70 - 130	30	
Trichloroethene	ND	5.0	97	96	1.0	93	97	4.2	70 - 130	30	
Trichlorofluoromethane	ND	5.0	109	107	1.9	107	113	5.5	70 - 130	30	
Trichlorotrifluoroethane	ND	5.0	107	104	2.8	101	110	8.5	70 - 130	30	
Vinyl chloride	ND	5.0	93	93	0.0	86	90	4.5	70 - 130	30	
% 1,2-dichlorobenzene-d4	95	%	100	99	1.0	97	96	1.0	70 - 130	30	
% Bromofluorobenzene	99	%	100	100	0.0	98	94	4.2	70 - 130	30	
% Dibromofluoromethane	96	%	99	100	1.0	100	99	1.0	70 - 130	30	
% Toluene-d8	92	%	99	101	2.0	100	99	1.0	70 - 130	30	

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 543460 (ug/kg), QC Sample No: CG63127 (CG63127, CG63128)

Volatiles - Solid (Low Level)

1,1,1,2-Tetrachloroethane	ND	5.0	111	113	1.8				70 - 130	30	
1,1,1-Trichloroethane	ND	5.0	120	116	3.4				70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0	108	106	1.9				70 - 130	30	
1,1,2-Trichloroethane	ND	5.0	99	100	1.0				70 - 130	30	
1,1-Dichloroethane	ND	5.0	103	103	0.0				70 - 130	30	
1,1-Dichloroethene	ND	5.0	110	106	3.7				70 - 130	30	
1,1-Dichloropropene	ND	5.0	108	104	3.8				70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0	102	102	0.0				70 - 130	30	
1,2,3-Trichloropropane	ND	5.0	106	104	1.9				70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0	103	100	3.0				70 - 130	30	
1,2,4-Trimethylbenzene	ND	1.0	101	99	2.0				70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0	117	115	1.7				70 - 130	30	
1,2-Dibromoethane	ND	5.0	101	101	0.0				70 - 130	30	
1,2-Dichlorobenzene	ND	5.0	101	99	2.0				70 - 130	30	
1,2-Dichloroethane	ND	5.0	111	110	0.9				70 - 130	30	
1,2-Dichloropropane	ND	5.0	97	96	1.0				70 - 130	30	
1,3,5-Trimethylbenzene	ND	1.0	100	99	1.0				70 - 130	30	
1,3-Dichlorobenzene	ND	5.0	99	97	2.0				70 - 130	30	

QA/QC Data

SDG I.D.: GCG63127

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,3-Dichloropropane	ND	5.0	101	99	2.0				70 - 130	30	
1,4-Dichlorobenzene	ND	5.0	100	98	2.0				70 - 130	30	
2,2-Dichloropropane	ND	5.0	118	114	3.4				70 - 130	30	
2-Chlorotoluene	ND	5.0	98	97	1.0				70 - 130	30	
2-Hexanone	ND	25	96	91	5.3				70 - 130	30	
2-Isopropyltoluene	ND	5.0	106	104	1.9				70 - 130	30	
4-Chlorotoluene	ND	5.0	98	96	2.1				70 - 130	30	
4-Methyl-2-pentanone	ND	25	106	101	4.8				70 - 130	30	
Acetone	ND	10	126	115	9.1				70 - 130	30	
Acrylonitrile	ND	5.0	111	105	5.6				70 - 130	30	
Benzene	ND	1.0	101	100	1.0				70 - 130	30	
Bromobenzene	ND	5.0	99	97	2.0				70 - 130	30	
Bromochloromethane	ND	5.0	102	105	2.9				70 - 130	30	
Bromodichloromethane	ND	5.0	113	114	0.9				70 - 130	30	
Bromoform	ND	5.0	121	118	2.5				70 - 130	30	
Bromomethane	ND	5.0	106	109	2.8				70 - 130	30	
Carbon Disulfide	ND	5.0	104	100	3.9				70 - 130	30	
Carbon tetrachloride	ND	5.0	128	125	2.4				70 - 130	30	
Chlorobenzene	ND	5.0	101	99	2.0				70 - 130	30	
Chloroethane	ND	5.0	106	103	2.9				70 - 130	30	
Chloroform	ND	5.0	110	106	3.7				70 - 130	30	
Chloromethane	ND	5.0	81	78	3.8				70 - 130	30	
cis-1,2-Dichloroethene	ND	5.0	98	98	0.0				70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0	106	105	0.9				70 - 130	30	
Dibromochloromethane	ND	3.0	120	119	0.8				70 - 130	30	
Dibromomethane	ND	5.0	102	103	1.0				70 - 130	30	
Dichlorodifluoromethane	ND	5.0	92	86	6.7				70 - 130	30	
Ethylbenzene	ND	1.0	102	100	2.0				70 - 130	30	
Hexachlorobutadiene	ND	5.0	111	106	4.6				70 - 130	30	
Isopropylbenzene	ND	1.0	100	96	4.1				70 - 130	30	
m&p-Xylene	ND	2.0	99	97	2.0				70 - 130	30	
Methyl ethyl ketone	ND	5.0	103	105	1.9				70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	1.0	140	141	0.7				70 - 130	30	I
Methylene chloride	ND	5.0	95	93	2.1				70 - 130	30	
Naphthalene	ND	5.0	111	108	2.7				70 - 130	30	
n-Butylbenzene	ND	1.0	111	107	3.7				70 - 130	30	
n-Propylbenzene	ND	1.0	102	100	2.0				70 - 130	30	
o-Xylene	ND	2.0	99	98	1.0				70 - 130	30	
p-Isopropyltoluene	ND	1.0	104	101	2.9				70 - 130	30	
sec-Butylbenzene	ND	1.0	110	107	2.8				70 - 130	30	
Styrene	ND	5.0	99	98	1.0				70 - 130	30	
tert-Butylbenzene	ND	1.0	101	99	2.0				70 - 130	30	
Tetrachloroethene	ND	5.0	103	100	3.0				70 - 130	30	
Tetrahydrofuran (THF)	ND	5.0	105	100	4.9				70 - 130	30	
Toluene	ND	1.0	103	102	1.0				70 - 130	30	
trans-1,2-Dichloroethene	ND	5.0	117	116	0.9				70 - 130	30	
trans-1,3-Dichloropropene	ND	5.0	112	112	0.0				70 - 130	30	
trans-1,4-dichloro-2-butene	ND	5.0	139	135	2.9				70 - 130	30	I
Trichloroethene	ND	5.0	101	101	0.0				70 - 130	30	
Trichlorofluoromethane	ND	5.0	112	109	2.7				70 - 130	30	
Trichlorotrifluoroethane	ND	5.0	112	106	5.5				70 - 130	30	
Vinyl chloride	ND	5.0	98	95	3.1				70 - 130	30	
% 1,2-dichlorobenzene-d4	94	%	99	98	1.0				70 - 130	30	

QA/QC Data

SDG I.D.: GCG63127

Parameter	Blank	Blk RL		LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
% Bromofluorobenzene	100	%		101	101	0.0				70 - 130	30
% Dibromofluoromethane	96	%		96	99	3.1				70 - 130	30
% Toluene-d8	93	%		99	100	1.0				70 - 130	30

Comment:

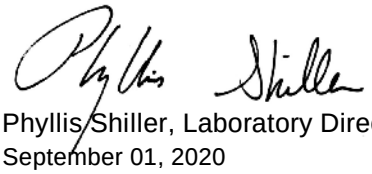
The Low Level MS/MSD are not reported for this batch.

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
m = This parameter is outside laboratory MS/MSD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference



Phyllis Shiller, Laboratory Director
September 01, 2020

Tuesday, September 01, 2020

Criteria: CT: GAM, RC

State: CT

Sample Criteria Exceedances Report

GCG63127 - WSP

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** WSP USA

Project Location: ROCKHEAD ***Project Number:***

Laboratory Sample ID(s): CG63127-CG63132 ***Sampling Date(s):*** 8/26/2020

List RCP Methods Used (e.g., 8260, 8270, et cetera) 1311/1312, 6010, 7470/7471, 8082, 8260, 8270, ETPH

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☑ Yes ☐ No ☐ NA
4	**Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents acheived? See Section: VOA Narration.**	☐ Yes ☑ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?** **b) Were these reporting limits met?**	☑ Yes ☐ No ☑ Yes ☐ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☑ Yes ☐ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Tuesday, September 01, 2020

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

NY # 11301

RCP Certification Report

September 01, 2020

SDG I.D.: GCG63127

SDG Comments

Metals Analysis:
The client requested a site specific list of elements which is shorter than the 6010 RCP list.

8270 Semi-volatile Organics:
The client requested a short list for 8270 RCP Semivolatile. Only the PAH constituents are reported as requested on the chain-of-custody.

ETPH Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-FID84 08/27/20-1 Jeff Bucko, Chemist 08/27/20

CG63128 (1X), CG63132 (1X)

The initial calibration (ETPH805I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (827A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

AU-FID84 08/28/20-1 Jeff Bucko, Chemist 08/28/20

CG63127 (5X), CG63131 (5X)

The initial calibration (ETPH805I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (828A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

QC (Batch Specific):

Batch 543129 (CG63117)

CG63127, CG63128, CG63131, CG63132

All LCS recoveries were within 60 - 120 with the following exceptions: None.
All LCSD recoveries were within 60 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Mercury Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

MERLIN 08/28/20 09:49 Mike Hornak, Chemist 08/28/20

CG63132

The method preparation blank, ICB, and CCBs contain all of the acids and reagents as the samples.
The initial calibration met all criteria including a standard run at or below the reporting level.
All calibration verification standards (ICV, CCV) met criteria.
All calibration blank verification standards (ICB, CCB) met criteria.
The matrix spike sample is used to identify spectral interference for each batch of samples, if within 85-115%, no interference is observed and no further action is taken.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.

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Certification Report

September 01, 2020

SDG I.D.: GCG63127

Mercury Narration

QC (Batch Specific):

Batch 543247 (CG63087)

CG63132

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

ARCOS-2 08/27/20 08:43 Emily Kolominskaya, Chemist 08/27/20

CG63127, CG63128, CG63129, CG63130

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

ARCOS-2 08/29/20 09:10 Cindy Pearce, Chemist 08/29/20

CG63131, CG63132

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

BLUE 08/28/20 08:00 Cindy Pearce, Chemist 08/28/20

CG63127, CG63128, CG63129, CG63130, CG63131

The initial calibration met criteria.
The continuing calibration standards met criteria for all the elements reported. The linear range is defined daily by the calibration range.
The continuing calibration blanks were less than the reporting level for the elements reported.
The ICSA and ICSAB were analyzed at the beginning and end of the run and were within criteria.The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 543154 (CG62950)

CG63127, CG63128, CG63129, CG63130

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.

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NY # 11301

Certification Report

September 01, 2020

SDG I.D.: GCG63127

ICP Metals Narration

Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

Batch 543310 (CG63955)

CG63131, CG63132

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

QC (Site Specific):

Batch 543252 (CG63127)

CG63127, CG63128, CG63129, CG63130, CG63131

All LCS recoveries were within 80 - 120 with the following exceptions: None.
All LCSD recoveries were within 80 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

PCB Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-ECD24 08/28/20-1 Saadia Chudary, Chemist 08/28/20

CG63127 (10X), CG63128 (10X), CG63131 (10X), CG63132 (10X)

The initial calibration (PC723AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PC723BI) RSD for the compound list was less than 20% except for the following compounds: None.
The continuing calibration %D for the compound list was less than 15% except for the following compounds:None.

QC (Site Specific):

Batch 543138 (CG63132)

CG63127, CG63128, CG63131, CG63132

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 40 - 140 with the following exceptions: None.
All MSD recoveries were within 40 - 140 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: None.

SVOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

CHEM07 08/27/20-2 Wes Bryon, Chemist 08/27/20

CG63132 (1X)

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RCP Certification Report

September 01, 2020

SDG I.D.: GCG63127

SVOA Narration

For 8270 full list, the DDT breakdown and pentachlorophenol & benzidine peak tailing were evaluated in the DFTPP tune and were found to be in control.
For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM07/7_BN_0810):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM07/0827_22-7_BN_0810):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Site Specific):

Batch 543176 (CG63132)

CG63132

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 40 - 140 with the following exceptions: None.
All MSD recoveries were within 40 - 140 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: None.
Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

VOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 543460 (Samples: CG63127, CG63128): -----

The LCS and/or the LCSD recovery is above the upper range for one or more analytes that were not reported in the sample(s), therefore no significant bias is suspected. (Methyl t-butyl ether (MTBE), trans-1,4-dichloro-2-butene)

Instrument:

CHEM14 08/27/20-2 Jane Li, Chemist 08/27/20

CG63129 (1X), CG63130 (1X), CG63131 (1X), CG63132 (1X)

Initial Calibration Evaluation (CHEM14/VT080720):
95% of target compounds met criteria.
The following compounds had %RSDs >20%: 1,2-Dibromo-3-chloropropane 25% (20%), Acetone 31% (20%), Methyl Ethyl Ketone 29% (20%), Methylene chloride 25% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Acetone 0.086 (0.1), Bromoform 0.080

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RCP Certification Report

September 01, 2020

SDG I.D.: GCG63127

VOA Narration

(0.1), Tetrachloroethene 0.181 (0.2)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM14/0827_34-VT080720):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

CHEM14 08/28/20-1 Jane Li, Chemist 08/28/20

CG63127 (1X, 50X, 61.7X), CG63128 (1X)

Initial Calibration Evaluation (CHEM14/VT080720):
95% of target compounds met criteria.
The following compounds had %RSDs >20%: 1,2-Dibromo-3-chloropropane 25% (20%), Acetone 31% (20%), Methyl Ethyl Ketone 29% (20%), Methylene chloride 25% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Acetone 0.086 (0.1), Bromoform 0.080 (0.1), Tetrachloroethene 0.181 (0.2)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM14/0828_02-VT080720):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

QC (Batch Specific):

Batch 543269 (CG63085) CHEM14 8/27/2020-2

CG63129(1X), CG63130(1X), CG63131(1X), CG63132(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Batch 543460 (CG63127) CHEM14 8/28/2020-1

CG63127(1X), CG63128(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: Methyl t-butyl ether (MTBE)(140%), trans-1,4-dichloro-2-butene(139%)
All LCSD recoveries were within 70 - 130 with the following exceptions: Methyl t-butyl ether (MTBE)(141%), trans-1,4-dichloro-2-butene(135%)
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
The Low Level MS/MSD are not reported for this batch.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Temperature Narration

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Tel. (860) 645-1102 Fax (860) 645-0823

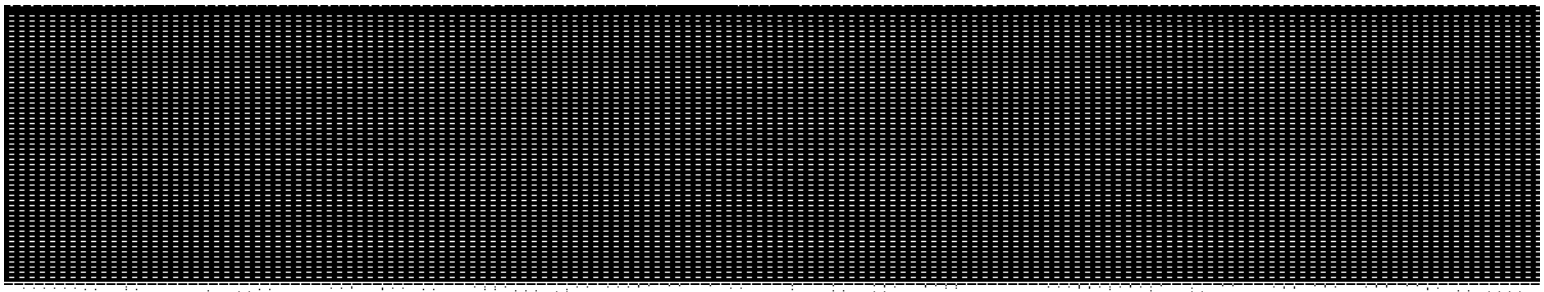
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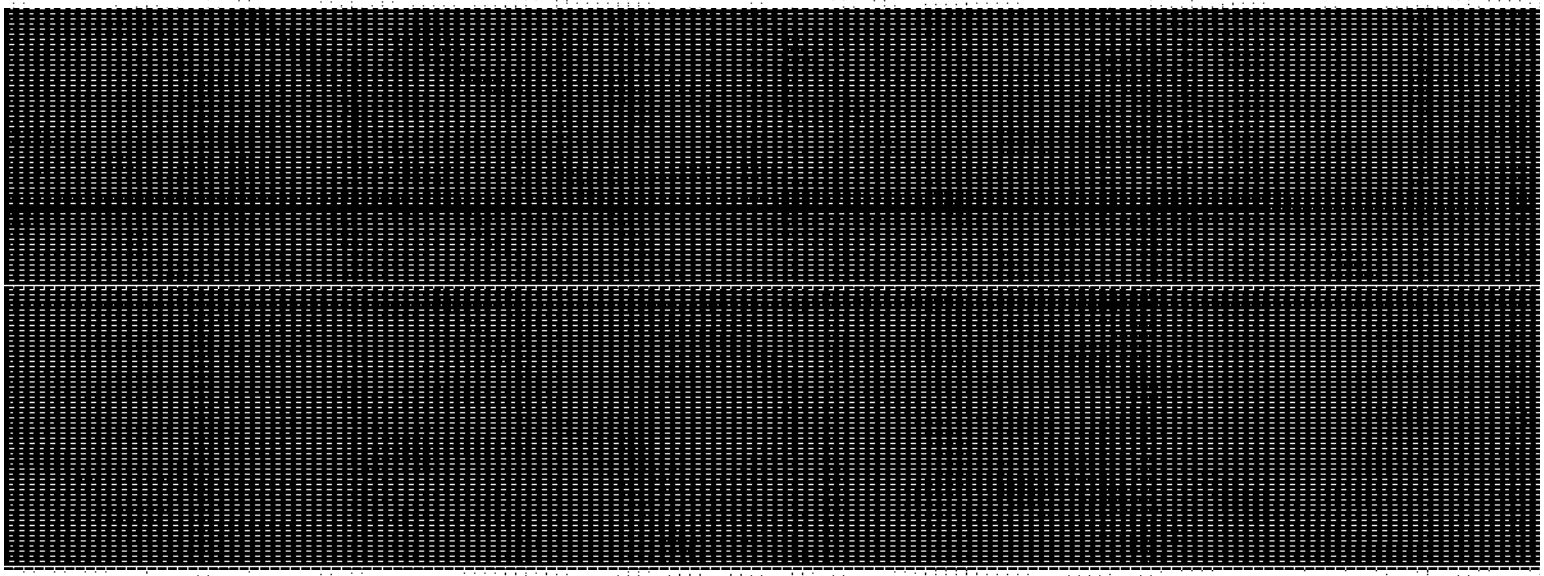
RCP Certification Report

September 01, 2020

SDG I.D.: GCG63127

The samples were received at 1.7C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)





PHOENIX
Environmental Laboratories, Inc.

Friday, October 09, 2020

Attn: Mr. Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Project ID: 64 CAM
SDG ID: GCG89663
Sample ID#s: CG89663 - CG89664

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

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SDG Comments

October 09, 2020

SDG I.D.: GCG89663

Volatile 8260 analysis:
1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane do not meet GWP criteria, these compounds are analyzed by GC/ECD to achieve this criteria.

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Sample Id Cross Reference

October 09, 2020

SDG I.D.: GCG89663

Project ID: 64 CAM

Client Id	Lab Id	Matrix
MW-1	CG89663	GROUND WATER
MW-3	CG89664	GROUND WATER

Environmental Laboratories, Inc.
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Analysis Report

October 09, 2020

FOR: Attn: Mr. Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	GROUND WATER	Collected by:		10/01/20	11:40
Location Code:	WSP	Received by:	LB	10/02/20	13:16
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG89663
Phoenix ID: CG89663

Project ID: 64 CAM
Client ID: MW-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	0.005	0.004	mg/L	1	10/03/20	CPP	SW6010D
Cadmium	< 0.001	0.001	mg/L	1	10/03/20	CPP	SW6010D
Chromium	0.001	0.001	mg/L	1	10/03/20	CPP	SW6010D
Copper	0.019	0.005	mg/L	1	10/03/20	CPP	SW6010D
Mercury	< 0.0002	0.0002	mg/L	1	10/07/20	RS	SW7470A
Nickel	0.002	0.001	mg/L	1	10/03/20	CPP	SW6010D
Lead	< 0.002	0.002	mg/L	1	10/03/20	CPP	SW6010D
Zinc	0.006	0.004	mg/L	1	10/03/20	CPP	SW6010D
Extraction of CT ETPH	Completed				10/06/20	P/CG	SW3510C/SW3520C
Mercury Digestion	Completed				10/03/20	VT/ARW	SW7470A
Semi-Volatile Extraction	Completed				10/02/20	P/CG	SW3520C
Total Metals Digestion	Completed				10/02/20	AG	
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	0.069	mg/L	1	10/07/20	JRB	CTETPH 8015D
Identification	ND		mg/L	1	10/07/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	57		%	1	10/07/20	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1,1-Trichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1,2,2-Tetrachloroethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,1,2-Trichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloropropene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,3-Trichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C

Project ID: 64 CAM
Client ID: MW-1

Phoenix I.D.: CG89663

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,2,3-Trichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,4-Trichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,4-Trimethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,2-Dibromoethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichloroethane	ND	0.60	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3,5-Trimethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,4-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2,2-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2-Chlorotoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2-Hexanone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
2-Isopropyltoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
4-Chlorotoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
4-Methyl-2-pentanone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Acetone	ND	25	ug/L	1	10/02/20	HM	SW8260C
Acrylonitrile	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Benzene	ND	0.70	ug/L	1	10/02/20	HM	SW8260C
Bromobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromochloromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromodichloromethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Bromoform	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromomethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Carbon Disulfide	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Carbon tetrachloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloroform	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
cis-1,2-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
cis-1,3-Dichloropropene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
Dibromochloromethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Dibromomethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Dichlorodifluoromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Ethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Hexachlorobutadiene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
Isopropylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
m&p-Xylene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Methyl ethyl ketone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Methyl t-butyl ether (MTBE)	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Methylene chloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Naphthalene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
n-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
n-Propylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
o-Xylene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
p-Isopropyltoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C

Project ID: 64 CAM
Client ID: MW-1

Phoenix I.D.: CG89663

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
sec-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Styrene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
tert-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Tetrachloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Tetrahydrofuran (THF)	ND	2.5	ug/L	1	10/02/20	HM	SW8260C
Toluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Total Xylenes	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
trans-1,2-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
trans-1,3-Dichloropropene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
trans-1,4-dichloro-2-butene	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Trichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Trichlorofluoromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Trichlorotrifluoroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Vinyl chloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	106		%	1	10/02/20	HM	70 - 130 %
% Bromofluorobenzene	92		%	1	10/02/20	HM	70 - 130 %
% Dibromofluoromethane	106		%	1	10/02/20	HM	70 - 130 %
% Toluene-d8	92		%	1	10/02/20	HM	70 - 130 %

Semivolatiles by SIM, PAH

2-Methylnaphthalene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Acenaphthene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Acenaphthylene	ND	0.3	ug/L	1	10/05/20	WB	SW8270D (SIM)
Anthracene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benz(a)anthracene	ND	0.05	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(a)pyrene	ND	0.20	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(b)fluoranthene	ND	0.07	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(ghi)perylene	ND	0.48	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(k)fluoranthene	ND	0.3	ug/L	1	10/05/20	WB	SW8270D (SIM)
Chrysene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	ND	0.10	ug/L	1	10/05/20	WB	SW8270D (SIM)
Fluoranthene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Fluorene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	ND	0.10	ug/L	1	10/05/20	WB	SW8270D (SIM)
Naphthalene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
Phenanthrene	ND	0.06	ug/L	1	10/05/20	WB	SW8270D (SIM)
Pyrene	ND	0.51	ug/L	1	10/05/20	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	38		%	1	10/05/20	WB	30 - 130 %
% Nitrobenzene-d5	51		%	1	10/05/20	WB	30 - 130 %
% Terphenyl-d14	52		%	1	10/05/20	WB	30 - 130 %

Project ID: 64 CAM
Client ID: MW-1

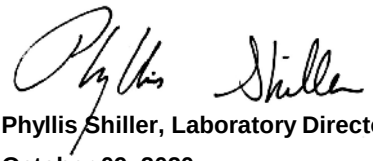
Phoenix I.D.: CG89663

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

October 09, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 09, 2020

FOR: Attn: Mr. Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	GROUND WATER	Collected by:		10/01/20	12:50
Location Code:	WSP	Received by:	LB	10/02/20	13:16
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG89663
Phoenix ID: CG89664

Project ID: 64 CAM
Client ID: MW-3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	< 0.004	0.004	mg/L	1	10/03/20	CPP	SW6010D
Cadmium	< 0.001	0.001	mg/L	1	10/03/20	CPP	SW6010D
Chromium	< 0.001	0.001	mg/L	1	10/03/20	CPP	SW6010D
Copper	< 0.005	0.005	mg/L	1	10/03/20	CPP	SW6010D
Mercury	< 0.0002	0.0002	mg/L	1	10/07/20	RS	SW7470A
Nickel	< 0.001	0.001	mg/L	1	10/03/20	CPP	SW6010D
Lead	< 0.002	0.002	mg/L	1	10/03/20	CPP	SW6010D
Zinc	< 0.004	0.004	mg/L	1	10/03/20	CPP	SW6010D
Extraction of CT ETPH	Completed				10/02/20	P/CG	SW3510C/SW3520C
Mercury Digestion	Completed				10/03/20	VT/ARW	SW7470A
Semi-Volatile Extraction	Completed				10/02/20	P/CG	SW3520C
Total Metals Digestion	Completed				10/02/20	AG	
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	0.066	mg/L	1	10/05/20	JRB	CTETPH 8015D
Identification	ND		mg/L	1	10/05/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	76		%	1	10/05/20	JRB	50 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1,1-Trichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1,2,2-Tetrachloroethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,1,2-Trichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,1-Dichloropropene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,3-Trichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C

Project ID: 64 CAM
Client ID: MW-3

Phoenix I.D.: CG89664

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,2,3-Trichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,4-Trichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2,4-Trimethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2-Dibromo-3-chloropropane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,2-Dibromoethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichloroethane	ND	0.60	ug/L	1	10/02/20	HM	SW8260C
1,2-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3,5-Trimethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,3-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
1,4-Dichlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2,2-Dichloropropane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2-Chlorotoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
2-Hexanone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
2-Isopropyltoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
4-Chlorotoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
4-Methyl-2-pentanone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Acetone	ND	25	ug/L	1	10/02/20	HM	SW8260C
Acrylonitrile	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Benzene	ND	0.70	ug/L	1	10/02/20	HM	SW8260C
Bromobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromochloromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromodichloromethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Bromoform	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Bromomethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Carbon Disulfide	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Carbon tetrachloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chlorobenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloroform	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Chloromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
cis-1,2-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
cis-1,3-Dichloropropene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
Dibromochloromethane	ND	0.50	ug/L	1	10/02/20	HM	SW8260C
Dibromomethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Dichlorodifluoromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Ethylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Hexachlorobutadiene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
Isopropylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
m&p-Xylene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Methyl ethyl ketone	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Methyl t-butyl ether (MTBE)	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Methylene chloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Naphthalene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
n-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
n-Propylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
o-Xylene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
p-Isopropyltoluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C

Project ID: 64 CAM
Client ID: MW-3

Phoenix I.D.: CG89664

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
sec-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Styrene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
tert-Butylbenzene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Tetrachloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Tetrahydrofuran (THF)	ND	2.5	ug/L	1	10/02/20	HM	SW8260C
Toluene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Total Xylenes	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
trans-1,2-Dichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
trans-1,3-Dichloropropene	ND	0.40	ug/L	1	10/02/20	HM	SW8260C
trans-1,4-dichloro-2-butene	ND	5.0	ug/L	1	10/02/20	HM	SW8260C
Trichloroethene	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Trichlorofluoromethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Trichlorotrifluoroethane	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
Vinyl chloride	ND	1.0	ug/L	1	10/02/20	HM	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	105		%	1	10/02/20	HM	70 - 130 %
% Bromofluorobenzene	94		%	1	10/02/20	HM	70 - 130 %
% Dibromofluoromethane	104		%	1	10/02/20	HM	70 - 130 %
% Toluene-d8	92		%	1	10/02/20	HM	70 - 130 %

Semivolatiles by SIM, PAH

2-Methylnaphthalene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Acenaphthene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Acenaphthylene	ND	0.28	ug/L	1	10/05/20	WB	SW8270D (SIM)
Anthracene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benz(a)anthracene	ND	0.05	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(a)pyrene	ND	0.19	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(b)fluoranthene	ND	0.07	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(ghi)perylene	ND	0.45	ug/L	1	10/05/20	WB	SW8270D (SIM)
Benzo(k)fluoranthene	ND	0.28	ug/L	1	10/05/20	WB	SW8270D (SIM)
Chrysene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Dibenz(a,h)anthracene	ND	0.09	ug/L	1	10/05/20	WB	SW8270D (SIM)
Fluoranthene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Fluorene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Indeno(1,2,3-cd)pyrene	ND	0.09	ug/L	1	10/05/20	WB	SW8270D (SIM)
Naphthalene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
Phenanthrene	ND	0.06	ug/L	1	10/05/20	WB	SW8270D (SIM)
Pyrene	ND	0.47	ug/L	1	10/05/20	WB	SW8270D (SIM)
QA/QC Surrogates							
% 2-Fluorobiphenyl	72		%	1	10/05/20	WB	30 - 130 %
% Nitrobenzene-d5	94		%	1	10/05/20	WB	30 - 130 %
% Terphenyl-d14	97		%	1	10/05/20	WB	30 - 130 %

Project ID: 64 CAM
Client ID: MW-3

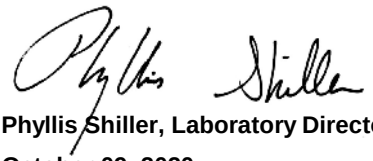
Phoenix I.D.: CG89664

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Phyllis Shiller, Laboratory Director

October 09, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 09, 2020

QA/QC Data

SDG I.D.: GCG89663

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 548064 (mg/L), QC Sample No: CG89739 (CG89663, CG89664)													
Mercury - Water	BRL	0.0002	<0.0002	<0.0002	NC	97.2			104			80 - 120	20
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 547995 (mg/L), QC Sample No: CG90204 (CG89663, CG89664)													
ICP Metals - Aqueous													
Arsenic	BRL	0.004	<0.004	<0.004	NC	96.8	97.0	0.2	98.8			80 - 120	20
Cadmium	BRL	0.001	<0.001	<0.001	NC	101	99.7	1.3	99.1			80 - 120	20
Chromium	BRL	0.001	0.002	0.002	NC	101	98.5	2.5	98.5			80 - 120	20
Copper	BRL	0.005	0.007	0.010	NC	102	99.1	2.9	99.4			80 - 120	20
Lead	BRL	0.002	0.007	0.006	NC	101	99.2	1.8	99.0			80 - 120	20
Nickel	BRL	0.001	0.001	0.001	NC	101	99.0	2.0	98.8			80 - 120	20
Zinc	BRL	0.004	0.348	0.354	1.70	98.7	97.3	1.4	98.8			80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

October 09, 2020

QA/QC Data

SDG I.D.: GCG89663

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
QA/QC Batch 547976 (mg/L), QC Sample No: CG87505 (CG89664)											
TPH by GC (Extractable Products) - Ground Water											
Ext. Petroleum H.C. (C9-C36)	ND	0.10	53	60	12.4				60 - 120	30	l
% n-Pentacosane	37	%	54	61	12.2				50 - 150	20	s
Comment:											
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.											
QA/QC Batch 548323 (mg/L), QC Sample No: CG91251 (CG89663)											
TPH by GC (Extractable Products) - Ground Water											
Ext. Petroleum H.C. (C9-C36)	ND	0.10	31	33	6.3				60 - 120	30	l
% n-Pentacosane	57	%	30	31	3.3				50 - 150	20	l
Comment:											
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.											
QA/QC Batch 547975 (ug/L), QC Sample No: CG89637 (CG89663, CG89664)											
Semivolatiles by SIM, PAH - Ground Water											
2-Methylnaphthalene	ND	0.50	63	79	22.5				30 - 130	20	r
Acenaphthene	ND	0.50	79	86	8.5				30 - 130	20	
Acenaphthylene	ND	0.10	62	61	1.6				30 - 130	20	
Anthracene	ND	0.10	66	74	11.4				30 - 130	20	
Benz(a)anthracene	ND	0.02	70	85	19.4				30 - 130	20	
Benzo(a)pyrene	ND	0.02	61	85	32.9				30 - 130	20	r
Benzo(b)fluoranthene	ND	0.02	79	109	31.9				30 - 130	20	r
Benzo(ghi)perylene	ND	0.02	51	79	43.1				30 - 130	20	r
Benzo(k)fluoranthene	ND	0.02	49	69	33.9				30 - 130	20	r
Chrysene	ND	0.02	57	72	23.3				30 - 130	20	r
Dibenz(a,h)anthracene	ND	0.02	56	96	52.6				30 - 130	20	r
Fluoranthene	ND	0.50	75	83	10.1				30 - 130	20	
Fluorene	ND	0.10	74	80	7.8				30 - 130	20	
Indeno(1,2,3-cd)pyrene	ND	0.02	57	93	48.0				30 - 130	20	r
Naphthalene	ND	0.50	57	72	23.3				30 - 130	20	r
Phenanthrene	ND	0.06	63	70	10.5				30 - 130	20	
Pyrene	ND	0.07	77	84	8.7				30 - 130	20	
% 2-Fluorobiphenyl	48	%	67	72	7.2				30 - 130	20	
% Nitrobenzene-d5	49	%	85	93	9.0				30 - 130	20	
% Terphenyl-d14	65	%	85	103	19.1				30 - 130	20	
Comment:											
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)											
QA/QC Batch 548162 (ug/L), QC Sample No: CG89659 (CG89663, CG89664)											
Volatiles - Ground Water											
1,1,1,2-Tetrachloroethane	ND	1.0	89	86	3.4				70 - 130	30	

QA/QC Data

SDG I.D.: GCG89663

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
1,1,1-Trichloroethane	ND	1.0	89	90	1.1				70 - 130	30
1,1,2,2-Tetrachloroethane	ND	0.50	93	91	2.2				70 - 130	30
1,1,2-Trichloroethane	ND	1.0	88	87	1.1				70 - 130	30
1,1-Dichloroethane	ND	1.0	87	85	2.3				70 - 130	30
1,1-Dichloroethene	ND	1.0	93	89	4.4				70 - 130	30
1,1-Dichloropropene	ND	1.0	88	87	1.1				70 - 130	30
1,2,3-Trichlorobenzene	ND	1.0	98	93	5.2				70 - 130	30
1,2,3-Trichloropropane	ND	1.0	96	92	4.3				70 - 130	30
1,2,4-Trichlorobenzene	ND	1.0	93	93	0.0				70 - 130	30
1,2,4-Trimethylbenzene	ND	1.0	104	101	2.9				70 - 130	30
1,2-Dibromo-3-chloropropane	ND	1.0	96	97	1.0				70 - 130	30
1,2-Dibromoethane	ND	1.0	92	90	2.2				70 - 130	30
1,2-Dichlorobenzene	ND	1.0	88	85	3.5				70 - 130	30
1,2-Dichloroethane	ND	1.0	86	88	2.3				70 - 130	30
1,2-Dichloropropane	ND	1.0	87	87	0.0				70 - 130	30
1,3,5-Trimethylbenzene	ND	1.0	103	102	1.0				70 - 130	30
1,3-Dichlorobenzene	ND	1.0	93	93	0.0				70 - 130	30
1,3-Dichloropropane	ND	1.0	93	92	1.1				70 - 130	30
1,4-Dichlorobenzene	ND	1.0	89	88	1.1				70 - 130	30
2,2-Dichloropropane	ND	1.0	97	92	5.3				70 - 130	30
2-Chlorotoluene	ND	1.0	96	95	1.0				70 - 130	30
2-Hexanone	ND	5.0	98	100	2.0				70 - 130	30
2-Isopropyltoluene	ND	1.0	107	105	1.9				70 - 130	30
4-Chlorotoluene	ND	1.0	92	87	5.6				70 - 130	30
4-Methyl-2-pentanone	ND	5.0	104	102	1.9				70 - 130	30
Acetone	ND	5.0	94	97	3.1				70 - 130	30
Acrylonitrile	ND	5.0	94	93	1.1				70 - 130	30
Benzene	ND	0.70	87	86	1.2				70 - 130	30
Bromobenzene	ND	1.0	91	88	3.4				70 - 130	30
Bromochloromethane	ND	1.0	85	83	2.4				70 - 130	30
Bromodichloromethane	ND	0.50	94	94	0.0				70 - 130	30
Bromoform	ND	1.0	90	89	1.1				70 - 130	30
Bromomethane	ND	1.0	90	95	5.4				70 - 130	30
Carbon Disulfide	ND	1.0	97	95	2.1				70 - 130	30
Carbon tetrachloride	ND	1.0	91	90	1.1				70 - 130	30
Chlorobenzene	ND	1.0	86	85	1.2				70 - 130	30
Chloroethane	ND	1.0	85	84	1.2				70 - 130	30
Chloroform	ND	1.0	86	85	1.2				70 - 130	30
Chloromethane	ND	1.0	77	78	1.3				70 - 130	30
cis-1,2-Dichloroethene	ND	1.0	83	81	2.4				70 - 130	30
cis-1,3-Dichloropropene	ND	0.40	96	104	8.0				70 - 130	30
Dibromochloromethane	ND	0.50	95	94	1.1				70 - 130	30
Dibromomethane	ND	1.0	86	86	0.0				70 - 130	30
Dichlorodifluoromethane	ND	1.0	92	88	4.4				70 - 130	30
Ethylbenzene	ND	1.0	89	89	0.0				70 - 130	30
Hexachlorobutadiene	ND	0.40	97	92	5.3				70 - 130	30
Isopropylbenzene	ND	1.0	103	98	5.0				70 - 130	30
m&p-Xylene	ND	1.0	97	93	4.2				70 - 130	30
Methyl ethyl ketone	ND	5.0	106	108	1.9				70 - 130	30
Methyl t-butyl ether (MTBE)	ND	1.0	97	96	1.0				70 - 130	30
Methylene chloride	ND	1.0	85	78	8.6				70 - 130	30
Naphthalene	ND	1.0	102	99	3.0				70 - 130	30
n-Butylbenzene	ND	1.0	101	98	3.0				70 - 130	30

QA/QC Data

SDG I.D.: GCG89663

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
n-Propylbenzene	ND	1.0	93	92	1.1				70 - 130	30
o-Xylene	ND	1.0	98	96	2.1				70 - 130	30
p-Isopropyltoluene	ND	1.0	105	101	3.9				70 - 130	30
sec-Butylbenzene	ND	1.0	113	109	3.6				70 - 130	30
Styrene	ND	1.0	104	101	2.9				70 - 130	30
tert-Butylbenzene	ND	1.0	101	99	2.0				70 - 130	30
Tetrachloroethene	ND	1.0	89	90	1.1				70 - 130	30
Tetrahydrofuran (THF)	ND	2.5	107	103	3.8				70 - 130	30
Toluene	ND	1.0	88	89	1.1				70 - 130	30
trans-1,2-Dichloroethene	ND	1.0	94	90	4.3				70 - 130	30
trans-1,3-Dichloropropene	ND	0.40	96	98	2.1				70 - 130	30
trans-1,4-dichloro-2-butene	ND	5.0	113	113	0.0				70 - 130	30
Trichloroethene	ND	1.0	89	87	2.3				70 - 130	30
Trichlorofluoromethane	ND	1.0	96	93	3.2				70 - 130	30
Trichlorotrifluoroethane	ND	1.0	109	104	4.7				70 - 130	30
Vinyl chloride	ND	1.0	94	92	2.2				70 - 130	30
% 1,2-dichlorobenzene-d4	104	%	102	100	2.0				70 - 130	30
% Bromofluorobenzene	91	%	102	100	2.0				70 - 130	30
% Dibromofluoromethane	102	%	99	102	3.0				70 - 130	30
% Toluene-d8	96	%	99	106	6.8				70 - 130	30

Comment:

A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
r = This parameter is outside laboratory RPD specified recovery limits.
s = This parameter is outside laboratory Blank Surrogate specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
October 09, 2020

Friday, October 09, 2020

Criteria: CT: GWP, SWP

State: CT

Sample Criteria Exceedances Report

GCG89663 - WSP

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CG89663	$8260GWR	1,2-Dibromo-3-chloropropane	CT / RSR GWPC (ug/l) / APS Organics	ND	0.50	0.2	0.2	ug/L
CG89663	$8260GWR	1,2-Dibromoethane	CT / RSR GWPC (ug/l) / Volatiles	ND	0.50	0.05	0.05	ug/L
CG89663	AS-WM	Arsenic	CT / RSR SWPC (ug/l) / Inorganics	0.005	0.004	0.004	0.004	mg/L
CG89664	$8260GWR	1,2-Dibromo-3-chloropropane	CT / RSR GWPC (ug/l) / APS Organics	ND	0.50	0.2	0.2	ug/L
CG89664	$8260GWR	1,2-Dibromoethane	CT / RSR GWPC (ug/l) / Volatiles	ND	0.50	0.05	0.05	ug/L

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** WSP USA

Project Location: 64 CAM ***Project Number:***

Laboratory Sample ID(s): CG89663, CG89664 ***Sampling Date(s):*** 10/1/2020

List RCP Methods Used (e.g., 8260, 8270, et cetera) 6010, 7470/7471, 8260, 8270, ETPH

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☑ Yes ☐ No ☐ NA
4	**Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents acheived? See Sections: ETPH Narration, SVOASIM Narration.**	☐ Yes ☑ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?**	☑ Yes ☐ No
	b) Were these reporting limits met?	☐ Yes ☑ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☐ Yes ☑ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Friday, October 09, 2020

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

Environmental Laboratories, Inc.
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NY # 11301

RCP Certification Report

October 09, 2020

SDG I.D.: GCG89663

SDG Comments

Metals Analysis:
The client requested a site specific list of elements which is shorter than the 6010 RCP list.

8270 Semi-volatile Organics:
The client requested a short list for 8270 RCP Semivolatile. Only the PAH constituents are reported as requested on the chain-of-custody.

Volatile 8260 analysis:
1,2-Dibromoethane and 1,2-Dibromo-3-chloropropane do not meet the GWP these compounds are analyzed by GC/ECD to achieve this criteria.

ETPH Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 547976 (Samples: CG89664): -----

The blank surrogate was below criteria. (% n-Pentacosane(CG87505)), all other surrogate recoveries were within criteria, the low bias affects the blank only.

The LCS and/or the LCSD recovery is below the method criteria. All of the other QC is acceptable, therefore no significant bias is suspected. (Ext. Petroleum H.C. (C9-C36))

QC Batch 548323 (Samples: CG89663): -----

One or more analytes is below the method criteria. A low bias for these analytes is possible. (Ext. Petroleum H.C. (C9-C36))

One or more surrogates is outside of criteria. (% n-Pentacosane)

Instrument:

AU-XL1 10/07/20-1 Jeff Bucko, Chemist 10/07/20

CG89663 (1X)

The initial calibration (ETPH929I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O07A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

AU-XL2 10/05/20-1 Jeff Bucko, Chemist 10/05/20

CG89664 (1X)

The initial calibration (ETPH916I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O05A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

QC (Batch Specific):

Batch 547976 (CG87505)

CG89664

All LCS recoveries were within 60 - 120 with the following exceptions: Ext. Petroleum H.C. (C9-C36)(53%)
All LCSD recoveries were within 60 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

RCP Certification Report

October 09, 2020

SDG I.D.: GCG89663

ETPH Narration

Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Batch 548323 (CG91251)

CG89663

All LCS recoveries were within 60 - 120 with the following exceptions: % n-Pentacosane(30%), Ext. Petroleum H.C. (C9-C36)(31%)
All LCSD recoveries were within 60 - 120 with the following exceptions: % n-Pentacosane(31%), Ext. Petroleum H.C. (C9-C36)(33%)
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Mercury Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

MERLIN 10/07/20 07:16 Rick Schweitzer, Chemist 10/07/20

CG89663, CG89664

The method preparation blank, ICB, and CCBs contain all of the acids and reagents as the samples.
The initial calibration met all criteria including a standard run at or below the reporting level.
All calibration verification standards (ICV, CCV) met criteria.
All calibration blank verification standards (ICB, CCB) met criteria.
The matrix spike sample is used to identify spectral interference for each batch of samples, if within 85-115%, no interference is observed and no further action is taken.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 548064 (CG89739)

CG89663, CG89664

All LCS recoveries were within 80 - 120 with the following exceptions: None.
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

BLUE 10/03/20 08:40 Cindy Pearce, Chemist 10/03/20

CG89663, CG89664

The initial calibration met criteria.
The continuing calibration standards met criteria for all the elements reported. The linear range is defined daily by the calibration range.
The continuing calibration blanks were less than the reporting level for the elements reported.

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NY # 11301

Certification Report

October 09, 2020

SDG I.D.: GCG89663

ICP Metals Narration

The ICSA and ICSAB were analyzed at the beginning and end of the run and were within criteria.The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 547995 (CG90204)

CG89663, CG89664

All LCS recoveries were within 80 - 120 with the following exceptions: None.
All LCSD recoveries were within 80 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

SVOASIM Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 547975 (Samples: CG89663, CG89664): -----

The LCS/LCSD RPD exceeds the method criteria for one or more analytes, but these analytes were not reported in the sample(s) so no variability is suspected. (2-Methylnaphthalene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(ghi)perylene, Benzo(k)fluoranthene, Chrysene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, Naphthalene)

Instrument:

CHEM27 10/05/20-1 Wes Bryon, Chemist 10/05/20

CG89663 (1X), CG89664 (1X)

For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM27/27_BNSIM18_1002):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM27/1005_03-27_BNSIM18_1002):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Batch Specific):

Batch 547975 (CG89637)

CG89663, CG89664

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RCP Certification Report

October 09, 2020

SDG I.D.: GCG89663

SVOASIM Narration

All LCS recoveries were within 30 - 130 with the following exceptions: None.
All LCSD recoveries were within 30 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: 2-Methylnaphthalene(22.5%), Benzo(a)pyrene(32.9%), Benzo(b)fluoranthene(31.9%), Benzo(ghi)perylene(43.1%), Benzo(k)fluoranthene(33.9%), Chrysene(23.3%), Dibenz(a,h)anthracene(52.6%), Indeno(1,2,3-cd)pyrene(48.0%), Naphthalene(23.3%)
Additional 8270 criteria:20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

VOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

CHEM15 10/02/20-2 Harry Mullin, Chemist 10/02/20

CG89663 (1X), CG89664 (1X)

Initial Calibration Evaluation (CHEM15/VOA15-100220):
92% of target compounds met criteria.
The following compounds had %RSDs >20%: Bromomethane 23% (20%), Chloroethane 23% (20%), Isopropylbenzene 21% (20%), Methylene chloride 23% (20%), Naphthalene 28% (20%), p-Isopropyltoluene 22% (20%), Styrene 22% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: None.
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM15/1002B18-VOA15-100220):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

QC (Batch Specific):

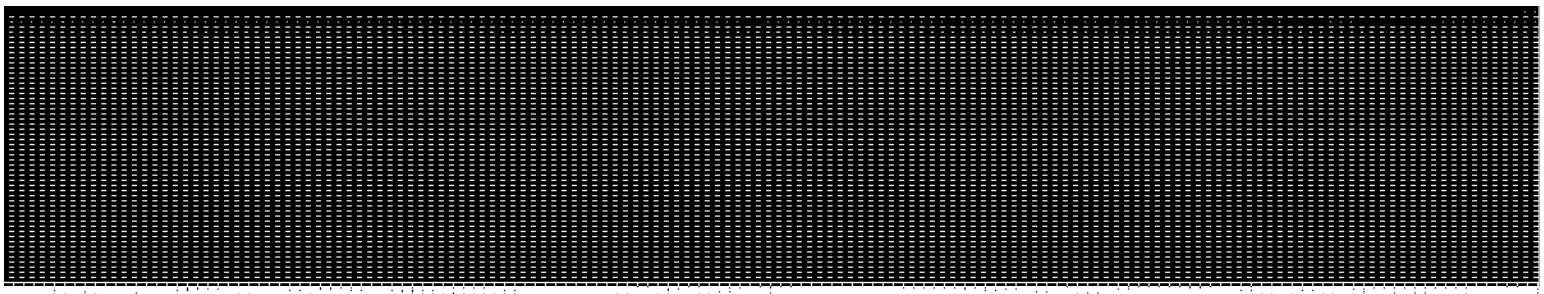
Batch 548162 (CG89659) CHEM15 10/2/2020-2

CG89663(1X), CG89664(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
A LCS and LCS Duplicate were performed instead of a matrix spike and matrix spike duplicate.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Temperature Narration

The samples were received at 1.6C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)



Friday, October 16, 2020

Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Project ID: 31402701.000 (64 CAM)
SDG ID: GCG93880
Sample ID#s: CG93880 - CG93896

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 16, 2020

SDG I.D.: GCG93880

Project ID: 31402701.000 (64 CAM)

Client Id	Lab Id	Matrix
TP-1	CG93880	SOIL
TP-2	CG93881	SOIL
TP-3	CG93882	SOIL
TP-4	CG93883	SOIL
TP-7	CG93884	SOIL
TP-8	CG93885	SOIL
TP-9	CG93886	SOIL
B1 (26-28)	CG93887	SOIL
B1 (36-38)	CG93888	SOIL
B2 (17-19)	CG93889	SOIL
B2 (22-24)	CG93890	SOIL
B2 (30-32)	CG93891	SOIL
B3 (11-13)	CG93892	SOIL
B4 (16-18)	CG93893	SOIL
B4 (20-22)	CG93894	SOIL
B5 (16-18)	CG93895	SOIL
B5 (25-27)	CG93896	SOIL

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93880

Project ID: 31402701.000 (64 CAM)
Client ID: TP-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	21.6	0.38	mg/Kg	1	10/09/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	88		%		10/08/20	CAJ	SW846-%Solid
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	57	57	mg/Kg	1	10/09/20	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	84		%	1	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	77		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	73		%	10	10/12/20	SC	30 - 150 %

Ver 1

Project ID: 31402701.000 (64 CAM)
Client ID: TP-1

Phoenix I.D.: CG93880

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
% TCMX	74		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	72		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	300	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.5	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-1

Phoenix I.D.: CG93880

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Hexachlorobutadiene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	35	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	5.9	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	100		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	90		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	95		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

Project ID: 31402701.000 (64 CAM) Phoenix I.D.: CG93880

Client ID: TP-1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By

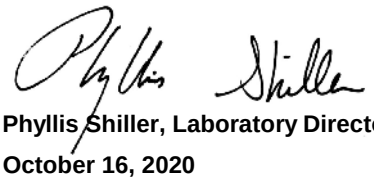
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C14 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

October 16, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93881

Project ID: 31402701.000 (64 CAM)
Client ID: TP-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	3.30	0.75	mg/Kg	1	10/09/20	EK	SW6010D
Cadmium	1.03	0.38	mg/Kg	1	10/09/20	EK	SW6010D
Chromium	23.4	0.38	mg/Kg	1	10/09/20	EK	SW6010D
Copper	25.5	0.8	mg/kg	1	10/09/20	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/12/20	RS	SW7471B
Nickel	16.6	0.38	mg/Kg	1	10/09/20	EK	SW6010D
Lead	14.7	0.38	mg/Kg	1	10/09/20	EK	SW6010D
Percent Solid	91		%		10/08/20	CAJ	SW846-%Solid
Mercury Digestion	Completed				10/09/20	VT/ARW	SW7471B
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
Soil Extraction for SVOA PAH	Completed				10/08/20	K/M	SW3546
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	72	55	mg/Kg	1	10/09/20	JRB	CTETPH 8015D
Identification	**		mg/Kg	1	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	71		%	1	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	360	ug/Kg	10	10/12/20	SC	SW8082A

Ver 1

Project ID: 31402701.000 (64 CAM)
Client ID: TP-2

Phoenix I.D.: CG93881

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	84		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	82		%	10	10/12/20	SC	30 - 150 %
% TCMX	82		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	79		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	2.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	24	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	24	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	240	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-2

Phoenix I.D.: CG93881

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	2.9	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	29	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	9.6	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	9.6	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	9.6	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	9.6	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	9.6	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	100		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	91		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	95		%	1	10/13/20	JLI	70 - 130 %
Polynuclear Aromatic HC							
2-Methylnaphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthylene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Anthracene	320	250	ug/Kg	1	10/09/20	AW	SW8270D
Benz(a)anthracene	860	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(a)pyrene	770	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(b)fluoranthene	650	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(ghi)perylene	340	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(k)fluoranthene	640	250	ug/Kg	1	10/09/20	AW	SW8270D
Chrysene	830	250	ug/Kg	1	10/09/20	AW	SW8270D
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluoranthene	1800	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluorene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D

Project ID: 31402701.000 (64 CAM)
Client ID: TP-2

Phoenix I.D.: CG93881

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	460	250	ug/Kg	1	10/09/20	AW	SW8270D
Naphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Phenanthrene	940	250	ug/Kg	1	10/09/20	AW	SW8270D
Pyrene	1400	250	ug/Kg	1	10/09/20	AW	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	65		%	1	10/09/20	AW	30 - 130 %
% Nitrobenzene-d5	70		%	1	10/09/20	AW	30 - 130 %
% Terphenyl-d14	89		%	1	10/09/20	AW	30 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

TPH Comment:
**Petroleum hydrocarbon chromatogram contains a multicomponent hydrocarbon distribution in the range of C14 to C36. The sample was quantitated against a C9-C36 alkane hydrocarbon standard.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93882

Project ID: 31402701.000 (64 CAM)
Client ID: TP-3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	3.78	0.71	mg/Kg	1	10/09/20	EK	SW6010D
Cadmium	1.11	0.36	mg/Kg	1	10/09/20	EK	SW6010D
Chromium	26.3	0.36	mg/Kg	1	10/09/20	EK	SW6010D
Copper	27.0	0.7	mg/kg	1	10/09/20	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/12/20	RS	SW7471B
Nickel	17.9	0.36	mg/Kg	1	10/09/20	EK	SW6010D
Lead	15.9	0.36	mg/Kg	1	10/09/20	EK	SW6010D
Percent Solid	91		%		10/08/20	CAJ	SW846-%Solid
Mercury Digestion	Completed				10/09/20	VT/ARW	SW7471B
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
Soil Extraction for SVOA PAH	Completed				10/08/20	K/M	SW3546
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	270	mg/Kg	5	10/09/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	5	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	69		%	5	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	360	ug/Kg	10	10/12/20	SC	SW8082A

Ver 1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	80		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	79		%	10	10/12/20	SC	30 - 150 %
% TCMX	77		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	76		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.3	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	270	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-3

Phoenix I.D.: CG93882

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.3	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	33	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	101		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	88		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %
Polynuclear Aromatic HC							
2-Methylnaphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthylene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benz(a)anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(a)pyrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(b)fluoranthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(ghi)perylene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(k)fluoranthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Chrysene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluoranthene	470	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluorene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D

Project ID: 31402701.000 (64 CAM)
Client ID: TP-3

Phoenix I.D.: CG93882

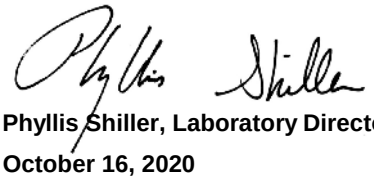
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Naphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Phenanthrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Pyrene	400	250	ug/Kg	1	10/09/20	AW	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	73		%	1	10/09/20	AW	30 - 130 %
% Nitrobenzene-d5	81		%	1	10/09/20	AW	30 - 130 %
% Terphenyl-d14	97		%	1	10/09/20	AW	30 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93883

Project ID: 31402701.000 (64 CAM)
Client ID: TP-4

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	2.95	0.69	mg/Kg	1	10/09/20	EK	SW6010D
Cadmium	1.58	0.35	mg/Kg	1	10/09/20	EK	SW6010D
Chromium	34.8	0.35	mg/Kg	1	10/09/20	EK	SW6010D
Copper	12.5	0.7	mg/kg	1	10/09/20	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/12/20	RS	SW7471B
Nickel	15.5	0.35	mg/Kg	1	10/09/20	EK	SW6010D
Lead	3.45	0.35	mg/Kg	1	10/09/20	EK	SW6010D
Percent Solid	94		%		10/08/20	CAJ	SW846-%Solid
Mercury Digestion	Completed				10/09/20	VT/ARW	SW7471B
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
Soil Extraction for SVOA PAH	Completed				10/08/20	K/M	SW3546
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	53	mg/Kg	1	10/09/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	1	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	85		%	1	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A

Project ID: 31402701.000 (64 CAM)
Client ID: TP-4

Phoenix I.D.: CG93883

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	85		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	85		%	10	10/12/20	SC	30 - 150 %
% TCMX	83		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	81		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.8	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	32	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	32	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	320	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-4

Phoenix I.D.: CG93883

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.8	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	6.4	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	100		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	95		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	97		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	98		%	1	10/13/20	JLI	70 - 130 %
Polynuclear Aromatic HC							
2-Methylnaphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Acenaphthylene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benz(a)anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(a)pyrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(b)fluoranthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(ghi)perylene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Benzo(k)fluoranthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Chrysene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Dibenz(a,h)anthracene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluoranthene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Fluorene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D

Project ID: 31402701.000 (64 CAM)
Client ID: TP-4

Phoenix I.D.: CG93883

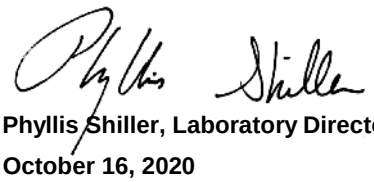
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Naphthalene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Phenanthrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
Pyrene	ND	250	ug/Kg	1	10/09/20	AW	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	70		%	1	10/09/20	AW	30 - 130 %
% Nitrobenzene-d5	66		%	1	10/09/20	AW	30 - 130 %
% Terphenyl-d14	77		%	1	10/09/20	AW	30 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93884

Project ID: 31402701.000 (64 CAM)
Client ID: TP-7

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	235	0.37	mg/Kg	1	10/09/20	EK	SW6010D
SPLP Lead	0.022	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	88		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	70		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	66		%	10	10/12/20	SC	30 - 150 %
% TCMX	68		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	66		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.7	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-7

Phoenix I.D.: CG93884

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	31	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	31	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	310	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	37	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-7

Phoenix I.D.: CG93884

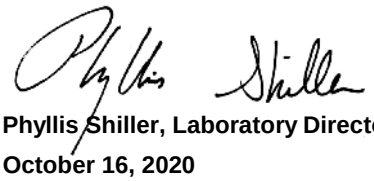
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	6.1	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	83		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	100		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93885

Project ID: 31402701.000 (64 CAM)
Client ID: TP-8

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	4.99	0.34	mg/Kg	1	10/09/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	94		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/08/20	TH/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	92		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	90		%	10	10/12/20	SC	30 - 150 %
% TCMX	87		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	84		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.3	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-8

Phoenix I.D.: CG93885

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	270	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.3	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	33	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM) Phoenix I.D.: CG93885
Client ID: TP-8

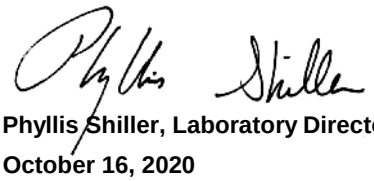
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	11	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	5.5	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	101		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	91		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	87		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	96		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93886

Project ID: 31402701.000 (64 CAM)
Client ID: TP-9

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	29.4	0.39	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	82		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	400	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	94		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	92		%	10	10/12/20	SC	30 - 150 %
% TCMX	92		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	88		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.6	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-9

Phoenix I.D.: CG93886

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	300	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	36	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: TP-9

Phoenix I.D.: CG93886

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	89		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	92		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

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Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	10:30
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93887

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (26-28)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	3.99	0.33	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	92		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	85		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	83		%	10	10/12/20	SC	30 - 150 %
% TCMX	81		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	79		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (26-28)

Phoenix I.D.: CG93887

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	380	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	46	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (26-28)

Phoenix I.D.: CG93887

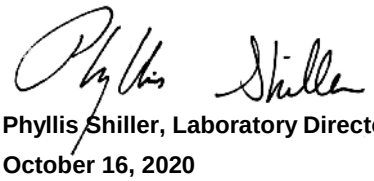
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	97		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	94		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	91		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	93		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	10:50
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93888

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (36-38)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	5.65	0.34	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	89		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	84		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	83		%	10	10/12/20	SC	30 - 150 %
% TCMX	86		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	84		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (36-38)

Phoenix I.D.: CG93888

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	380	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	46	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B1 (36-38)

Phoenix I.D.: CG93888

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Naphthalene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Propylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
o-Xylene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
p-Isopropyltoluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
sec-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Styrene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
tert-Butylbenzene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrachloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C	
Toluene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Total Xylenes	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichloroethene	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorofluoromethane	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C	
Vinyl chloride	ND	7.6	ug/Kg	1	10/13/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %	
% Bromofluorobenzene	93		%	1	10/13/20	JLI	70 - 130 %	
% Dibromofluoromethane	27		%	1	10/13/20	JLI	70 - 130 %	3
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %	
Field Extraction	Completed				10/07/20		SW5035A	

3 = This parameter exceeds laboratory specified limits.

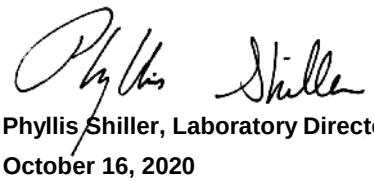
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	11:20
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93889

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (17-19)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	7.05	0.35	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	92		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	76		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	67		%	10	10/12/20	SC	30 - 150 %
% TCMX	79		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	81		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	2.8	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (17-19)

Phoenix I.D.: CG93889

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	24	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	24	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	240	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	2.8	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	28	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	9.5	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	9.5	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (17-19)

Phoenix I.D.: CG93889

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	4200	290	ug/Kg	50	10/14/20	JLI	SW8260C
n-Butylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	9.5	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	9.5	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	9.5	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	4.7	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	93		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	86		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	93		%	1	10/13/20	JLI	70 - 130 %
% 1,2-dichlorobenzene-d4 (50x)	97		%	50	10/14/20	JLI	70 - 130 %
% Bromofluorobenzene (50x)	94		%	50	10/14/20	JLI	70 - 130 %
% Dibromofluoromethane (50x)	82		%	50	10/14/20	JLI	70 - 130 %
% Toluene-d8 (50x)	96		%	50	10/14/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director

October 16, 2020

Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	11:50
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93890

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (22-24)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	7.39	0.37	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	91		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	360	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	85		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	83		%	10	10/12/20	SC	30 - 150 %
% TCMX	89		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	83		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.3	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (22-24)

Phoenix I.D.: CG93890

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	35	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	35	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	350	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.3	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	43	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	14	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	14	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (22-24)

Phoenix I.D.: CG93890

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Naphthalene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Butylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Propylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
o-Xylene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
p-Isopropyltoluene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
sec-Butylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Styrene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
tert-Butylbenzene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrachloroethene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	14	ug/Kg	1	10/13/20	JLI	SW8260C	
Toluene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Total Xylenes	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	14	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichloroethene	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorofluoromethane	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	14	ug/Kg	1	10/13/20	JLI	SW8260C	
Vinyl chloride	ND	7.1	ug/Kg	1	10/13/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	97		%	1	10/13/20	JLI	70 - 130 %	
% Bromofluorobenzene	92		%	1	10/13/20	JLI	70 - 130 %	
% Dibromofluoromethane	54		%	1	10/13/20	JLI	70 - 130 %	3
% Toluene-d8	92		%	1	10/13/20	JLI	70 - 130 %	
Field Extraction	Completed				10/07/20		SW5035A	

3 = This parameter exceeds laboratory specified limits.

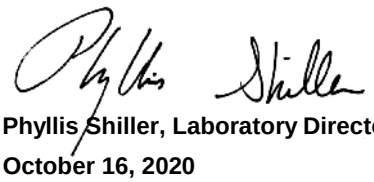
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	12:00
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93891

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (30-32)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	9.97	0.38	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	88		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	380	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	78		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	75		%	10	10/12/20	SC	30 - 150 %
% TCMX	81		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	77		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	3.6	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (30-32)

Phoenix I.D.: CG93891

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	30	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	300	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	3.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	36	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B2 (30-32)

Phoenix I.D.: CG93891

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Naphthalene	32	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Propylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
o-Xylene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
p-Isopropyltoluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
sec-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Styrene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
tert-Butylbenzene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrachloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C	
Toluene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Total Xylenes	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichloroethene	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorofluoromethane	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	12	ug/Kg	1	10/13/20	JLI	SW8260C	
Vinyl chloride	ND	6.0	ug/Kg	1	10/13/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	97		%	1	10/13/20	JLI	70 - 130 %	
% Bromofluorobenzene	91		%	1	10/13/20	JLI	70 - 130 %	
% Dibromofluoromethane	68		%	1	10/13/20	JLI	70 - 130 %	3
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %	
Field Extraction	Completed				10/07/20		SW5035A	

3 = This parameter exceeds laboratory specified limits.

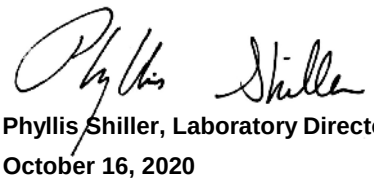
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	12:10
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93892

Project ID: 31402701.000 (64 CAM)
Client ID: B3 (11-13)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	7.95	0.34	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	93		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	77		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	74		%	10	10/12/20	SC	30 - 150 %
% TCMX	74		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	72		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	2.7	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B3 (11-13)

Phoenix I.D.: CG93892

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	23	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	23	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	230	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	2.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	9.1	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	9.1	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B3 (11-13)

Phoenix I.D.: CG93892

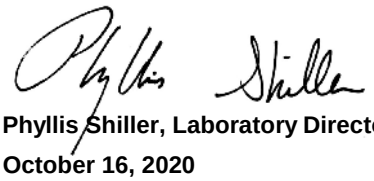
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	9.1	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	9.1	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	9.1	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	90		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	95		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	13:20
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93893

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (16-18)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	38.6	0.35	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	88		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	79		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	75		%	10	10/12/20	SC	30 - 150 %
% TCMX	82		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	76		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (16-18)

Phoenix I.D.: CG93893

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	38	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	380	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.6	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	46	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (16-18)

Phoenix I.D.: CG93893

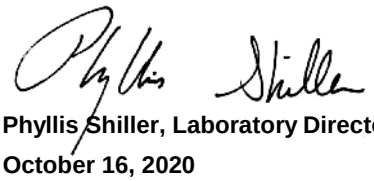
Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Naphthalene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	15	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	7.7	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	97		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	90		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	96		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	93		%	1	10/13/20	JLI	70 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	13:30
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93894

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (20-22)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	15.9	0.38	mg/Kg	1	10/10/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	10/10/20	EK	SW6010D
SPLP Metals Digestion	Completed				10/09/20	VT/ARW	SW3010A
Percent Solid	89		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
SPLP Extraction for Metals	Completed				10/08/20	ARW	SW1312
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
Polychlorinated Biphenyls							
PCB-1016	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1262	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	370	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	51		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	50		%	10	10/12/20	SC	30 - 150 %
% TCMX	52		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	49		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (20-22)

Phoenix I.D.: CG93894

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
1,1,2-Trichloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	7.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	40	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	40	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	400	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,3-Dichloropropene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.8	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	48	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	16	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	16	ug/Kg	1	10/13/20	JLI	SW8260C

Project ID: 31402701.000 (64 CAM)
Client ID: B4 (20-22)

Phoenix I.D.: CG93894

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By		
Naphthalene	460	380	ug/Kg	50	10/14/20	JLI	SW8260C	
n-Butylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
n-Propylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
o-Xylene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
p-Isopropyltoluene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
sec-Butylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Styrene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
tert-Butylbenzene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrachloroethene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Tetrahydrofuran (THF)	ND	16	ug/Kg	1	10/13/20	JLI	SW8260C	
Toluene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Total Xylenes	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,2-Dichloroethene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,3-Dichloropropene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
trans-1,4-dichloro-2-butene	ND	16	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichloroethene	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorofluoromethane	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
Trichlorotrifluoroethane	ND	16	ug/Kg	1	10/13/20	JLI	SW8260C	
Vinyl chloride	ND	7.9	ug/Kg	1	10/13/20	JLI	SW8260C	
QA/QC Surrogates								
% 1,2-dichlorobenzene-d4	96		%	1	10/13/20	JLI	70 - 130 %	
% Bromofluorobenzene	87		%	1	10/13/20	JLI	70 - 130 %	
% Dibromofluoromethane	58		%	1	10/13/20	JLI	70 - 130 %	3
% Toluene-d8	91		%	1	10/13/20	JLI	70 - 130 %	
% 1,2-dichlorobenzene-d4 (50x)	99		%	50	10/14/20	JLI	70 - 130 %	
% Bromofluorobenzene (50x)	94		%	50	10/14/20	JLI	70 - 130 %	
% Dibromofluoromethane (50x)	83		%	50	10/14/20	JLI	70 - 130 %	
% Toluene-d8 (50x)	94		%	50	10/14/20	JLI	70 - 130 %	
Field Extraction	Completed				10/07/20		SW5035A	

3 = This parameter exceeds laboratory specified limits.

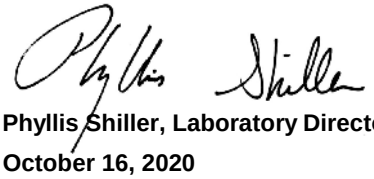
RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

Volatile Comment:
Poor surrogate recovery was observed for volatiles due to matrix interference. Sample was analyzed twice with similar results.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.



Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Ver 1

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	13:45
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93895

Project ID: 31402701.000 (64 CAM)
Client ID: B5 (16-18)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	2.05	0.68	mg/Kg	1	10/10/20	EK	SW6010D
Cadmium	1.29	0.34	mg/Kg	1	10/10/20	EK	SW6010D
Chromium	17.7	0.34	mg/Kg	1	10/10/20	EK	SW6010D
Copper	6.1	0.7	mg/kg	1	10/10/20	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/12/20	RS	SW7471B
Nickel	7.36	0.34	mg/Kg	1	10/10/20	EK	SW6010D
Lead	2.41	0.34	mg/Kg	1	10/10/20	EK	SW6010D
Percent Solid	96		%		10/08/20	CAJ	SW846-%Solid
Mercury Digestion	Completed				10/09/20	VT/ARW	SW7471B
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for PCB	Completed				10/09/20	K/M	SW3545A
Soil Extraction for SVOA PAH	Completed				10/08/20	K/M	SW3546
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	52	mg/Kg	1	10/09/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	1	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	64		%	1	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	88		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	85		%	10	10/12/20	SC	30 - 150 %
% TCMX	85		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	81		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	4.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	5.0	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	33	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	33	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	330	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	4.0	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	40	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	13	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	6.7	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	99		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	95		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	98		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	94		%	1	10/13/20	JLI	70 - 130 %

Polynuclear Aromatic HC

2-Methylnaphthalene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Acenaphthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Acenaphthylene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benz(a)anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(a)pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(b)fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(ghi)perylene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(k)fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Chrysene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Fluorene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D

Project ID: 31402701.000 (64 CAM)
Client ID: B5 (16-18)

Phoenix I.D.: CG93895

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Naphthalene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Phenanthrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	77		%	1	10/09/20	WB	30 - 130 %
% Nitrobenzene-d5	77		%	1	10/09/20	WB	30 - 130 %
% Terphenyl-d14	85		%	1	10/09/20	WB	30 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 16, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	10/07/20	14:00
Location Code:	WSP	Received by:	SW	10/08/20	16:20
Rush Request:	Standard	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCG93880
Phoenix ID: CG93896

Project ID: 31402701.000 (64 CAM)
Client ID: B5 (25-27)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Arsenic	1.91	0.72	mg/Kg	1	10/10/20	EK	SW6010D
Cadmium	1.27	0.36	mg/Kg	1	10/10/20	EK	SW6010D
Chromium	16.9	0.36	mg/Kg	1	10/10/20	EK	SW6010D
Copper	8.5	0.7	mg/kg	1	10/10/20	EK	SW6010D
Mercury	< 0.03	0.03	mg/Kg	2	10/12/20	RS	SW7471B
Nickel	7.48	0.36	mg/Kg	1	10/10/20	EK	SW6010D
Lead	3.01	0.36	mg/Kg	1	10/10/20	EK	SW6010D
Percent Solid	95		%		10/08/20	CAJ	SW846-%Solid
Soil Extraction for PCB	Completed				10/09/20	K/N	SW3545A
Mercury Digestion	Completed				10/09/20	VT/ARW	SW7471B
Extraction of CT ETPH	Completed				10/08/20	G/E	SW3546
Soil Extraction for SVOA PAH	Completed				10/08/20	K/M	SW3546
Total Metals Digest	Completed				10/09/20	B/AG/BF	SW3050B
TPH by GC (Extractable Products)							
Ext. Petroleum H.C. (C9-C36)	ND	51	mg/Kg	1	10/09/20	JRB	CTETPH 8015D
Identification	ND		mg/Kg	1	10/09/20	JRB	CTETPH 8015D
QA/QC Surrogates							
% n-Pentacosane	74		%	1	10/09/20	JRB	50 - 150 %
Polychlorinated Biphenyls							
PCB-1016	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1221	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1232	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1242	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1248	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1254	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1260	ND	350	ug/Kg	10	10/12/20	SC	SW8082A

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
PCB-1262	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
PCB-1268	ND	350	ug/Kg	10	10/12/20	SC	SW8082A
QA/QC Surrogates							
% DCBP	106		%	10	10/12/20	SC	30 - 150 %
% DCBP (Confirmation)	105		%	10	10/12/20	SC	30 - 150 %
% TCMX	100		%	10	10/12/20	SC	30 - 150 %
% TCMX (Confirmation)	99		%	10	10/12/20	SC	30 - 150 %
Volatiles							
1,1,1,2-Tetrachloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,1-Trichloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2,2-Tetrachloroethane	ND	2.7	ug/Kg	1	10/13/20	JLI	SW8260C
1,1,2-Trichloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloroethene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,1-Dichloropropene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,3-Trichloropropane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trichlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2,4-Trimethylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromo-3-chloropropane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dibromoethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,2-Dichloropropane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3,5-Trimethylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,3-Dichloropropane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
1,4-Dichlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
2,2-Dichloropropane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
2-Chlorotoluene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
2-Hexanone	ND	22	ug/Kg	1	10/13/20	JLI	SW8260C
2-Isopropyltoluene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
4-Chlorotoluene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
4-Methyl-2-pentanone	ND	22	ug/Kg	1	10/13/20	JLI	SW8260C
Acetone	ND	220	ug/Kg	1	10/13/20	JLI	SW8260C
Acrylonitrile	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Benzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromochloromethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromodichloromethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromoform	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Bromomethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon Disulfide	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Carbon tetrachloride	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chlorobenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloroform	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Chloromethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
cis-1,2-Dichloroethene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
cis-1,3-Dichloropropene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromochloromethane	ND	2.7	ug/Kg	1	10/13/20	JLI	SW8260C
Dibromomethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Dichlorodifluoromethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Ethylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Hexachlorobutadiene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Isopropylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
m&p-Xylene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl Ethyl Ketone	ND	27	ug/Kg	1	10/13/20	JLI	SW8260C
Methyl t-butyl ether (MTBE)	ND	8.8	ug/Kg	1	10/13/20	JLI	SW8260C
Methylene chloride	ND	8.8	ug/Kg	1	10/13/20	JLI	SW8260C
Naphthalene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
n-Butylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
n-Propylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
o-Xylene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
p-Isopropyltoluene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
sec-Butylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Styrene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
tert-Butylbenzene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrachloroethene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Tetrahydrofuran (THF)	ND	8.8	ug/Kg	1	10/13/20	JLI	SW8260C
Toluene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Total Xylenes	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,2-Dichloroethene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,3-Dichloropropene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
trans-1,4-dichloro-2-butene	ND	8.8	ug/Kg	1	10/13/20	JLI	SW8260C
Trichloroethene	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorofluoromethane	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
Trichlorotrifluoroethane	ND	8.8	ug/Kg	1	10/13/20	JLI	SW8260C
Vinyl chloride	ND	4.4	ug/Kg	1	10/13/20	JLI	SW8260C
QA/QC Surrogates							
% 1,2-dichlorobenzene-d4	98		%	1	10/13/20	JLI	70 - 130 %
% Bromofluorobenzene	93		%	1	10/13/20	JLI	70 - 130 %
% Dibromofluoromethane	94		%	1	10/13/20	JLI	70 - 130 %
% Toluene-d8	93		%	1	10/13/20	JLI	70 - 130 %

Polynuclear Aromatic HC

2-Methylnaphthalene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Acenaphthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Acenaphthylene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benz(a)anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(a)pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(b)fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(ghi)perylene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Benzo(k)fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Chrysene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Dibenz(a,h)anthracene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Fluoranthene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Fluorene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D

Project ID: 31402701.000 (64 CAM)
Client ID: B5 (25-27)

Phoenix I.D.: CG93896

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	
Indeno(1,2,3-cd)pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Naphthalene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Phenanthrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
Pyrene	ND	240	ug/Kg	1	10/09/20	WB	SW8270D
QA/QC Surrogates							
% 2-Fluorobiphenyl	79		%	1	10/09/20	WB	30 - 130 %
% Nitrobenzene-d5	86		%	1	10/09/20	WB	30 - 130 %
% Terphenyl-d14	86		%	1	10/09/20	WB	30 - 130 %
Field Extraction	Completed				10/07/20		SW5035A

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level
QA/QC Surrogates: Surrogates are compounds (preceeded with a %) added by the lab to determine analysis efficiency. Surrogate results(%) listed in the report are not "detected" compounds.

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
October 16, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 16, 2020

QA/QC Data

SDG I.D.: GCG93880

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 548872 (mg/kg), QC Sample No: CG93883 2X (CG93881, CG93882, CG93883, CG93895, CG93896)													
Mercury - Soil	BRL	0.02	<0.03	<0.03	NC	97.8	101	3.2	88.3	95.6	7.9	70 - 130	30
Comment:													
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.													
QA/QC Batch 548759 (mg/kg), QC Sample No: CG93882 (CG93880, CG93881, CG93882, CG93883, CG93884, CG93885)													
ICP Metals - Soil													
Arsenic	BRL	0.67	3.78	3.38	NC	99.6	101	1.4	107			75 - 125	35
Cadmium	BRL	0.33	1.11	1.04	NC	93.9	98.2	4.5	107			75 - 125	35
Chromium	BRL	0.33	26.3	25.1	4.70	103	108	4.7	111			75 - 125	35
Copper	BRL	0.67	27.0	24.8	8.50	110	113	2.7	106			75 - 125	35
Lead	BRL	0.33	15.9	13.6	15.6	95.9	100	4.2	112			75 - 125	35
Nickel	BRL	0.33	17.9	17.5	2.30	100	104	3.9	110			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													
QA/QC Batch 548877 (mg/kg), QC Sample No: CG93886 (CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895, CG93896)													
ICP Metals - Soil													
Arsenic	BRL	0.67	2.83	2.98	NC	98.6	90.8	8.2	83.6			75 - 125	35
Cadmium	BRL	0.33	0.77	0.74	NC	94.1	92.1	2.1	80.2			75 - 125	35
Chromium	BRL	0.33	26.9	25.8	4.20	105	98.2	6.7	87.7			75 - 125	35
Copper	BRL	0.67	23.5	22.4	4.80	112	104	7.4	103			75 - 125	35
Lead	BRL	0.33	29.4	28.5	3.10	102	92.7	9.6	84.2			75 - 125	35
Nickel	BRL	0.33	11.2	11.1	0.90	101	98.5	2.5	82.4			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													
QA/QC Batch 548851 (mg/L), QC Sample No: CG93886 (CG93880, CG93884, CG93885, CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894)													
ICP Metals - SPLP Extraction													
Lead	BRL	0.010	<0.010	<0.010	NC	104	95.1	8.9	98.9			80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

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QA/QC Report

October 16, 2020

QA/QC Data

SDG I.D.: GCG93880

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 548727 (mg/Kg), QC Sample No: CG93882 (CG93880, CG93881, CG93882, CG93883, CG93895, CG93896)										
TPH by GC (Extractable Products) - Soil										
Ext. Petroleum H.C. (C9-C36)	ND	50	109	102	6.6	97	98	1.0	60 - 120	30
% n-Pentacosane	83	%	85	81	4.8	72	87	18.9	50 - 150	30
Comment:										
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.										
QA/QC Batch 548923 (ug/Kg), QC Sample No: CG93882 2X (CG93880, CG93881, CG93882, CG93883, CG93884, CG93885, CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895)										
Polychlorinated Biphenyls - Soil										
PCB-1016	ND	33	73	78	6.6	84	67	22.5	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	77	82	6.3	82	65	23.1	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	66	%	82	89	8.2	90	70	25.0	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	66	%	83	92	10.3	91	71	24.7	30 - 150	30
% TCMX (Surrogate Rec)	67	%	79	79	0.0	86	70	20.5	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	66	%	80	82	2.5	87	72	18.9	30 - 150	30
QA/QC Batch 548932 (ug/Kg), QC Sample No: CG94409 2X (CG93896)										
Polychlorinated Biphenyls - Soil										
PCB-1016	ND	33	97	94	3.1	71	73	2.8	40 - 140	30
PCB-1221	ND	33							40 - 140	30
PCB-1232	ND	33							40 - 140	30
PCB-1242	ND	33							40 - 140	30
PCB-1248	ND	33							40 - 140	30
PCB-1254	ND	33							40 - 140	30
PCB-1260	ND	33	98	102	4.0	73	78	6.6	40 - 140	30
PCB-1262	ND	33							40 - 140	30
PCB-1268	ND	33							40 - 140	30
% DCBP (Surrogate Rec)	93	%	110	114	3.6	83	88	5.8	30 - 150	30
% DCBP (Surrogate Rec) (Confirm	85	%	107	106	0.9	78	71	9.4	30 - 150	30
% TCMX (Surrogate Rec)	86	%	96	99	3.1	72	75	4.1	30 - 150	30
% TCMX (Surrogate Rec) (Confirm	84	%	96	99	3.1	70	74	5.6	30 - 150	30
QA/QC Batch 548749 (ug/kg), QC Sample No: CG94141 (CG93881, CG93882, CG93883, CG93895, CG93896)										
Semivolatiles - Soil										
2-Methylnaphthalene	ND	230	73	76	4.0	76	75	1.3	40 - 140	30
Acenaphthene	ND	230	80	78	2.5	76	75	1.3	30 - 130	30

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Acenaphthylene	ND	130	73	72	1.4	68	66	3.0	40 - 140	30	
Anthracene	ND	230	80	78	2.5	74	76	2.7	40 - 140	30	
Benz(a)anthracene	ND	230	85	82	3.6	85	83	2.4	40 - 140	30	
Benzo(a)pyrene	ND	130	95	92	3.2	96	93	3.2	40 - 140	30	
Benzo(b)fluoranthene	ND	160	103	100	3.0	101	99	2.0	40 - 140	30	
Benzo(ghi)perylene	ND	230	91	81	11.6	88	80	9.5	40 - 140	30	
Benzo(k)fluoranthene	ND	230	69	65	6.0	61	57	6.8	40 - 140	30	
Chrysene	ND	230	85	80	6.1	82	81	1.2	40 - 140	30	
Dibenz(a,h)anthracene	ND	130	92	83	10.3	90	87	3.4	40 - 140	30	
Fluoranthene	ND	230	84	81	3.6	79	77	2.6	40 - 140	30	
Fluorene	ND	230	82	78	5.0	78	75	3.9	40 - 140	30	
Indeno(1,2,3-cd)pyrene	ND	230	89	82	8.2	87	80	8.4	40 - 140	30	
Naphthalene	ND	230	68	70	2.9	70	67	4.4	40 - 140	30	
Phenanthrene	ND	130	79	76	3.9	72	76	5.4	40 - 140	30	
Pyrene	ND	230	86	82	4.8	81	78	3.8	30 - 130	30	
% 2-Fluorobiphenyl	68	%	72	67	7.2	70	68	2.9	30 - 130	30	
% Nitrobenzene-d5	62	%	64	75	15.8	74	72	2.7	30 - 130	30	
% Terphenyl-d14	85	%	87	80	8.4	85	87	2.3	30 - 130	30	

Comment:

Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

QA/QC Batch 549389 (ug/kg), QC Sample No: CG93832 (CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895, CG93896)

Volatiles - Soil (Low Level)

1,1,1,2-Tetrachloroethane	ND	5.0	105	105	0.0	97	99	2.0	70 - 130	30	
1,1,1-Trichloroethane	ND	5.0	82	89	8.2	82	84	2.4	70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0	95	98	3.1	84	82	2.4	70 - 130	30	
1,1,2-Trichloroethane	ND	5.0	94	95	1.1	90	88	2.2	70 - 130	30	
1,1-Dichloroethane	ND	5.0	82	85	3.6	80	83	3.7	70 - 130	30	
1,1-Dichloroethene	ND	5.0	89	94	5.5	85	88	3.5	70 - 130	30	
1,1-Dichloropropene	ND	5.0	91	91	0.0	83	85	2.4	70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0	97	104	7.0	89	87	2.3	70 - 130	30	
1,2,3-Trichloropropane	ND	5.0	94	92	2.2	89	88	1.1	70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0	100	104	3.9	86	85	1.2	70 - 130	30	
1,2,4-Trimethylbenzene	ND	1.0	97	96	1.0	84	84	0.0	70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0	98	103	5.0	95	93	2.1	70 - 130	30	
1,2-Dibromoethane	ND	5.0	94	96	2.1	90	90	0.0	70 - 130	30	
1,2-Dichlorobenzene	ND	5.0	98	98	0.0	89	89	0.0	70 - 130	30	
1,2-Dichloroethane	ND	5.0	93	94	1.1	87	89	2.3	70 - 130	30	
1,2-Dichloropropane	ND	5.0	92	93	1.1	88	88	0.0	70 - 130	30	
1,3,5-Trimethylbenzene	ND	1.0	97	97	0.0	85	86	1.2	70 - 130	30	
1,3-Dichlorobenzene	ND	5.0	97	98	1.0	86	87	1.2	70 - 130	30	
1,3-Dichloropropane	ND	5.0	91	94	3.2	89	90	1.1	70 - 130	30	
1,4-Dichlorobenzene	ND	5.0	98	98	0.0	86	87	1.2	70 - 130	30	
2,2-Dichloropropane	ND	5.0	87	90	3.4	82	84	2.4	70 - 130	30	
2-Chlorotoluene	ND	5.0	95	97	2.1	88	87	1.1	70 - 130	30	
2-Hexanone	ND	25	115	123	6.7	119	116	2.6	70 - 130	30	
2-Isopropyltoluene	ND	5.0	104	106	1.9	96	95	1.0	70 - 130	30	
4-Chlorotoluene	ND	5.0	96	96	0.0	85	87	2.3	70 - 130	30	
4-Methyl-2-pentanone	ND	25	93	94	1.1	91	90	1.1	70 - 130	30	
Acetone	ND	10	136	144	5.7	157	172	9.1	70 - 130	30	l,m
Acrylonitrile	ND	5.0	81	85	4.8	81	82	1.2	70 - 130	30	

QA/QC Data

SDG I.D.: GCG93880

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
Benzene	ND	1.0	92	93	1.1	86	87	1.2	70 - 130	30	
Bromobenzene	ND	5.0	100	99	1.0	92	91	1.1	70 - 130	30	
Bromochloromethane	ND	5.0	86	92	6.7	85	85	0.0	70 - 130	30	
Bromodichloromethane	ND	5.0	103	103	0.0	93	95	2.1	70 - 130	30	
Bromoform	ND	5.0	108	106	1.9	97	96	1.0	70 - 130	30	
Bromomethane	ND	5.0	100	103	3.0	87	93	6.7	70 - 130	30	
Carbon Disulfide	ND	5.0	98	103	5.0	88	92	4.4	70 - 130	30	
Carbon tetrachloride	ND	5.0	91	95	4.3	86	90	4.5	70 - 130	30	
Chlorobenzene	ND	5.0	96	98	2.1	90	92	2.2	70 - 130	30	
Chloroethane	ND	5.0	91	97	6.4	87	92	5.6	70 - 130	30	
Chloroform	ND	5.0	82	88	7.1	81	84	3.6	70 - 130	30	
Chloromethane	ND	5.0	74	78	5.3	69	71	2.9	70 - 130	30	m
cis-1,2-Dichloroethene	ND	5.0	79	83	4.9	77	80	3.8	70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0	98	99	1.0	89	92	3.3	70 - 130	30	
Dibromochloromethane	ND	3.0	111	113	1.8	104	106	1.9	70 - 130	30	
Dibromomethane	ND	5.0	90	91	1.1	85	86	1.2	70 - 130	30	
Dichlorodifluoromethane	ND	5.0	81	84	3.6	71	72	1.4	70 - 130	30	
Ethylbenzene	ND	1.0	95	97	2.1	89	89	0.0	70 - 130	30	
Hexachlorobutadiene	ND	5.0	103	111	7.5	85	81	4.8	70 - 130	30	
Isopropylbenzene	ND	1.0	96	99	3.1	88	89	1.1	70 - 130	30	
m&p-Xylene	ND	2.0	95	97	2.1	88	89	1.1	70 - 130	30	
Methyl ethyl ketone	ND	5.0	105	116	10.0	112	110	1.8	70 - 130	30	
Methyl t-butyl ether (MTBE)	ND	1.0	91	94	3.2	92	84	9.1	70 - 130	30	
Methylene chloride	ND	5.0	82	86	4.8	80	82	2.5	70 - 130	30	
Naphthalene	ND	5.0	96	102	6.1	87	83	4.7	70 - 130	30	
n-Butylbenzene	ND	1.0	96	98	2.1	79	79	0.0	70 - 130	30	
n-Propylbenzene	ND	1.0	97	97	0.0	87	86	1.2	70 - 130	30	
o-Xylene	ND	2.0	96	98	2.1	90	91	1.1	70 - 130	30	
p-Isopropyltoluene	ND	1.0	98	100	2.0	86	85	1.2	70 - 130	30	
sec-Butylbenzene	ND	1.0	103	104	1.0	91	91	0.0	70 - 130	30	
Styrene	ND	5.0	96	97	1.0	88	90	2.2	70 - 130	30	
tert-Butylbenzene	ND	1.0	98	99	1.0	90	89	1.1	70 - 130	30	
Tetrachloroethene	ND	5.0	97	99	2.0	87	89	2.3	70 - 130	30	
Tetrahydrofuran (THF)	ND	5.0	76	83	8.8	78	78	0.0	70 - 130	30	
Toluene	ND	1.0	93	96	3.2	88	89	1.1	70 - 130	30	
trans-1,2-Dichloroethene	ND	5.0	94	99	5.2	93	93	0.0	70 - 130	30	
trans-1,3-Dichloropropene	ND	5.0	99	101	2.0	91	91	0.0	70 - 130	30	
trans-1,4-dichloro-2-butene	ND	5.0	124	125	0.8	114	111	2.7	70 - 130	30	
Trichloroethene	ND	5.0	94	95	1.1	95	96	1.0	70 - 130	30	
Trichlorofluoromethane	ND	5.0	89	95	6.5	85	87	2.3	70 - 130	30	
Trichlorotrifluoroethane	ND	5.0	96	104	8.0	89	93	4.4	70 - 130	30	
Vinyl chloride	ND	5.0	87	92	5.6	81	84	3.6	70 - 130	30	
% 1,2-dichlorobenzene-d4	96	%	98	98	0.0	99	98	1.0	70 - 130	30	
% Bromofluorobenzene	93	%	96	96	0.0	96	96	0.0	70 - 130	30	
% Dibromofluoromethane	92	%	98	100	2.0	96	98	2.1	70 - 130	30	
% Toluene-d8	94	%	98	99	1.0	98	98	0.0	70 - 130	30	

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 549240 (ug/kg), QC Sample No: CG93882 (CG93880, CG93881, CG93882, CG93883, CG93884, CG93885)

Volatiles - Soil (Low Level)

1,1,1,2-Tetrachloroethane	ND	5.0	100	103	3.0				70 - 130	30	

QA/QC Data

SDG I.D.: GCG93880

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits	
1,1,1-Trichloroethane	ND	5.0	99	101	2.0				70 - 130	30	
1,1,2,2-Tetrachloroethane	ND	3.0	99	101	2.0				70 - 130	30	
1,1,2-Trichloroethane	ND	5.0	93	98	5.2				70 - 130	30	
1,1-Dichloroethane	ND	5.0	98	97	1.0				70 - 130	30	
1,1-Dichloroethene	ND	5.0	111	112	0.9				70 - 130	30	
1,1-Dichloropropene	ND	5.0	100	103	3.0				70 - 130	30	
1,2,3-Trichlorobenzene	ND	5.0	104	108	3.8				70 - 130	30	
1,2,3-Trichloropropane	ND	5.0	99	104	4.9				70 - 130	30	
1,2,4-Trichlorobenzene	ND	5.0	96	104	8.0				70 - 130	30	
1,2,4-Trimethylbenzene	ND	1.0	97	99	2.0				70 - 130	30	
1,2-Dibromo-3-chloropropane	ND	5.0	104	110	5.6				70 - 130	30	
1,2-Dibromoethane	ND	5.0	99	101	2.0				70 - 130	30	
1,2-Dichlorobenzene	ND	5.0	93	96	3.2				70 - 130	30	
1,2-Dichloroethane	ND	5.0	94	96	2.1				70 - 130	30	
1,2-Dichloropropane	ND	5.0	96	97	1.0				70 - 130	30	
1,3,5-Trimethylbenzene	ND	1.0	98	101	3.0				70 - 130	30	
1,3-Dichlorobenzene	ND	5.0	92	96	4.3				70 - 130	30	
1,3-Dichloropropane	ND	5.0	96	98	2.1				70 - 130	30	
1,4-Dichlorobenzene	ND	5.0	92	94	2.2				70 - 130	30	
2,2-Dichloropropane	ND	5.0	107	102	4.8				70 - 130	30	
2-Chlorotoluene	ND	5.0	95	96	1.0				70 - 130	30	
2-Hexanone	ND	25	138	148	7.0				70 - 130	30	I
2-Isopropyltoluene	ND	5.0	109	110	0.9				70 - 130	30	
4-Chlorotoluene	ND	5.0	94	97	3.1				70 - 130	30	
4-Methyl-2-pentanone	ND	25	119	125	4.9				70 - 130	30	
Acetone	ND	10	148	159	7.2				70 - 130	30	I
Acrylonitrile	ND	5.0	108	113	4.5				70 - 130	30	
Benzene	ND	1.0	97	99	2.0				70 - 130	30	
Bromobenzene	ND	5.0	96	97	1.0				70 - 130	30	
Bromochloromethane	ND	5.0	93	93	0.0				70 - 130	30	
Bromodichloromethane	ND	5.0	99	100	1.0				70 - 130	30	
Bromoform	ND	5.0	102	104	1.9				70 - 130	30	
Bromomethane	ND	5.0	111	107	3.7				70 - 130	30	
Carbon Disulfide	ND	5.0	116	119	2.6				70 - 130	30	
Carbon tetrachloride	ND	5.0	103	104	1.0				70 - 130	30	
Chlorobenzene	ND	5.0	96	98	2.1				70 - 130	30	
Chloroethane	ND	5.0	108	109	0.9				70 - 130	30	
Chloroform	ND	5.0	93	93	0.0				70 - 130	30	
Chloromethane	ND	5.0	95	96	1.0				70 - 130	30	
cis-1,2-Dichloroethene	ND	5.0	90	93	3.3				70 - 130	30	
cis-1,3-Dichloropropene	ND	5.0	100	101	1.0				70 - 130	30	
Dibromochloromethane	ND	3.0	108	111	2.7				70 - 130	30	
Dibromomethane	ND	5.0	94	94	0.0				70 - 130	30	
Dichlorodifluoromethane	ND	5.0	115	116	0.9				70 - 130	30	
Ethylbenzene	ND	1.0	97	99	2.0				70 - 130	30	
Hexachlorobutadiene	ND	5.0	108	111	2.7				70 - 130	30	
Isopropylbenzene	ND	1.0	100	101	1.0				70 - 130	30	
m&p-Xylene	ND	2.0	98	100	2.0				70 - 130	30	
Methyl ethyl ketone	ND	5.0	138	148	7.0				70 - 130	30	I
Methyl t-butyl ether (MTBE)	ND	1.0	101	100	1.0				70 - 130	30	
Methylene chloride	ND	5.0	80	83	3.7				70 - 130	30	
Naphthalene	ND	5.0	120	125	4.1				70 - 130	30	
n-Butylbenzene	ND	1.0	99	103	4.0				70 - 130	30	

QA/QC Data

SDG I.D.: GCG93880

Parameter	Blank	Blk RL	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
n-Propylbenzene	ND	1.0	98	101	3.0				70 - 130	30
o-Xylene	ND	2.0	99	102	3.0				70 - 130	30
p-Isopropyltoluene	ND	1.0	101	103	2.0				70 - 130	30
sec-Butylbenzene	ND	1.0	106	110	3.7				70 - 130	30
Styrene	ND	5.0	98	101	3.0				70 - 130	30
tert-Butylbenzene	ND	1.0	101	102	1.0				70 - 130	30
Tetrachloroethene	ND	5.0	101	102	1.0				70 - 130	30
Tetrahydrofuran (THF)	ND	5.0	102	107	4.8				70 - 130	30
Toluene	ND	1.0	98	99	1.0				70 - 130	30
trans-1,2-Dichloroethene	ND	5.0	108	113	4.5				70 - 130	30
trans-1,3-Dichloropropene	ND	5.0	105	105	0.0				70 - 130	30
trans-1,4-dichloro-2-butene	ND	5.0	123	128	4.0				70 - 130	30
Trichloroethene	ND	5.0	98	102	4.0				70 - 130	30
Trichlorofluoromethane	ND	5.0	102	105	2.9				70 - 130	30
Trichlorotrifluoroethane	ND	5.0	118	121	2.5				70 - 130	30
Vinyl chloride	ND	5.0	106	107	0.9				70 - 130	30
% 1,2-dichlorobenzene-d4	102	%	99	101	2.0				70 - 130	30
% Bromofluorobenzene	95	%	99	100	1.0				70 - 130	30
% Dibromofluoromethane	97	%	98	101	3.0				70 - 130	30
% Toluene-d8	98	%	98	100	2.0				70 - 130	30

Comment:

The Low Level MS/MSD are not reported for this batch.

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

QA/QC Batch 549564H (ug/kg), QC Sample No: CG95955 50X (CG93889 (50X) , CG93894 (50X))

Volatiles - Soil (High Level)

Naphthalene	ND	250	109	106	2.8	107			70 - 130	30
% 1,2-dichlorobenzene-d4	97	%	98	98	0.0	99			70 - 130	30
% Bromofluorobenzene	94	%	95	96	1.0	97			70 - 130	30
% Dibromofluoromethane	86	%	93	96	3.2	93			70 - 130	30
% Toluene-d8	96	%	99	98	1.0	98			70 - 130	30

Comment:

Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

l = This parameter is outside laboratory LCS/LCSD specified recovery limits.
m = This parameter is outside laboratory MS/MSD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
October 16, 2020

Friday, October 16, 2020

Criteria: CT: GAM, RC

State: CT

Sample Criteria Exceedances Report

GCG93880 - WSP

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
CG93884	SPLP-PB	SPLP Lead	CT / RSR GA,GAA (mg/l) TCLP / Inorganic/PCB	0.022	0.010	0.015	0.015	mg/L

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** WSP USA

Project Location: 31402701.000 (64 CAM) ***Project Number:***

Laboratory Sample ID(s): CG93880-CG93896 ***Sampling Date(s):*** 10/7/2020

List RCP Methods Used (e.g., 8260, 8270, et cetera) 1311/1312, 6010, 7470/7471, 8082, 8260, 8270, ETPH

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☐ Yes ☑ No ☐ NA
4	**Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents acheived? See Section: VOA Narration.**	☐ Yes ☑ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?** **b) Were these reporting limits met?**	☑ Yes ☐ No ☑ Yes ☐ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☑ Yes ☐ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Friday, October 16, 2020

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

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RCP Certification Report

October 16, 2020

SDG I.D.: GCG93880

SDG Comments

Metals Analysis:
The client requested a site specific list of elements which is shorter than the 6010 RCP list.

8270 Semi-volatile Organics:
The client requested a short list for 8270 RCP Semivolatile. Only the PAH constituents are reported as requested on the chain-of-custody.

ETPH Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

AU-FID1 10/08/20-1 Jeff Bucko, Chemist 10/08/20

CG93880 (1X), CG93881 (1X)

The initial calibration (ETPHO05I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O08A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:
Samples: CG93880, CG93881
Preceding CC O08A043 - ETPH (C9-C36) 44%H (30%)
Succeeding CC O08A053 - None.

AU-FID11 10/09/20-1 Jeff Bucko, Chemist 10/09/20

CG93896 (1X)

The initial calibration (ETPH921I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O09A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

AU-FID84 10/08/20-1 Jeff Bucko, Chemist 10/08/20

CG93882 (5X)

The initial calibration (ETPH805I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O08A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:
Samples: CG93882
Preceding CC O08A031 - ETPH (C9-C36) 34%H (30%), Pentacosane -100%L (30%)
Succeeding CC O08A043 - None.

AU-XL1 10/08/20-1 Jeff Bucko, Chemist 10/08/20

CG93883 (1X), CG93895 (1X)

The initial calibration (ETPH929I) RSD for the compound list was less than 30% except for the following compounds: None.
As per section 7.2.3, a discrimination check standard was run (O08A003_1) and contained the following outliers: None.
The continuing calibration %D for the compound list was less than 30% except for the following compounds:None.

QC (Site Specific):

Batch 548727 (CG93882)

CG93880, CG93881, CG93882, CG93883, CG93895, CG93896

All LCS recoveries were within 60 - 120 with the following exceptions: None.
All LCSD recoveries were within 60 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.

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RCP Certification Report

October 16, 2020

SDG I.D.: GCG93880

ETPH Narration

All MS recoveries were within 50 - 150 with the following exceptions: None.
All MSD recoveries were within 50 - 150 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: None.
Additional surrogate criteria: LCS acceptance range is 60-120% MS acceptance range 50-150%. The ETPH/DRO LCS has been normalized based on the alkane calibration.

Mercury Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

MERLIN 10/12/20 09:09 Rick Schweitzer, Chemist 10/12/20

CG93881, CG93882, CG93883, CG93895, CG93896

The method preparation blank, ICB, and CCBs contain all of the acids and reagents as the samples.
The initial calibration met all criteria including a standard run at or below the reporting level.
All calibration verification standards (ICV, CCV) met criteria.
All calibration blank verification standards (ICB, CCB) met criteria.
The matrix spike sample is used to identify spectral interference for each batch of samples, if within 85-115%, no interference is observed and no further action is taken.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.

QC (Site Specific):

Batch 548872 (CG93883)

CG93881, CG93882, CG93883, CG93895, CG93896

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.
All MSD recoveries were within 75 - 125 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: None.
Additional Mercury criteria: LCS acceptance range for waters is 80-120% and for soils is 70-130%. MS acceptance range is 75-125%.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

ARCOS-2 10/08/20 12:04 Emily Kolominskaya, Chemist 10/08/20

CG93880, CG93881, CG93882, CG93883, CG93884, CG93885

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

ARCOS-2 10/10/20 09:35 Emily Kolominskaya, Chemist 10/10/20

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October 16, 2020

SDG I.D.: GCG93880

ICP Metals Narration

CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895, CG93896

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

BLUE 10/09/20 09:57 Emily Kolominskaya, Chemist 10/09/20

CG93880, CG93884, CG93885, CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894

The initial calibration met criteria.
The continuing calibration standards met criteria for all the elements reported. The linear range is defined daily by the calibration range.
The continuing calibration blanks were less than the reporting level for the elements reported.
The ICSA and ICSAB were analyzed at the beginning and end of the run and were within criteria.The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Site Specific):

Batch 548759 (CG93882)

CG93880, CG93881, CG93882, CG93883, CG93884, CG93885

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

Batch 548851 (CG93886)

CG93880, CG93884, CG93885, CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894

All LCS recoveries were within 80 - 120 with the following exceptions: None.
All LCSD recoveries were within 80 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

Batch 548877 (CG93886)

CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895, CG93896

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

PCB Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

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RCP Certification Report

October 16, 2020

SDG I.D.: GCG93880

PCB Narration

AU-ECD1 10/12/20-1 Saadia Chudary, Chemist 10/12/20

CG93880 (10X), CG93881 (10X), CG93882 (2X, 10X), CG93883 (10X), CG93884 (10X), CG93885 (10X), CG93886 (10X), CG93887 (10X), CG93888 (10X), CG93890 (10X), CG93891 (10X), CG93892 (10X), CG93893 (10X), CG93894 (10X), CG93895 (10X)

The initial calibration (PC1009AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PC1009BI) RSD for the compound list was less than 20% except for the following compounds: None.
The continuing calibration %D for the compound list was less than 15% except for the following compounds:None.

AU-ECD3 10/12/20-1 Saadia Chudary, Chemist 10/12/20

CG93896 (10X)

The initial calibration (PC1009AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PC1009BI) RSD for the compound list was less than 20% except for the following compounds: None.
The continuing calibration %D for the compound list was less than 15% except for the following compounds:None.

AU-ECD5 10/12/20-1 Saadia Chudary, Chemist 10/12/20

CG93889 (10X)

The initial calibration (PC1006AI) RSD for the compound list was less than 20% except for the following compounds: None.
The initial calibration (PC1006BI) RSD for the compound list was less than 20% except for the following compounds: None.
The continuing calibration %D for the compound list was less than 15% except for the following compounds:None.

QC (Batch Specific):

Batch 548932 (CG94409)

CG93896

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.

QC (Site Specific):

Batch 548923 (CG93882)

CG93880, CG93881, CG93882, CG93883, CG93884, CG93885, CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
All MS recoveries were within 40 - 140 with the following exceptions: None.
All MSD recoveries were within 40 - 140 with the following exceptions: None.
All MS/MSD RPDs were less than 30% with the following exceptions: None.

SVOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? Yes.

Instrument:

CHEM07 10/08/20-2 Wes Bryon, Chemist 10/08/20

CG93881 (1X), CG93882 (1X)

For 8270 full list, the DDT breakdown and pentachlorophenol & benzidine peak tailing were evaluated in the DFTPP tune and were found to be in control.

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RCP Certification Report

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SDG I.D.: GCG93880

SVOA Narration

For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM07/7_SPLIT_1006):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM07/1008_26-7_SPLIT_1006):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

CHEM29 10/09/20-1 Wes Bryon, Chemist 10/09/20

CG93883 (1X), CG93895 (1X), CG93896 (1X)

For 8270 full list, the DDT breakdown and pentachlorophenol & benzidine peak tailing were evaluated in the DFTPP tune and were found to be in control.
For 8270 BN list, benzidine peak tailing was evaluated in the DFTPP tune and was found to be in control.

Initial Calibration Evaluation (CHEM29/29_BN_0921):
100% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet a minimum response factors: None.

Continuing Calibration Verification (CHEM29/1009_03-29_BN_0921):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet recommended response factors: None.
The following compounds did not meet minimum response factors: None.

QC (Batch Specific):

Batch 548749 (CG94141)

CG93881, CG93882, CG93883, CG93895, CG93896

All LCS recoveries were within 40 - 140 with the following exceptions: None.
All LCSD recoveries were within 40 - 140 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8270 criteria: 20% of compounds can be outside of acceptance criteria as long as recovery is at least 10%. (Acid surrogates acceptance range for aqueous samples: 15-110%, for soils 30-130%)

VOA Narration

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RCP Certification Report

October 16, 2020

SDG I.D.: GCG93880

VOA Narration

Were all QA/QC performance criteria specified in the Reasonable Confidence Protocol documents achieved? No.

QC Batch 549240 (Samples: CG93880, CG93881, CG93882, CG93883, CG93884, CG93885): -----

The LCS and/or the LCSD recovery is above the upper range for one or more analytes that were not reported in the sample(s), therefore no significant bias is suspected. (2-Hexanone, Acetone, Methyl ethyl ketone)

QC Batch 549389 (Samples: CG93886, CG93887, CG93888, CG93889, CG93890, CG93891, CG93892, CG93893, CG93894, CG93895, CG93896): -----

The QC recovery for one or more analytes is above the upper range but were not reported in the sample(s), therefore no significant bias is suspected. (Acetone)

Instrument:

CHEM18 10/13/20-1 Jane Li, Chemist 10/13/20

CG93886 (1X), CG93887 (1X), CG93888 (1X), CG93889 (1X), CG93890 (1X), CG93891 (1X), CG93892 (1X), CG93893 (1X), CG93894 (1X), CG93895 (1X), CG93896 (1X)

Initial Calibration Evaluation (CHEM18/VT-M091320):
94% of target compounds met criteria.
The following compounds had %RSDs >20%: 1,2-Dibromo-3-chloropropane 21% (20%), Acetone 23% (20%), Bromoform 29% (20%), Dibromochloromethane 22% (20%), trans-1,4-dichloro-2-butene 30% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: None.
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM18/1013_02A-VT-M091320):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
98% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

CHEM18 10/14/20-1 Jane Li, Chemist 10/14/20

CG93889 (50X), CG93894 (50X)

Initial Calibration Evaluation (CHEM18/VT-M091320):
94% of target compounds met criteria.
The following compounds had %RSDs >20%: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM18/1014_01-VT-M091320):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

CHEM31 10/12/20-2 Jane Li, Chemist 10/12/20

CG93880 (1X), CG93881 (1X), CG93882 (1X, 50X), CG93883 (1X), CG93884 (1X), CG93885 (1X)

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

RCP Certification Report

October 16, 2020

SDG I.D.: GCG93880

VOA Narration

Initial Calibration Evaluation (CHEM31/VT-L100620):
96% of target compounds met criteria.
The following compounds had %RSDs >20%: Methylene chloride 29% (20%), Naphthalene 21% (20%), trans-1,4-dichloro-2-butene 26% (20%)
The following compounds did not meet Table 4 recommended minimum response factors: Bromoform 0.098 (0.1), Tetrachloroethene 0.168 (0.2)
The following compounds did not meet the minimum response factor of 0.05: None.

Continuing Calibration Verification (CHEM31/1012_38-VT-L100620):
Internal standard areas were within 50 to 200% of the initial calibration with the following exceptions: None.
100% of target compounds met criteria.
The following compounds did not meet % deviation criteria: None.
The following compounds did not meet maximum % deviations: None.
The following compounds did not meet Table 4 recommended minimum response factors: None.

QC (Batch Specific):

Batch 549240 (CG93882) CHEM31 10/12/2020-2

CG93880(1X), CG93881(1X), CG93882(1X), CG93883(1X), CG93884(1X), CG93885(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: 2-Hexanone(138%), Acetone(148%), Methyl ethyl ketone(138%)
All LCSD recoveries were within 70 - 130 with the following exceptions: 2-Hexanone(148%), Acetone(159%), Methyl ethyl ketone(148%)
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
The Low Level MS/MSD are not reported for this batch.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Batch 549389 (CG93832) CHEM18 10/13/2020-1

CG93886(1X), CG93887(1X), CG93888(1X), CG93889(1X), CG93890(1X), CG93891(1X), CG93892(1X), CG93893(1X), CG93894(1X), CG93895(1X), CG93896(1X)

All LCS recoveries were within 70 - 130 with the following exceptions: Acetone(136%)
All LCSD recoveries were within 70 - 130 with the following exceptions: Acetone(144%)
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

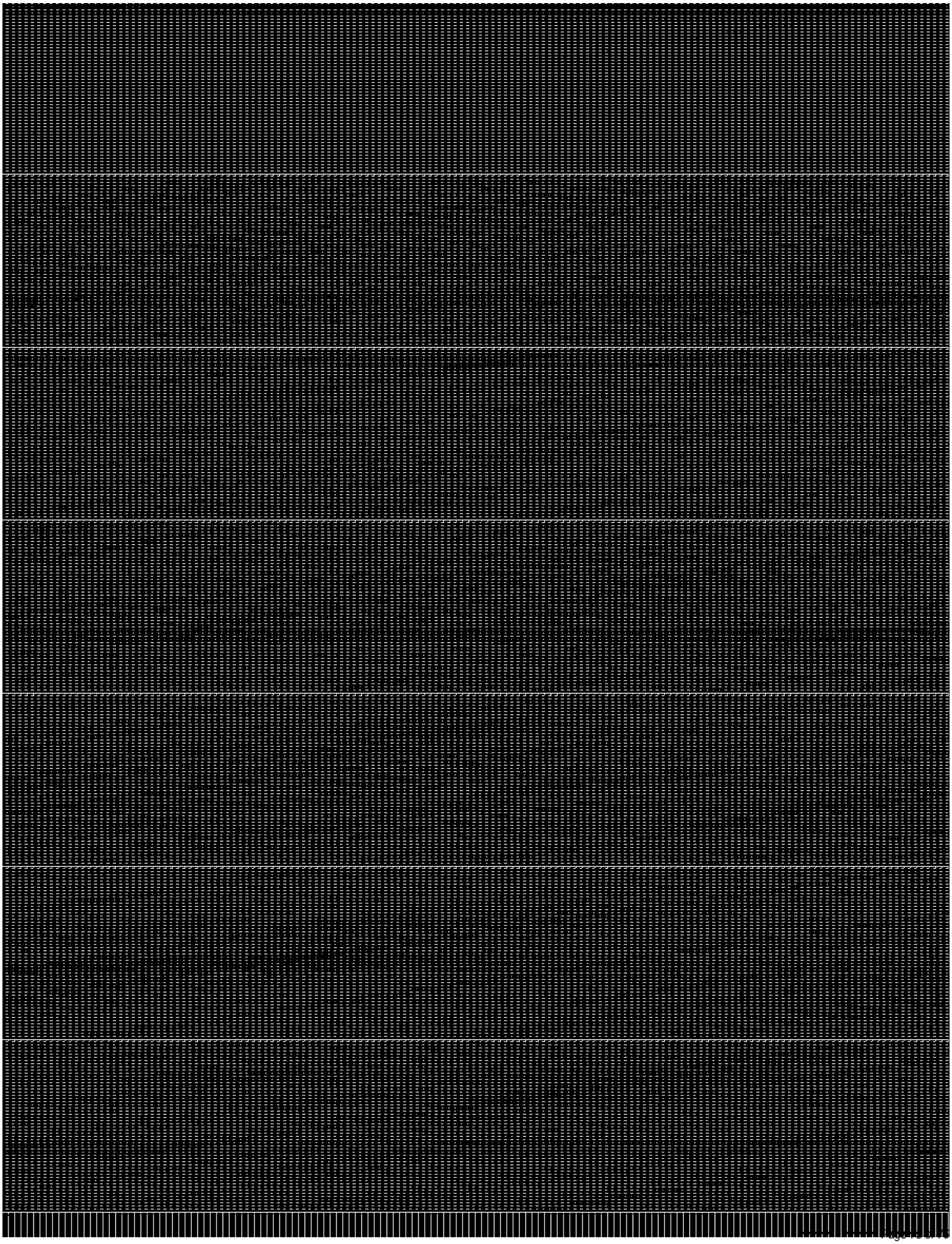
Batch 549564H (CG95955) CHEM18 10/14/2020-1

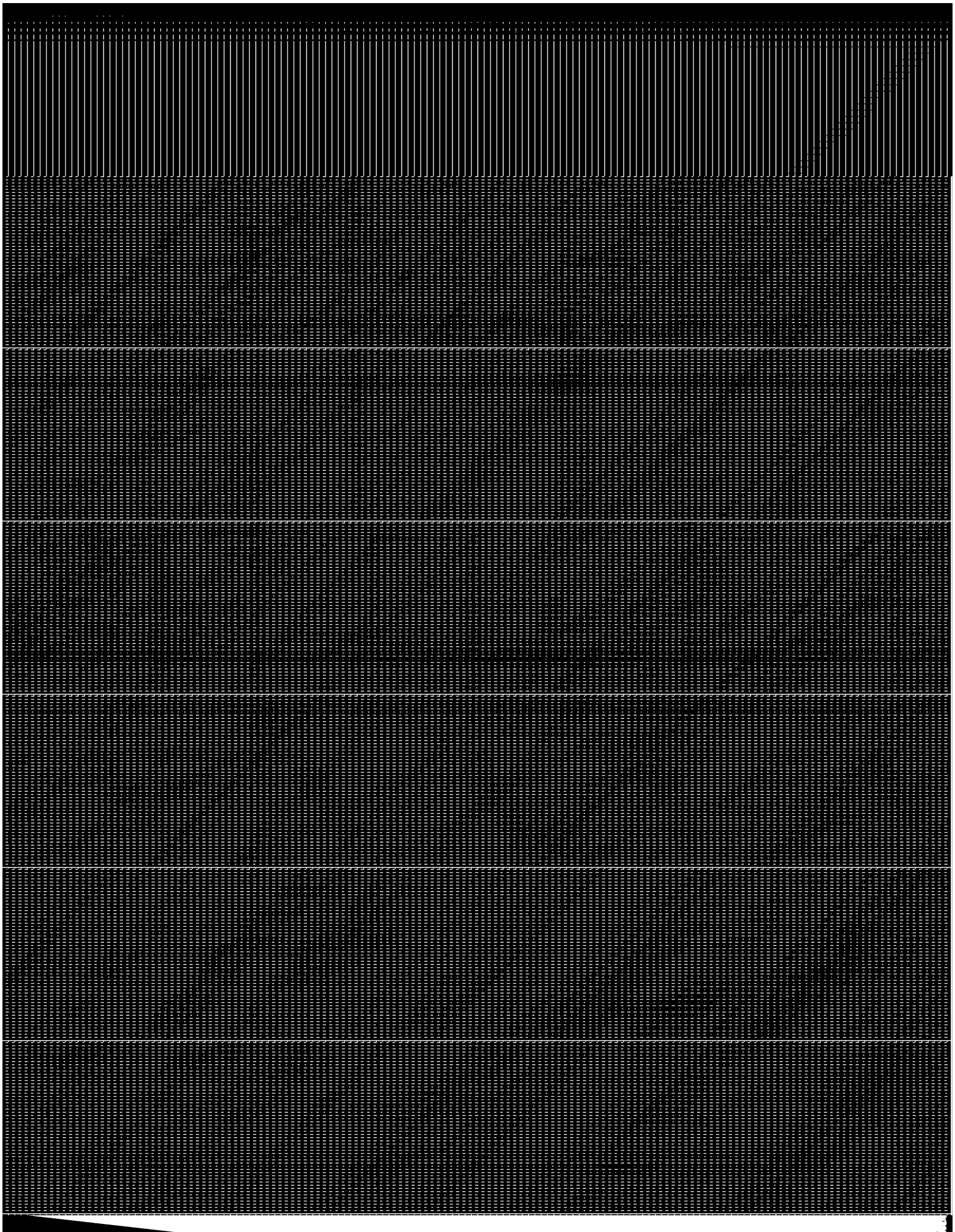
CG93889(50X), CG93894(50X)

All LCS recoveries were within 70 - 130 with the following exceptions: None.
All LCSD recoveries were within 70 - 130 with the following exceptions: None.
All LCS/LCSD RPDs were less than 30% with the following exceptions: None.
Additional 8260 criteria: 10% of LCS/LCSD compounds can be outside of acceptance criteria as long as recovery is 40-160%, 25-160% for Chloroethane-HL and Trichlorofluoromethane-HL.

Temperature Narration

The samples were received at 12.2C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)





Friday, November 13, 2020

Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Project ID: 64 CAM
SDG ID: GCH11882
Sample ID#s: CH11882 - CH11889

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B
NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

November 13, 2020

SDG I.D.: GCH11882

Project ID: 64 CAM

Client Id	Lab Id	Matrix
B6 (10-11)	CH11882	SOIL
B6 (25-26)	CH11883	SOIL
B8 (10-12)	CH11884	SOIL
B8 (20-21)	CH11885	SOIL
B9 (11-13)	CH11886	SOIL
B9 (16-18)	CH11887	SOIL
B10 (0-2)	CH11888	SOIL
B10 (5-7)	CH11889	SOIL

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	9:25
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11882

Project ID: 64 CAM
Client ID: B6 (10-11)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	16.1	0.36	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	89		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	9:35
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11883

Project ID: 64 CAM
Client ID: B6 (25-26)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	4.60	0.38	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	90		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	10:45
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11884

Project ID: 64 CAM
Client ID: B8 (10-12)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	2.95	0.37	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	90		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	11:00
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11885

Project ID: 64 CAM
Client ID: B8 (20-21)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	78.2	0.37	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	89		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	11:50
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11886

Project ID: 64 CAM
Client ID: B9 (11-13)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	4.77	0.36	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	93		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	12:00
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11887

Project ID: 64 CAM
Client ID: B9 (16-18)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	4.84	0.35	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	90		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	12:30
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11888

Project ID: 64 CAM
Client ID: B10 (0-2)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	141	0.36	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	88		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
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Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

November 13, 2020

FOR: Attn: Darrick Jones
WSP USA
4 Research Dr Suite 204
Shelton, CT 06484

Sample Information		Custody Information		Date	Time
Matrix:	SOIL	Collected by:	MS	11/10/20	12:35
Location Code:	WSP	Received by:	SW	11/10/20	14:50
Rush Request:	24 Hour	Analyzed by:	see "By" below		
P.O.#:					

Laboratory Data

SDG ID: GCH11882
Phoenix ID: CH11889

Project ID: 64 CAM
Client ID: B10 (5-7)

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Lead	32.6	0.33	mg/Kg	1	11/11/20	EK	SW6010D
SPLP Lead	< 0.010	0.010	mg/L	1	11/11/20	CPP	SW6010D
SPLP Metals Digestion	Completed				11/11/20	VT/ARW	SW3010A
Percent Solid	91		%		11/10/20	CAJ	SW846-%Solid
SPLP Extraction for Metals	Completed				11/10/20	ARW	SW1312
Total Metals Digest	Completed				11/10/20	J/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director
November 13, 2020
Reviewed and Released by: Rashmi Makol, Project Manager

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

November 13, 2020

QA/QC Data

SDG I.D.: GCH11882

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 552834 (mg/kg), QC Sample No: CH11852 (CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889)													
ICP Metals - Soil													
Lead	BRL	0.33	30.6	32.3	5.40	104	98.6	5.3	91.4			75 - 125	35
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													
QA/QC Batch 552916 (mg/L), QC Sample No: CH11882 (CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889)													
ICP Metals - SPLP Extraction													
Lead	BRL	0.010	<0.010	<0.010	NC	103	102	1.0	108			80 - 120	20
Comment:													
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.													

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference

Phyllis Shiller, Laboratory Director
November 13, 2020

Friday, November 13, 2020

Criteria: CT: I/C, RC

State: CT

Sample Criteria Exceedances Report

GCH11882 - WSP

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.

REASONABLE CONFIDENCE PROTOCOL
LABORATORY ANALYSIS QA/QC CERTIFICATION FORM

Laboratory Name: Phoenix Environmental Labs, Inc. ***Client:*** WSP USA

Project Location: 64 CAM ***Project Number:***

Laboratory Sample ID(s): CH11882-CH11889 ***Sampling Date(s):*** 11/10/2020

List RCP Methods Used (e.g., 8260, 8270, et cetera) 1311/1312, 6010

1	**For each analytical method referenced in this laboratory report package, were all specified QA/QC performance criteria followed, including the requirement to explain any criteria falling outside of acceptable guidelines, as specified in the CT DEP method-specific Reasonable Confidence Protocol documents?**	☑ Yes ☐ No
1A	**Were the method specified preservation and holding time requirements met?**	☑ Yes ☐ No
1B	***VPH and EPH methods only:*** **Was the VPH or EPH method conducted without significant modifications (see section 11.3 of respective RCP methods)**	☐ Yes ☐ No ☑ NA
2	**Were all samples received by the laboratory in a condition consistent with that described on the associated Chain-of-Custody document(s)?**	☑ Yes ☐ No
3	**Were samples received at an appropriate temperature (< 6 Degrees C)?**	☐ Yes ☑ No ☐ NA
4	**Were all QA/QC performance criteria specified in the CTDEP Reasonable Confidence Protocol documents achieved?**	☑ Yes ☐ No
5	**a) Were reporting limits specified or referenced on the chain-of-custody?** **b) Were these reporting limits met?**	☑ Yes ☐ No ☑ Yes ☐ No
6	**For each analytical method referenced in this laboratory report package, were results reported for all constituents identified in the method-specific analyte lists presented in the Reasonable Confidence Protocol documents?**	☐ Yes ☑ No
7	**Are project-specific matrix spikes and laboratory duplicates included in the data set?**	☑ Yes ☐ No

Notes: For all questions to which the response was "No" (with the exception of question #7), additional information must be provided in an attached narrative. If the answer to question #1, #1A or 1B is "No", the data package does not meet the requirements for "Reasonable Confidence". This form may not be altered and all questions must be answered.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete.

Authorized Signature: Rashmi Makol **Position:** Project Manager

Printed Name: Rashmi Makol **Date:** Friday, November 13, 2020

Name of Laboratory Phoenix Environmental Labs, Inc.

This certification form is to be used for RCP methods only.

Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

RCP Certification Report

November 13, 2020

SDG I.D.: GCH11882

SDG Comments

Metals Analysis:
The client requested a shorter list of elements than the 6010 RCP list. Only Lead is reported as requested on the chain of custody.

Temperature above 6C:
The samples were received in a cooler with ice packs. The samples were delivered to the Laboratory within a short period of time after sample collection. Therefore no significant bias is suspected.

ICP Metals Narration

Were all QA/QC performance criteria specified in the analytical method achieved? Yes.

Instrument:

ARCOS-2 11/10/20 08:24 Emily Kolominskaya, Chemist 11/10/20

CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889

The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

BLUE 11/11/20 07:44 Cindy Pearce, Chemist 11/11/20

CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889

The initial calibration met criteria.
The continuing calibration standards met criteria for all the elements reported. The linear range is defined daily by the calibration range.
The continuing calibration blanks were less than the reporting level for the elements reported.
The ICSA and ICSAB were analyzed at the beginning and end of the run and were within criteria.The linear range is defined daily by the calibration range.
The following Initial Calibration Verification (ICV) compounds did not meet criteria: None.
The following Continuing Calibration Verification (CCV) compounds did not meet criteria: None.
The following ICP Interference Check (ICSAB) compounds did not meet criteria: None.

QC (Batch Specific):

Batch 552834 (CH11852)

CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889

All LCS recoveries were within 75 - 125 with the following exceptions: None.
All LCSD recoveries were within 75 - 125 with the following exceptions: None.
All LCS/LCSD RPDs were less than 35% with the following exceptions: None.
Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

QC (Site Specific):

Batch 552916 (CH11882)

CH11882, CH11883, CH11884, CH11885, CH11886, CH11887, CH11888, CH11889

All LCS recoveries were within 80 - 120 with the following exceptions: None.
All LCSD recoveries were within 80 - 120 with the following exceptions: None.
All LCS/LCSD RPDs were less than 20% with the following exceptions: None.
All MS recoveries were within 75 - 125 with the following exceptions: None.

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ACCREDITED IN ACCORDANCE WITH nelac NY # 11301

Certification Report

November 13, 2020

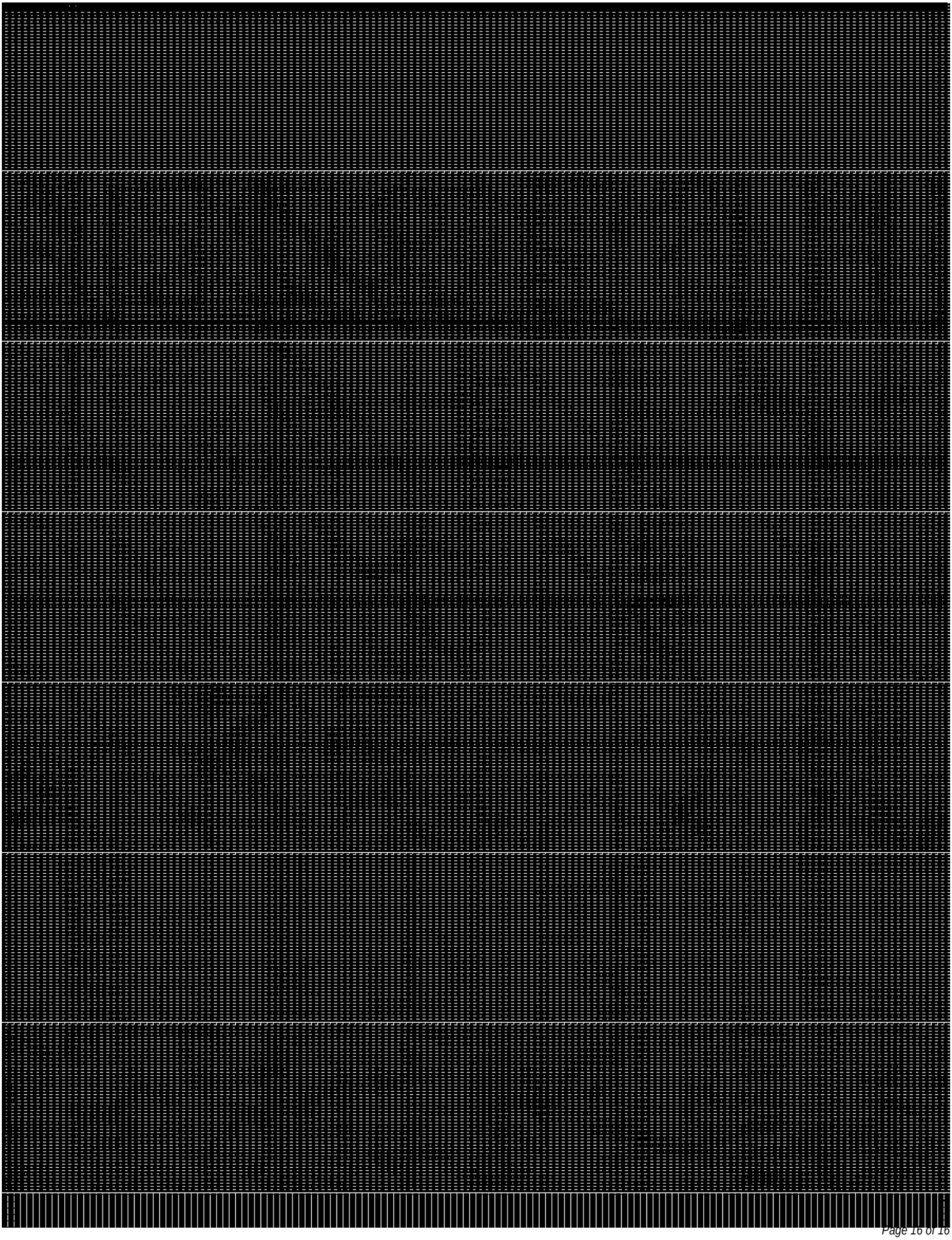
SDG I.D.: GCH11882

ICP Metals Narration

Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

Temperature Narration

The samples were received at 18.3C with cooling initiated.
(Note acceptance criteria for relevant matrices is above freezing up to 6°C)



APPENDIX IV

SPLP Lead

Descriptive Statistics

Number of Data Points	21	
Minimum	0.01	
Maximum	0.022	
Mean	0.01	
Median	0.01	
Midrange	0.02	
Standard Deviation	0	
T-Statistic	1.725	
Geometric Mean	-4.568	(Mean of Transformed Data)
Standard Deviation*	0.17	(Standard Deviation of Transformed Data)
H-Statistic	1.757	

Shapiro-Wilks W Test Results

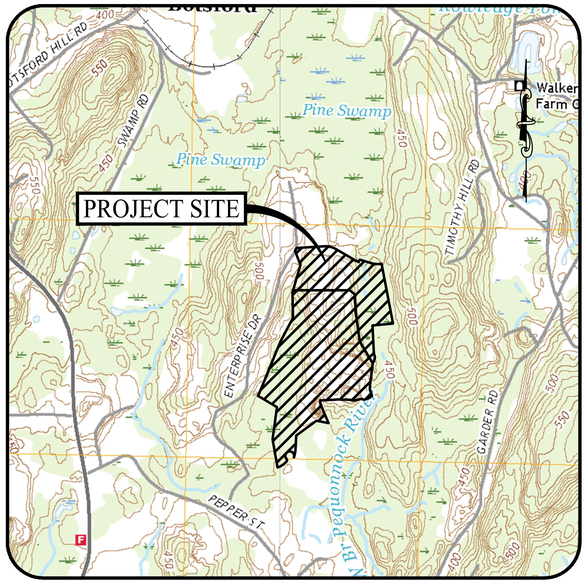
Normal Distribution:	0.226
Lognormal Distribution:	0.226

W Test Quantiles:

$W_{0.01}$ =	0.873
$W_{0.02}$ =	0.888
$W_{0.05}$ =	0.908
$W_{0.10}$ =	0.923
$W_{0.50}$ =	0.96

95% Upper Confidence Limit

Normal Distribution:	0.01
Lognormal Distribution:	0.01



USGS MAP

SCALE: 1" = 1,000'

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

PREPARED FOR:

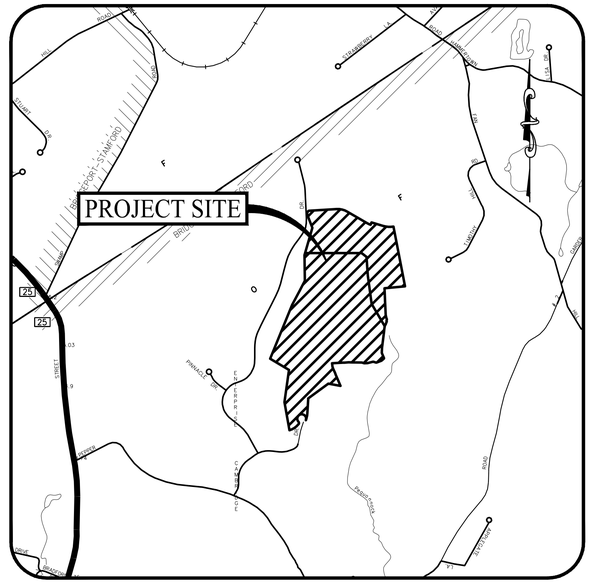
ASTRO LAND HOLDINGS LLC & SPACELY LAND HOLDINGS LLC

16 CROSS STREET
NEW CANAAN, CONNECTICUT

PREPARED BY:

SOLLI ENGINEERING

501 MAIN STREET, MONROE, CONNECTICUT 06468



LOCATION MAP

SCALE: 1" = 1,000'

PROPERTY INFORMATION

ADDRESS: 64 CAMBRIDGE DRIVE &
4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT 06468
MAP-BLOCK-LOT: 094/015/00 & 094/015/28

OWNER/APPLICANT

SPACELY LAND HOLDINGS LLC
16 CROSS STREET
NEW CANAAN, CONNECTICUT 06840
OWNER OF 4 INDEPENDENCE DRIVE, MONROE, CT 06468

OWNER/APPLICANT

ASTRO LAND HOLDINGS LLC
16 CROSS STREET
NEW CANAAN, CONNECTICUT 06840
OWNER OF 64 CAMBRIDGE DRIVE, MONROE, CT 06468

SITE/CIVIL ENGINEER

KEVIN SOLLI, P.E., CPESC, LEED AP BD+C
LICENSE NO. 25759
SOLLI ENGINEERING, LLC
501 MAIN STREET, SUITE 2A
MONROE, CONNECTICUT 06468
(203) 880-5455

LANDSCAPE ARCHITECT

MARY F. BLACKBURN, P.L.A.
LICENSE NO. 1499
SOLLI ENGINEERING, LLC
501 MAIN STREET, SUITE 2A
MONROE, CONNECTICUT 06468
(203) 880-5455

SURVEYOR OF RECORD

BRYAN NESTERIAK, PE, LS
LICENSE NO. 23556
ACCURATE LAND SURVEYING
15 RESEARCH DRIVE, SUITE 3
WOODBRIDGE, CONNECTICUT 06525
(203) 881-8145

SOIL SCIENTIST

WILLIAM KENNY
WILLIAM KENNY ASSOCIATES LLC
195 TUNXIS HILL CUTOFF SOUTH
FAIRFIELD, CT 06825
(203) 366-0588

DRAWING LIST

CIVIL PLAN SET

SHEET #	SHEET NAME	PLAN DATE	LATEST REVISION
0.00	COVER SHEET	10/18/23	N/A
1 OF 2	PROPERTY SURVEY	02/25/20	06/22/23
2 OF 2	PROPERTY SURVEY	02/25/20	06/22/23
1.40	500' RADIUS & AREA MAP	10/18/23	N/A
2.10	OVERALL SITE LAYOUT PLAN	10/18/23	N/A
2.11	SITE LAYOUT PLAN (1 OF 1)	10/18/23	N/A
2.20	OVERALL GRADING & DRAINAGE PLAN	10/18/23	N/A
2.21	GRADING & DRAINAGE PLAN (1 OF 3)	10/18/23	N/A
2.22	GRADING & DRAINAGE PLAN (2 OF 3)	10/18/23	N/A
2.23	GRADING & DRAINAGE PLAN (3 OF 3)	10/18/23	N/A
2.30	OVERALL SOIL EROSION & SEDIMENT CONTROL PLAN	10/18/23	N/A
2.31	SOIL EROSION & SEDIMENT CONTROL PLAN (1 OF 3)	10/18/23	N/A
2.32	SOIL EROSION & SEDIMENT CONTROL PLAN (2 OF 3)	10/18/23	N/A
2.33	SOIL EROSION & SEDIMENT CONTROL PLAN (3 OF 3)	10/18/23	N/A
2.34	SOIL EROSION & SEDIMENT CONTROL PHASING PLANS 1 & 2	10/18/23	N/A
2.35	SOIL EROSION & SEDIMENT CONTROL PHASING PLANS 3 & 4	10/18/23	N/A
2.36	SOIL EROSION & SEDIMENT CONTROL PHASING PLANS 5 & 6	10/18/23	N/A
2.41	SOIL EROSION & SEDIMENT CONTROL NOTES & DETAILS	10/18/23	N/A
2.60	OVERALL LANDSCAPE PLAN	10/18/23	N/A
2.61	LANDSCAPE ENLARGEMENT AREA PLAN	10/18/23	N/A
2.62	LANDSCAPE ENLARGEMENT AREA PLAN	10/18/23	N/A
2.63	LANDSCAPE ENLARGEMENT AREA PLAN	10/18/23	N/A
2.64	LANDSCAPE ENLARGEMENT AREA PLAN	10/18/23	N/A
2.80	CROSS SECTION LOCATION PLAN	10/18/23	N/A
2.81	SITE CROSS SECTIONS	10/18/23	N/A
2.82	SITE CROSS SECTIONS	10/18/23	N/A
2.83	SITE CROSS SECTIONS	10/18/23	N/A
2.84	SITE CROSS SECTIONS	10/18/23	N/A
2.85	SITE CROSS SECTIONS	10/18/23	N/A
2.86	SITE CROSS SECTIONS	10/18/23	N/A
3.01	DETAIL SHEET	10/18/23	N/A
3.02	DETAIL SHEET	10/18/23	N/A

(INCLUDED AS PART OF PLANNING AND ZONING APPLICATION ONLY)

PDP	POTENTIAL DEVELOPMENT PLAN	10/18/23	N/A

Rev. #: Date Description

Project:

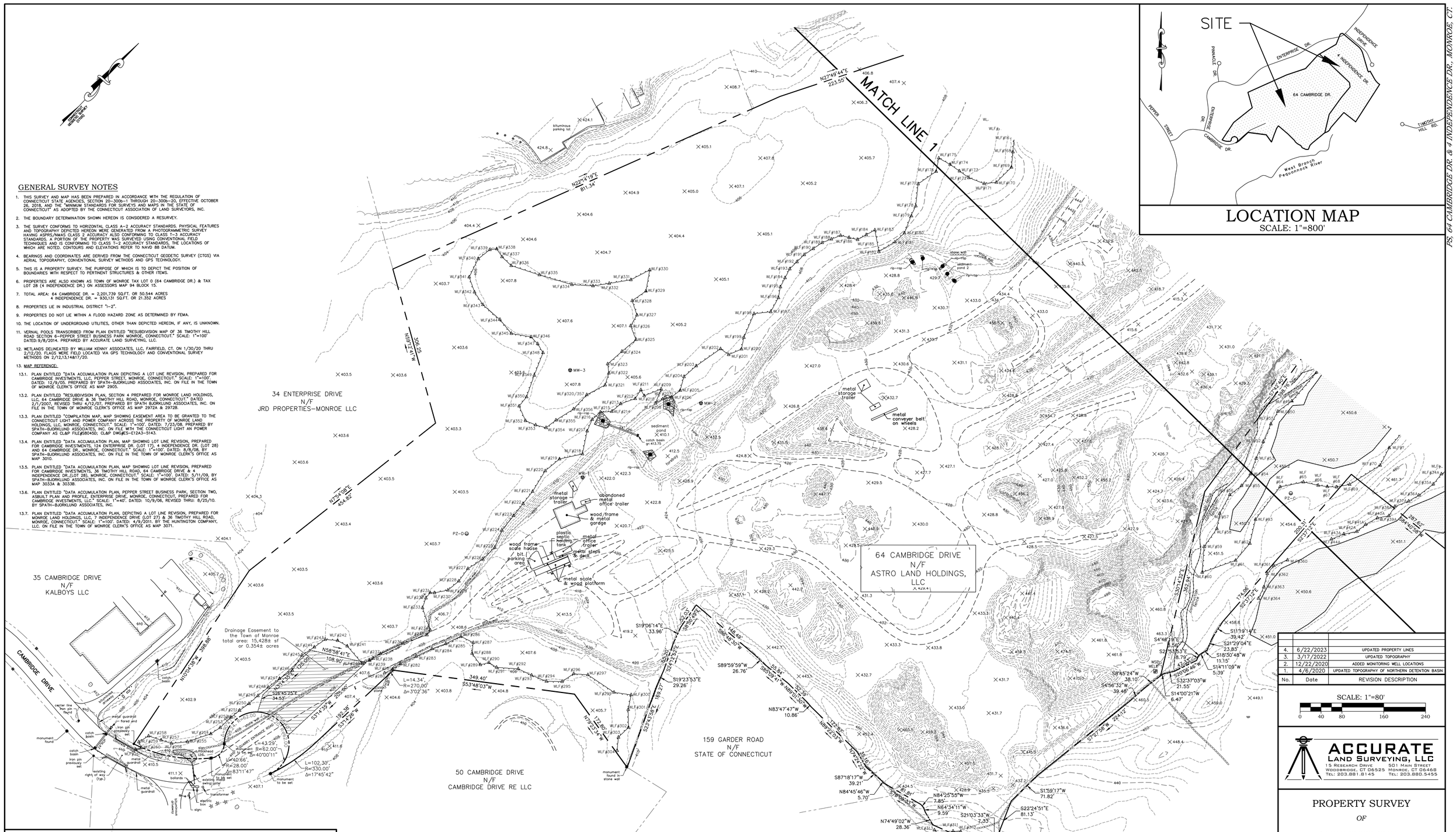
PROPOSED SITE RESTORATION
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: COVER SHEET

Sheet #: 0.00

GENERAL SURVEY NOTES

1. THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH THE REGULATION OF CONNECTICUT STATE AGENCIES, SECTION 20–300b–1 THROUGH 20–300b–20, EFFECTIVE OCTOBER 26, 2018, AND THE "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC.
2. THE BOUNDARY DETERMINATION SHOWN HEREON IS CONSIDERED A RESURVEY.
3. THE SURVEY CONFORMS TO HORIZONTAL CLASS A–2 ACCURACY STANDARDS. PHYSICAL FEATURES AND TOPOGRAPHY DEPICTED HEREON WERE GENERATED FROM A PHOTOGRAMMETRIC SURVEY HAVING ASPRS/NMAS CLASS 2 ACCURACY ALSO CONFORMING TO CLASS T–3 ACCURACY STANDARDS. A PORTION OF THE PROPERTY WAS SURVEYED USING CONVENTIONAL FIELD TECHNIQUES AND IS CONFORMING TO CLASS T–2 ACCURACY STANDARDS, THE LOCATIONS OF WHICH ARE NOTED. CONTOURS AND ELEVATIONS REFER TO NAVD 88 DATUM.
4. BEARINGS AND COORDINATES ARE DERIVED FROM THE CONNECTICUT GEODETIC SURVEY (CTGS) VIA AERIAL TOPOGRAPHY, CONVENTIONAL SURVEY METHODS AND GPS TECHNOLOGY.
5. THIS IS A PROPERTY SURVEY, THE PURPOSE OF WHICH IS TO DEPICT THE POSITION OF BOUNDARIES WITH RESPECT TO PERTINENT STRUCTURES & OTHER ITEMS.
6. PROPERTIES ARE ALSO KNOWN AS TOWN OF MONROE TAX LOT 0 (64 CAMBRIDGE DR.) & TAX LOT 28 (4 INDEPENDENCE DR.) ON ASSESSORS MAP 94 BLOCK 15.
7. TOTAL AREA: 64 CAMBRIDGE DR. = 2,201,739 SQ.FT. OR 50.544 ACRES
   4 INDEPENDENCE DR. = 930,131 SQ.FT. OR 21.352 ACRES
8. PROPERTIES LIE IN INDUSTRIAL DISTRICT "I–2".
9. PROPERTIES DO NOT LIE WITHIN A FLOOD HAZARD ZONE AS DETERMINED BY FEMA.
10. THE LOCATION OF UNDERGROUND UTILITIES, OTHER THAN DEPICTED HEREON, IF ANY, IS UNKNOWN.
11. VERNAL POOLS TRANSCRIBED FROM PLAN ENTITLED "RESUBDIVISION MAP OF 36 TIMOTHY HILL ROAD SECTION 6–PEPPER STREET BUSINESS PARK MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 9/8/2014. PREPARED BY ACCURATE LAND SURVEYING, LLC.
12. WETLANDS DELINEATED BY WILLIAM KENNY ASSOCIATES, LLC, FAIRFIELD, CT. ON 1/30/20 THRU 2/12/20. FLAGS WERE FIELD LOCATED VIA GPS TECHNOLOGY AND CONVENTIONAL SURVEY METHODS ON 2/12,13,14&17/20.
13. MAP REFERENCE:
    - 13.1. PLAN ENTITLED "DATA ACCUMULATION PLAN DEPICTING A LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, LLC, PEPPER STREET, MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 12/9/05. PREPARED BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 2905.
    - 13.2. PLAN ENTITLED "RESUBDIVISION PLAN, SECTION 4 PREPARED FOR MONROE LAND HOLDINGS, LLC, 64 CAMBRIDGE DRIVE & 36 TIMOTHY HILL ROAD, MONROE, CONNECTICUT." DATED 2/1/2007, REVISED THRU 4/12/07, PREPARED BY SPATH BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 2972A & 2972B.
    - 13.3. PLAN ENTITLED "COMPILATION MAP, MAP SHOWING EASEMENT AREA TO BE GRANTED TO THE CONNECTICUT LIGHT AND POWER COMPANY ACROSS THE PROPERTY OF MONROE LAND HOLDINGS, LLC, MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 7/23/08. PREPARED BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE WITH THE CONNECTICUT LIGHT AN POWER COMPANY AS CL&P FILE#580450; CL&P DWG#ES–E12A3–5143.
    - 13.4. PLAN ENTITLED "DATA ACCUMULATION PLAN, MAP SHOWING LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, 124 ENTERPRISE DR. (LOT 17), 4 INDEPENDENCE DR. (LOT 28) AND 64 CAMBRIDGE DR., MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 8/8/08, BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3010.
    - 13.5. PLAN ENTITLED "DATA ACCUMULATION PLAN, MAP SHOWING LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, 36 TIMOTHY HILL ROAD, 64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DR.,(LOT 28), MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 5/11/09, BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3033A & 3033B.
    - 13.6. PLAN ENTITLED "DATA ACCUMULATION PLAN, PEPPER STREET BUSINESS PARK, SECTION TWO, ASBUILT PLAN AND PROFILE, ENTERPRISE DRIVE, MONROE, CONNECTICUT, PREPARED FOR CAMBRIDGE INVESTMENTS, LLC." SCALE: 1"=40'. DATED: 10/9/06, REVISED THRU: 8/25/10. BY SPATH–BJORKLUND ASSOCIATES, INC.
    - 13.7. PLAN ENTITLED "DATA ACCUMULATION PLAN, DEPICTING A LOT LINE REVISION, PREPARED FOR MONROE LAND HOLDINGS, LLC, 7 INDEPENDENCE DRIVE (LOT 27) & 36 TIMOTHY HILL ROAD, MONROE, CONNECTICUT." SCALE: 1"=100'. DATED: 4/9/2011. BY THE HUNTINGTON COMPANY, LLC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3071.



LOCATION MAP
SCALE: 1"=800'

LEGEND

C.H.D.	Conn. Hwy. Dept. Monument	Gas gate valve	Tree Line
Mon.	Monument	Water gate valve	Watercourse
●	Iron Pin to be Set	Water meter	123 Existing Contours
■	Conc. Monument to be Set	hyd Hydrant	R.C.P. Reinforced Concrete Pipe
I. Pipe	Iron Pipe	W Water main (existing)	C.M.P. Corrugated Metal Pipe
●	Iron Pin	WS Water service lateral	PT A Percolation Test Location
D.H.	Drill Hole	G Gas Main (existing)	TP 100 Deep Test Pit Location
SS	Pile of Stones	SS Sanitary Sewer Main (existing)	Stone Retaining Wall
☼	Light Post	E Electrical Line (existing)	Retaining Wall
Fnd.	Found	S Sanitary Manhole	Stone Wall
N/F	Now or Formerly	D Drain Manhole	Wetland Limit
	Property Line	Chain Link or Split Rail Fence	WL Wetland Flag Number
	Property Line (adjoining)	Metal/Wire Fence	Wetland Setback
	Building Setback Line	Wooden or Vinyl Fence	Benchmark
	Easement Line	Utility Pole	Well (Existing)
	Edge of water	INV: Invert Elevation of Pipe	Well (Piezometer)
	FEMA Flood Zone	Existing Catch Basin/Pipe	Well (WSP)
BFE	Base Flood Elevation	Building (existing)	F.P. Fence Post
×200.0	Existing Spot Elevation		

No.	Date	REVISION DESCRIPTION
4.	6/22/2023	UPDATED PROPERTY LINES
3.	3/17/2022	UPDATED TOPOGRAPHY
2.	12/22/2020	ADDED MONITORING WELL LOCATIONS
1.	4/6/2020	UPDATED TOPOGRAPHY OF NORTHERN DETENTION BASIN

SCALE: 1"=80'
0 40 80 160 240

ACCURATE LAND SURVEYING, LLC
15 Research Drive 501 Main Street
Woodbridge, CT 06525 Monroe, CT 06468
Tel: 203.881.8145 Tel: 203.880.5455

PROPERTY SURVEY
OF
64 CAMBRIDGE DRIVE &
4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

PREPARED FOR
ASTRO LAND HOLDINGS, LLC
&
SPACELY LAND HOLDINGS, LLC

STATE OF CONNECTICUT · BRYAN P. NESTERIAK · # 23556 · LICENSED LAND SURVEYOR

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

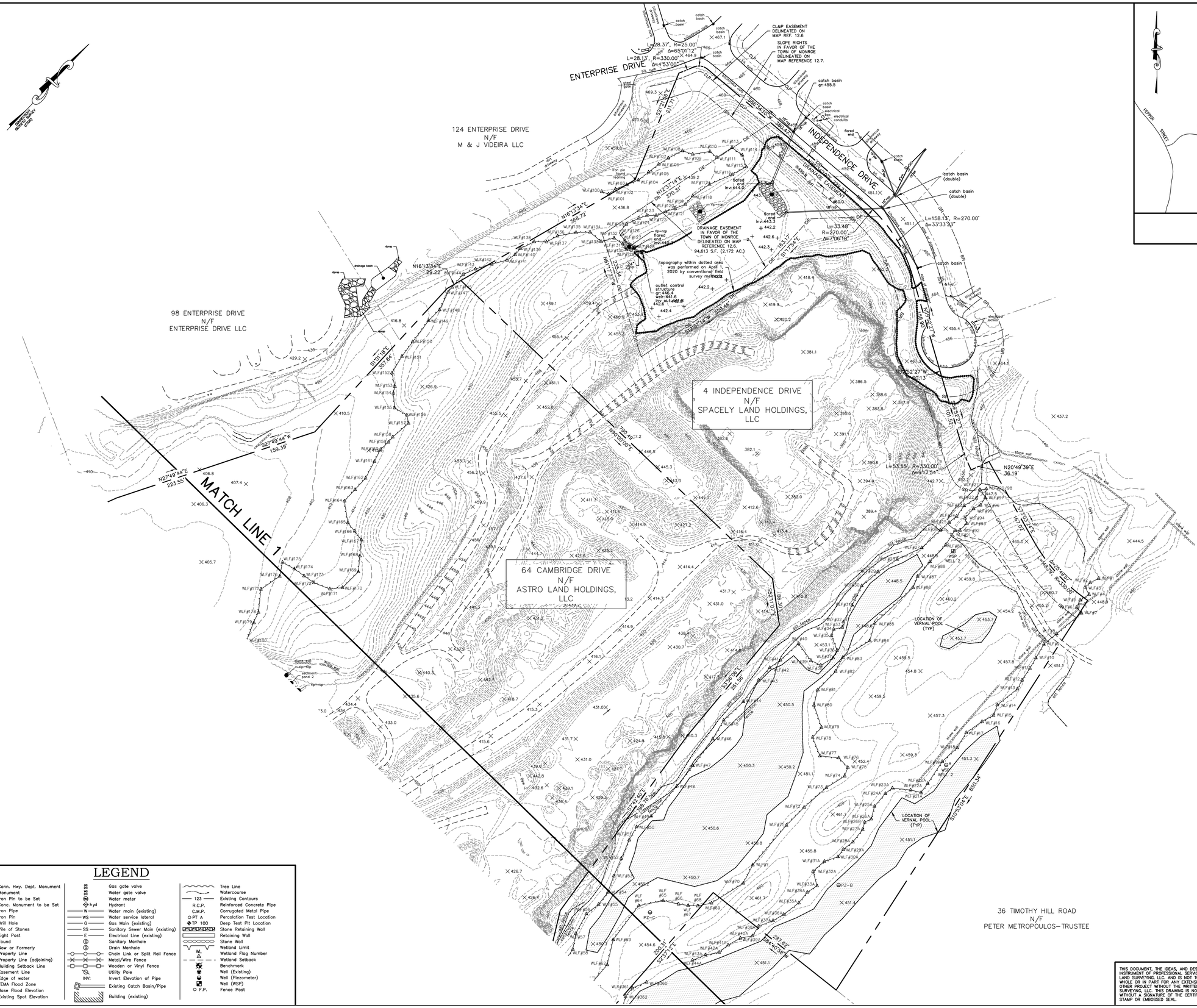
BRYAN P. NESTERIAK, PE, LS 23556

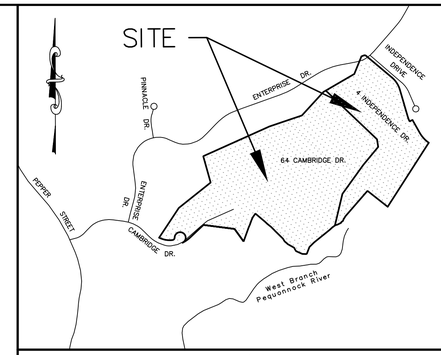
Date 2/25/2020
Scale 1"=80'
Job No. 992
Drawing No. 1 of 2

THIS DOCUMENT, THE IDEAS, AND DESIGN INCORPORATED HEREON IS AN INSTRUMENT OF PROFESSIONAL SERVICE AND THE PROPERTY OF ACCURATE LAND SURVEYING, LLC. AND IS NOT TO BE REPRODUCED OR USED IN WHOLE OR IN PART FOR ANY EXTENSION OF THIS PROJECT OR FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF ACCURATE LAND SURVEYING, LLC. THIS DRAWING IS NOT A FINAL AND VALID DOCUMENT WITHOUT A SIGNATURE OF THE CERTIFYING PROFESSIONAL AND A LIVE WET STAMP OR EMBOSSED SEAL.

PS, 64 CAMBRIDGE DR. & 4 INDEPENDENCE DR., MONROE, CT.

L:\Job Data\900-999\992\Cadd Data\992 Work.dwg, 6/22/2023 12:47:36 PM, ARCH full bleed D (36.00 x 24.00 Inches)





LOCATION MAP
SCALE: 1"=800'

GENERAL SURVEY NOTES

1. THIS SURVEY AND MAP HAS BEEN PREPARED IN ACCORDANCE WITH THE REGULATION OF CONNECTICUT STATE AGENCIES, SECTION 20–300b–1 THROUGH 20–300b–20, EFFECTIVE OCTOBER 26, 2018, AND THE "MINIMUM STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC.
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6. PROPERTIES ARE ALSO KNOWN AS TOWN OF MONROE TAX LOT 0 (64 CAMBRIDGE DR.) & TAX LOT 28 (4 INDEPENDENCE DR.) ON ASSESSORS MAP 94 BLOCK 15.
7. TOTAL AREA: 64 CAMBRIDGE DR. = 2,201,739 SQ.FT. OR 50.544 ACRES
   4 INDEPENDENCE DR. = 930,131 SQ.FT. OR 21.352 ACRES
8. PROPERTIES LIE IN INDUSTRIAL DISTRICT "I–2".
9. PROPERTIES DO NOT LIE WITHIN A FLOOD HAZARD ZONE AS DETERMINED BY FEMA.
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11. VERNAL POOLS TRANSCRIBED FROM PLAN ENTITLED "RESUBDIVISION MAP OF 36 TIMOTHY HILL ROAD SECTION 6–PEPPER STREET BUSINESS PARK MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 9/8/2014. PREPARED BY ACCURATE LAND SURVEYING, LLC.
12. WETLANDS DELINEATED BY WILLIAM KENNY ASSOCIATES, LLC, FAIRFIELD, CT. ON 1/30/20 THRU 2/12/20. FLAGS WERE FIELD LOCATED VIA GPS TECHNOLOGY AND CONVENTIONAL SURVEY METHODS ON 2/12,13,14&17/20.
13. MAP REFERENCE:
    - 13.1. PLAN ENTITLED "DATA ACCUMULATION PLAN DEPICTING A LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, LLC, PEPPER STREET, MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 12/9/05. PREPARED BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 2905.
    - 13.2. PLAN ENTITLED "RESUBDIVISION PLAN, SECTION 4 PREPARED FOR MONROE LAND HOLDINGS, LLC, 64 CAMBRIDGE DRIVE & 36 TIMOTHY HILL ROAD, MONROE, CONNECTICUT." DATED 2/1/2007, REVISED THRU 4/12/07, PREPARED BY SPATH BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 2972A & 2972B.
    - 13.3. PLAN ENTITLED "COMPILATION MAP, MAP SHOWING EASEMENT AREA TO BE GRANTED TO THE CONNECTICUT LIGHT AND POWER COMPANY ACROSS THE PROPERTY OF MONROE LAND HOLDINGS, LLC, MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 7/23/08. PREPARED BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE WITH THE CONNECTICUT LIGHT AN POWER COMPANY AS CL&P FILE#80450; CL&P DWG#ES–61243–5143.
    - 13.4. PLAN ENTITLED "DATA ACCUMULATION PLAN, MAP SHOWING LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, 124 ENTERPRISE DR. (LOT 17), 4 INDEPENDENCE DR. (LOT 28) AND 64 CAMBRIDGE DR., MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 8/8/08, BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3010.
    - 13.5. PLAN ENTITLED "DATA ACCUMULATION PLAN, MAP SHOWING LOT LINE REVISION, PREPARED FOR CAMBRIDGE INVESTMENTS, 36 TIMOTHY HILL ROAD, 64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DR.(LOT 28), MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 5/11/09, BY SPATH–BJORKLUND ASSOCIATES, INC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3033A & 3033B.
    - 13.6. PLAN ENTITLED "DATA ACCUMULATION PLAN, PEPPER STREET BUSINESS PARK, SECTION TWO, ASBUILT PLAN AND PROFILE, ENTERPRISE DRIVE, MONROE, CONNECTICUT, PREPARED FOR CAMBRIDGE INVESTMENTS, LLC." SCALE: 1"=40'. DATED: 10/9/06, REVISED THRU: 8/25/10. BY SPATH–BJORKLUND ASSOCIATES, INC.
    - 13.7. PLAN ENTITLED "DATA ACCUMULATION PLAN, DEPICTING A LOT LINE REVISION, PREPARED FOR MONROE LAND HOLDINGS, LLC, 7 INDEPENDENCE DRIVE (LOT 27) & 36 TIMOTHY HILL ROAD, MONROE, CONNECTICUT." SCALE: 1"=100' DATED: 4/9/2021. BY THE HUNTINGTON COMPANY, LLC. ON FILE IN THE TOWN OF MONROE CLERK'S OFFICE AS MAP 3071.

LEGEND

C.H.D.	Conn. Hwy. Dept. Monument
Mon.	Monument
●	Iron Pin to be Set
■	Conc. Monument to be Set
I. Pipe	Iron Pipe
●	Iron Pin
D.H.	Drill Hole
	Pile of Stones
	Light Post
Fnd.	Found
N/F	Now or Formerly
	Property Line
	Property Line (adjoining)
	Building Setback Line
	Easement Line
	Edge of water
	FEMA Flood Zone
BFE	Base Flood Elevation
×200.0	Existing Spot Elevation
	Gas gate volve
	Water gate valve
	Water meter
hyd	Hydrant
W	Water main (existing)
WS	Water service lateral
G	Gas Main (existing)
SS	Sanitary Sewer Main (existing)
E	Electrical Line (existing)
S	Sanitary Manhole
D	Drain Manhole
	Chain Link or Split Rail Fence
	Metal/Wire Fence
	Wooden or Vinyl Fence
	Utility Pole
INV.	Invert Elevation of Pipe
	Existing Catch Basin/Pipe
	Building (existing)
	Tree Line
	Watercourse
123	Existing Contours
R.C.P.	Reinforced Concrete Pipe
C.M.P.	Corrugated Metal Pipe
O P.T. A	Percolation Test Location
TP 100	Deep Test Pit Location
	Stone Retaining Wall
	Retaining Wall
	Stone Wall
	Wetland Limit
WL	Wetland Flag Number
	Wetland Setback
	Benchmark
	Well (Existing)
	Well (Piezometer)
	Well (WSP)
O F.P.	Fence Post

No.	Date	REVISION DESCRIPTION
4.	6/22/2023	UPDATED PROPERTY LINES
3.	3/17/2022	UPDATED TOPOGRAPHY
2.	12/22/2020	ADDED MONITORING WELL LOCATIONS
1.	4/6/2020	UPDATED TOPOGRAPHY OF NORTHERN DETENTION BASIN

SCALE: 1"=80'

0 40 80 160 240

ACCURATE LAND SURVEYING, LLC
15 Research Drive, Woodbridge, CT 06525, Tel: 203.881.8145
501 Main Street, Monroe, CT 06468, Tel: 203.880.5455

PROPERTY SURVEY

OF

64 CAMBRIDGE DRIVE &
4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

PREPARED FOR
ASTRO LAND HOLDINGS, LLC
&
SPACELY LAND HOLDINGS, LLC

STATE OF CONNECTICUT · BRYAN P. NESTERIAK · # 23556 · LICENSED LAND SURVEYOR

THIS DOCUMENT, THE IDEAS, AND DESIGN INCORPORATED HEREON IS AN INSTRUMENT OF PROFESSIONAL SERVICE AND THE PROPERTY OF ACCURATE LAND SURVEYING, LLC. AND IS NOT TO BE REPRODUCED OR USED IN WHOLE OR IN PART FOR ANY EXTENSION OF THIS PROJECT OR FOR ANY OTHER PROJECT WITHOUT THE WRITTEN AUTHORIZATION OF ACCURATE LAND SURVEYING, LLC. THIS DRAWING IS NOT A FINAL AND VALID DOCUMENT WITHOUT A SIGNATURE OF THE CERTIFYING PROFESSIONAL AND A LIVE WET STAMP OR EMBOSSED SEAL.

TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS MAP IS SUBSTANTIALLY CORRECT AS NOTED HEREON.

BRYAN P. NESTERIAK, PE, LS 23556

Date	2/25/2020
Scale	1"=80'
Job No.	992
Drawing No.	2 of 2

PS, 64 CAMBRIDGE DR. & 4 INDEPENDENCE DR., MONROE, CT.

GENERAL NOTES

1. BASE MAP INFORMATION TAKEN FROM MAP ENTITLED "PROPERTY SURVEY OF 64 CAMBRDIGE DRIVE & 4 INDEPENDENCE DRIVE, MONROE, CONNECTICUT," DATED: 02/25/2020; REVISED 03/17/22; SCALE: 1"=80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
3. PROPERTY OWNER INFORMATION TAKEN FROM RESIDENTIAL PROPERTY RECORD CARDS PROVIDED BY THE TOWN OF MONROE ASSESSOR'S OFFICE.THE INFORMATION IS UP TO DATE AS OF MAY 2021.

LEGEND

- PROPERTY LINE
- LIMIT OF 500' RADIUS FROM PROPERTY LINE
- FLOW PATH LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE

CAMBRIDGE DRIVE

ENTERPRISE DRIVE

INDEPENDENCE DRIVE

TOTAL SITE AREA

64 CAMBRIDGE DRIVE
MONROE, CT 06460

4 INDEPENDENCE DRIVE
MONROE, CT 06460

500' RADIUS (TYP.)

PROPERTY LINE (TYP.)

LIMIT OF VERNAL POOL ENVELOPE (TYP.)

LIMIT OF VERNAL POOL (TYP.)

LIMIT OF WETLANDS (TYP.)

FLOW PATH (TYP.)

LIMIT OF UPLAND REVIEW AREA (TYP.)

LIMIT OF VERNAL POOLS (TYP.)

500'

T SMITH & ASSOCIATES LLC
425 KOSSUTH ST
BRIDGEPORT, CT 06608
094/015/09

BATTAGLIA PHILIP S
67 ENTERPRISE DR
MONROE, CT 06468
094/015/12

J + S INDUSTRIES LLC
35 RIDGEVALE RD
MONROE, CT 06468
104/002/08

JRD PROPERTIES - MONROE LLC
146 HUNTINGDON AVE
WATERBURY, CT 06708
104/002/10

JPC INVESTMENTS LLC
PO BOX 551
SANDY HOOK, CT 06482-0551
094/015/14

MMI OF MONROE LLC +
INFANTE MARY E
74 ENTERPRISE DRIVE
MONROE, CT 06468
094/015/13

OHC CORPORATION
PO BOX 94
MONROE, CT 06468
094/015/16

STATE OF CONNECTICUT
79 ELM ST
HARTFORD, CT 06106-5127
113/001/00

MAYBROOK PROPERTIES LLC
70 RESEARCH DR
MILFORD, CT 06460
094/015/01

KALBOYS LLC
99 STAPLES RD
EASTON, CT 06612
094/015/11

TPG LLC
2 BRIDGE END FARM LN
SANDY HOOK, CT 06482-1055
094/015/18

YANKOCY PROPERTIES LLC
143 ENTERPRISE DR
MONROE, CT 06468
094/015/22

YANKOCY PROPERTIES LLC
143 ENTERPRISE DR
MONROE, CT 06468
094/015/20

ENTERPRISE DRIVE LLC
225 KNOWLTON ST
BRIDGEPORT, CT 06608
094/015/15

M & J VIDEIRA LLC
330 DEKALB AVE
BRIDGEPORT, CT 06607
094/015/17

HCA HOLDINGS LLC
831 FEDERAL ROAD
BROOKFIELD, CT 06804
094/016/02

CAMBRIDGE DRIVE RE LLC
59 CAMBRIDGE DR
MONROE, CT 06468
094/015/04

BRIT CAR LLC
1 INDEPENDENCE DR
MONROE, CT 06468
094/015/19

154-164 ENTERPRISE LLC
89 WEST TRAIL ST
STAMFORD, CT 06903
094/015/21

N & J CONSTRUCTION LLC
PO BOX 347
NEWTOWN, CT 06470
094/015/26

LANDTRUST DEVELOPMENT LLC
160 JUDD RD
EASTON, CT 06612
094/015/27

STATE OF CONNECTICUT
79 ELM ST
HARTFORD, CT 06106-5127
105/001/01

AQUARION WATER CO OF CONNECTICUT
600 LINDLEY ST
BRIDGEPORT, CT 06606
104/001/00

STATE OF CONNECTICUT
79 ELM ST
HARTFORD, CT 06106-5127
105/001/02

TOWN OF MONROE (PUBLIC WORKS)
7 FAN HILL RD
MONROE, CT 06468
105/002/00

METROPOULOS PETER - TRUSTEE
535 14TH STREET
MANHATTAN BEACH, CA 90266
114/006/00

ABANDONED

E 463500 E 464000 E 464500 E 465000 E 465500

N 1169500 N 1169000 N 1168500 N 1168000 N 1167500

Rev. #:	Date	Description

Graphic Scale: 200 0 200 400

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	AWC
Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 200'

Kevin Solli, P.E.
CT 25759

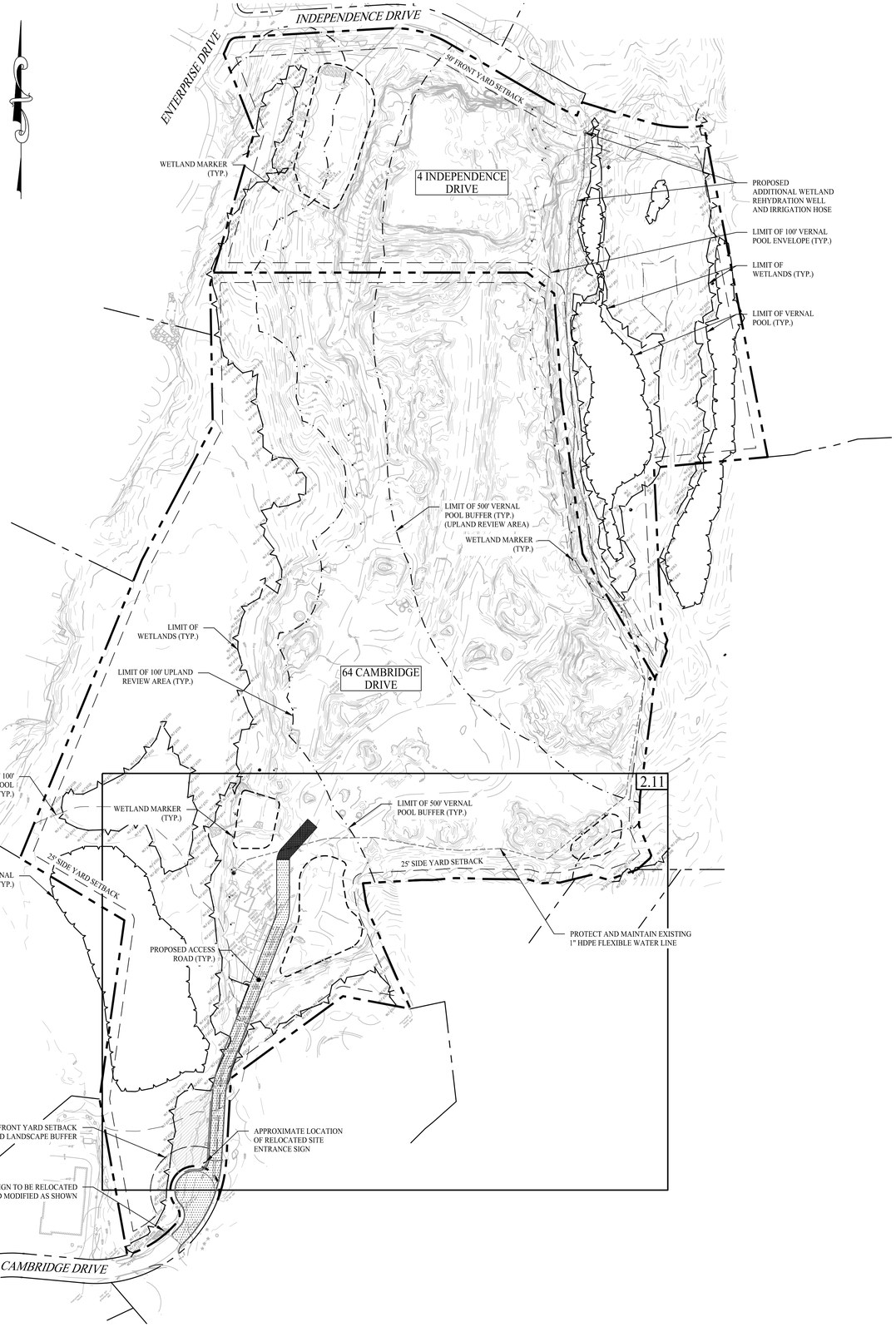
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
500' RADIUS & AREA MAP	1.40

Oct 17, 2023 – 4:36pm chris
X:\SE Files\Project Data\2019\1903601 – 64 Cambridge Drive – Monroe\Cadd Data\P & Z Submission (06-30-2021)\1903601 – 1.40.dwg



ZONING COMPLIANCE TABLE

PROPERTY: 64 CAMBRIDGE DRIVE — ZONE: INDUSTRIAL DISTRICT 2 (I-2)

ZONING REQUIREMENT	ZONING STANDARD	EXISTING CONDITIONS	PROPOSED CONDITIONS*	RESULTANT CONDITIONS
MINIMUM LOT AREA	3.0 AC	50.54 AC	50.54 AC	50.54 AC
MINIMUM LOT FRONTAGE	200 FT	456.7 FT	456.7 FT	456.7 FT
MINIMUM SQUARE	150 FT X 150 FT	150 FT X 150 FT	150 FT X 150 FT	150 FT X 150 FT
MINIMUM YARD FRONT YARD REAR AND SIDE	 50 FT 25 FT	 N/A N/A	 N/A N/A	 N/A N/A
MAXIMUM HEIGHT	3 STORIES (40 FT)	N/A	N/A	N/A
MAXIMUM BUILDING COVERAGE	25%	N/A	N/A	N/A

ZONING COMPLIANCE TABLE

PROPERTY: 4 INDEPENDENCE DRIVE — ZONE: INDUSTRIAL DISTRICT 2 (I-2)

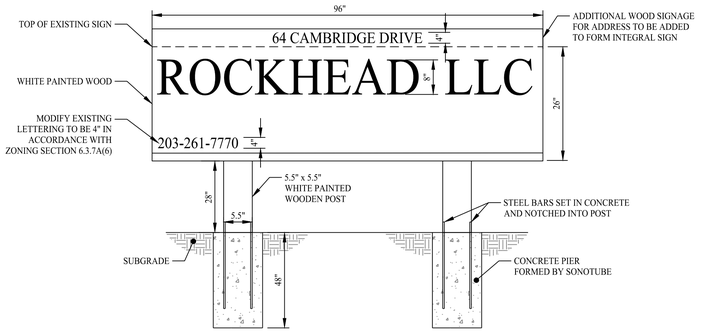
ZONING REQUIREMENT	ZONING STANDARD	EXISTING CONDITIONS	PROPOSED CONDITIONS*	RESULTANT CONDITIONS
MINIMUM LOT AREA	3.0 AC	21.35 AC	21.35 AC	21.35 AC
MINIMUM LOT FRONTAGE	200 FT	1005.4 FT	1005.4 FT	1005.4 FT
MINIMUM SQUARE	150 FT X 150 FT	150 FT X 150 FT	150 FT X 150 FT	150 FT X 150 FT
MINIMUM YARD FRONT YARD REAR AND SIDE	 50 FT 25 FT	 N/A N/A	 N/A N/A	 N/A N/A
MAXIMUM HEIGHT	3 STORIES (40 FT)	N/A	N/A	N/A
MAXIMUM BUILDING COVERAGE	25%	N/A	N/A	N/A

WETLAND AREA TABLE

AREA	LOT (ACRE)
LOT AREA	71.90±
WETLANDS ON LOT	18.89±
UPLAND REVIEW AREA ON LOT	37.44±
WETLANDS TO BE ALTERED	0.00±
UPLAND REVIEW AREA TO BE ALTERED	25.88±
TOTAL REGULATED AREA TO BE ALTERED	25.88±

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- BUILDING SETBACK
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- LIMIT OF VERNAL POOL ENVELOPE
- WETLAND MARKER
- SITE SIGNAGE
- HEAVY DUTY BITUMINOUS CONCRETE PAVEMENT
- EXISTING WELL



MONUMENT SIGN

SCALE: NTS

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
3. CONTRACTOR(S) TO TAKE AND VERIFY ALL DIMENSIONS AND CONDITIONS OF THE WORK AND BE RESPONSIBLE FOR COORDINATION OF SAME. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.
4. THIS PLAN IS FOR PERMITTING PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION. NO CONSTRUCTION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES.
5. ALL CONTRACTORS AND SUBCONTRACTORS SHALL OBTAIN COMPLETE DRAWING PLAN SETS FOR BIDDING AND CONSTRUCTION. PLAN SETS SHALL NOT BE DISASSEMBLED INTO PARTIAL PLAN SETS FOR USE BY CONTRACTORS AND SUBCONTRACTORS OF INDIVIDUAL TRADES. IT SHALL BE THE CONTRACTOR'S AND SUBCONTRACTOR'S RESPONSIBILITY TO OBTAIN COMPLETE PLAN SETS FOR USE IN BIDDING AND CONSTRUCTION.
6. DO NOT SCALE DRAWING. DIMENSIONS GOVERN OVER SCALED DIMENSIONS.
7. ALL NOTES AND DIMENSIONS DESIGNATED "TYP." APPLY TO ALL LIKE OR SIMILAR CONDITIONS THROUGHOUT THE PLAN SET.
8. THE CONTRACTOR SHALL VERIFY ALL SITE AND BUILDING CONDITIONS IN THE FIELD AND CONTACT THE SITE ENGINEER IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS.
9. THE CONTRACTOR SHALL ABIDE BY ALL OSHA FEDERAL STATE AND LOCAL REGULATIONS WHEN OPERATING CRANES, BOOMS, HOISTS, ETC. IN CLOSE PROXIMITY TO OVERHEAD AND BELOW GROUND ELECTRIC LINES. IF CONTRACTOR MUST OPERATE EQUIPMENT CLOSE TO ELECTRIC LINES, CONTACT POWER COMPANY TO MAKE ARRANGEMENTS FOR PROPER SAFEGUARDS. ANY UTILITY COMPANY FEES SHALL BE PAID FOR BY THE CONTRACTOR.
10. THE ARCHITECT OR ENGINEER IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ARCHITECT AND ENGINEER HAVE NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OR TO SUPERVISE SAFETY AND DOES NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
11. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY COMPANY AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE COMMENCEMENT OF WORK AT 1-800-922-4455 AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATION

VARIANCES GRANTED

THE ZONING BOARD OF APPEALS (ZBA) AT ITS JULY 18, 2023 MEETING VOTED 5 TO 0 TO APPROVE APPLICATION NO.: ZBA #2023-04 FILE #1417 FOR THE PLANNING AND ZONING REGULATIONS OF THE TOWN OF MONROE FOR VARIANCES OF SECTIONS(S) 6.4.9.C, 6.4.9.D, 6.4.9.E AND 6.4.9.P. THE APPLICABLE SECTIONS ARE LISTED BELOW:

- SECTION §6.4.9.C - NO CHANGE IN CONTOUR SHALL BE MADE WITHIN TWENTY-FIVE (25) FEET OF ANY PROPERTY LINE.
- SECTION §6.4.9.D - NO ARTIFICIAL SLOPE GREATER THAN FOURTEEN DEGREES (14°) TO THE HORIZONTAL (OR MAXIMUM FOUR FEET HORIZONTAL TO ONE FOOT VERTICAL) SHALL BE CREATED WITHIN FIFTY FEET OF ANY PROPERTY LINE.
- SECTION §6.4.9.E - NO ARTIFICIAL SLOPE GREATER THAN FOURTEEN DEGREES (14°) TO THE HORIZONTAL SHALL BE CREATED WITHIN FIFTY FEET OF ANY STREET LINE.
- SECTION §6.4.9.P – ALL PERMITTED SUCH ACTIVITIES REGARDLESS OF PERMITTED LOCATION SHALL NOT INCLUDE, PERMIT OR INVOLVE MATERIALS FROM OFFSITE LOCATIONS.

Rev. #:	Date	Description

Graphic Scale: 150 0 150 300

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 | T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 150'

Kevin Solli, P.E.
CT 25759

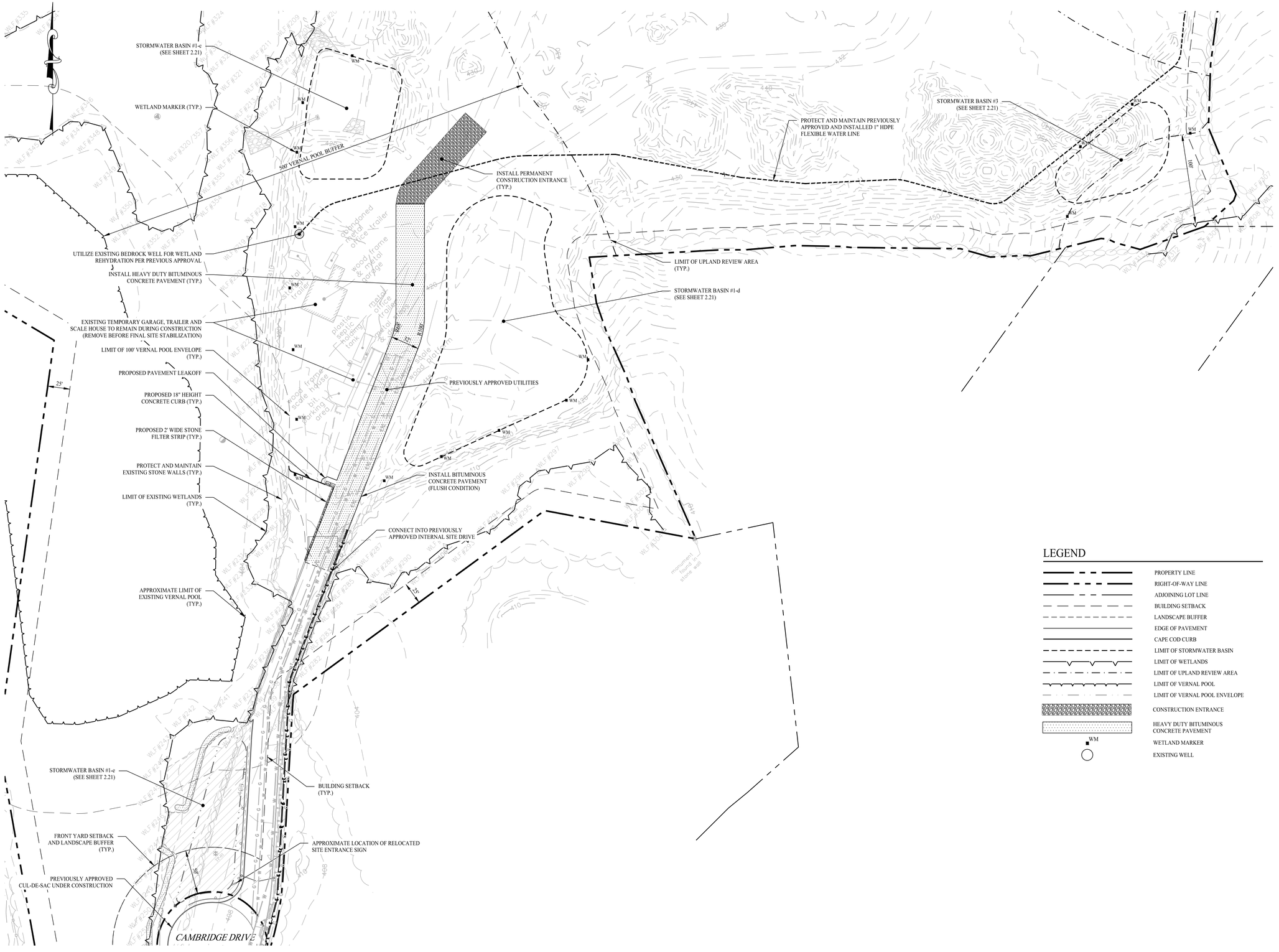
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
OVERALL SITE LAYOUT PLAN	2.10

Oct 17, 2023 – 4:36pm chris
X:\SE Files\Project Data\2019\1903601 – 64 Cambridge Drive – Monroe\Cadd Data\P & Z Submission (06-30-2021)\1903601 – 2.10.dwg



GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
3. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES AND ISSUANCE OF A DULY AUTHORIZED CERTIFIED OF ZONING COMPLIANCE AND BUILDING PERMIT FROM THE TOWN OF MONROE.
4. THE CONTRACTOR SHALL VERIFY ALL SITE AND BUILDING CONDITIONS IN THE FIELD AND CONTACT THE SITE ENGINEER IF THERE ARE ANY QUESTIONS OR CONFLICTS REGARDING THE CONSTRUCTION DOCUMENTS AND/OR FIELD CONDITIONS.
5. THE CONTRACTOR SHALL ABIDE BY ALL OSHA FEDERAL STATE AND LOCAL REGULATIONS WHEN OPERATING CRANES, BOOMS, HOISTS, ETC. IN CLOSE PROXIMITY TO OVERHEAD AND BELOW GROUND ELECTRIC LINES. IF CONTRACTOR MUST OPERATE EQUIPMENT CLOSE TO ELECTRIC LINES, CONTACT POWER COMPANY TO MAKE ARRANGEMENTS FOR PROPER SAFEGUARDS. ANY UTILITY COMPANY FEES SHALL BE PAID FOR BY THE CONTRACTOR.
6. THE ARCHITECT OR ENGINEER IS NOT RESPONSIBLE FOR SITE SAFETY MEASURES TO BE EMPLOYED DURING CONSTRUCTION. THE ARCHITECT AND ENGINEER HAVE NO CONTRACTUAL DUTY TO CONTROL THE SAFEST METHODS OR MEANS OF THE WORK, JOB SITE RESPONSIBILITIES, SUPERVISION OR TO SUPERVISE SAFETY AND DOES NOT VOLUNTARILY ASSUME ANY SUCH DUTY OR RESPONSIBILITY.
7. INFORMATION ON EXISTING UTILITIES AND STORM DRAINAGE SYSTEMS HAS BEEN COMPILED FROM AVAILABLE INFORMATION INCLUDING UTILITY COMPANY AND MUNICIPAL RECORD MAPS AND/OR FIELD SURVEY AND IS NOT GUARANTEED CORRECT OR COMPLETE. UTILITIES AND STORM DRAINAGE SYSTEMS ARE SHOWN TO ALERT THE CONTRACTOR TO THEIR PRESENCE AND THE CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ACTUAL LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STORM DRAINAGE SYSTEMS INCLUDING SERVICES. PRIOR TO DEMOLITION OR CONSTRUCTION, THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" 72 HOURS BEFORE COMMENCEMENT OF WORK AT 1-800-922-4455 AND VERIFY ALL UTILITY AND STORM DRAINAGE SYSTEM LOCATIONS.
8. DO NOT SCALE DRAWINGS. DIMENSIONS GOVERN OVER SCALED DIMENSIONS.
9. ALL CONTRACTORS AND SUBCONTRACTORS SHALL OBTAIN COMPLETE DRAWING PLAN SETS FOR BIDDING AND CONSTRUCTION. PLAN SETS SHALL NOT BE DISASSEMBLED INTO PARTIAL PLAN SETS FOR USE BY CONTRACTORS AND SUBCONTRACTORS OF INDIVIDUAL TRADES. IT SHALL BE THE CONTRACTOR'S AND SUBCONTRACTOR'S RESPONSIBILITY TO OBTAIN COMPLETE PLAN SETS FOR USE IN BIDDING AND CONSTRUCTION.
10. ALL NOTES AND DIMENSIONS DESIGNATED "TYP." APPLY TO ALL LIKE OR SIMILAR CONDITIONS THROUGHOUT THE PROJECT.
11. CONTRACTOR(S) TO TAKE AND VERIFY ALL DIMENSIONS AND CONDITIONS OF THE WORK AND BE RESPONSIBLE FOR COORDINATION OF SAME. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- BUILDING SETBACK
- LANDSCAPE BUFFER
- EDGE OF PAVEMENT
- CAPE COD CURB
- LIMIT OF STORMWATER BASIN
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- CONSTRUCTION ENTRANCE
- HEAVY DUTY BITUMINOUS CONCRETE PAVEMENT
- WM — WETLAND MARKER
- EXISTING WELL

Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 50'

Kevin Solli, P.E.
CT 25759

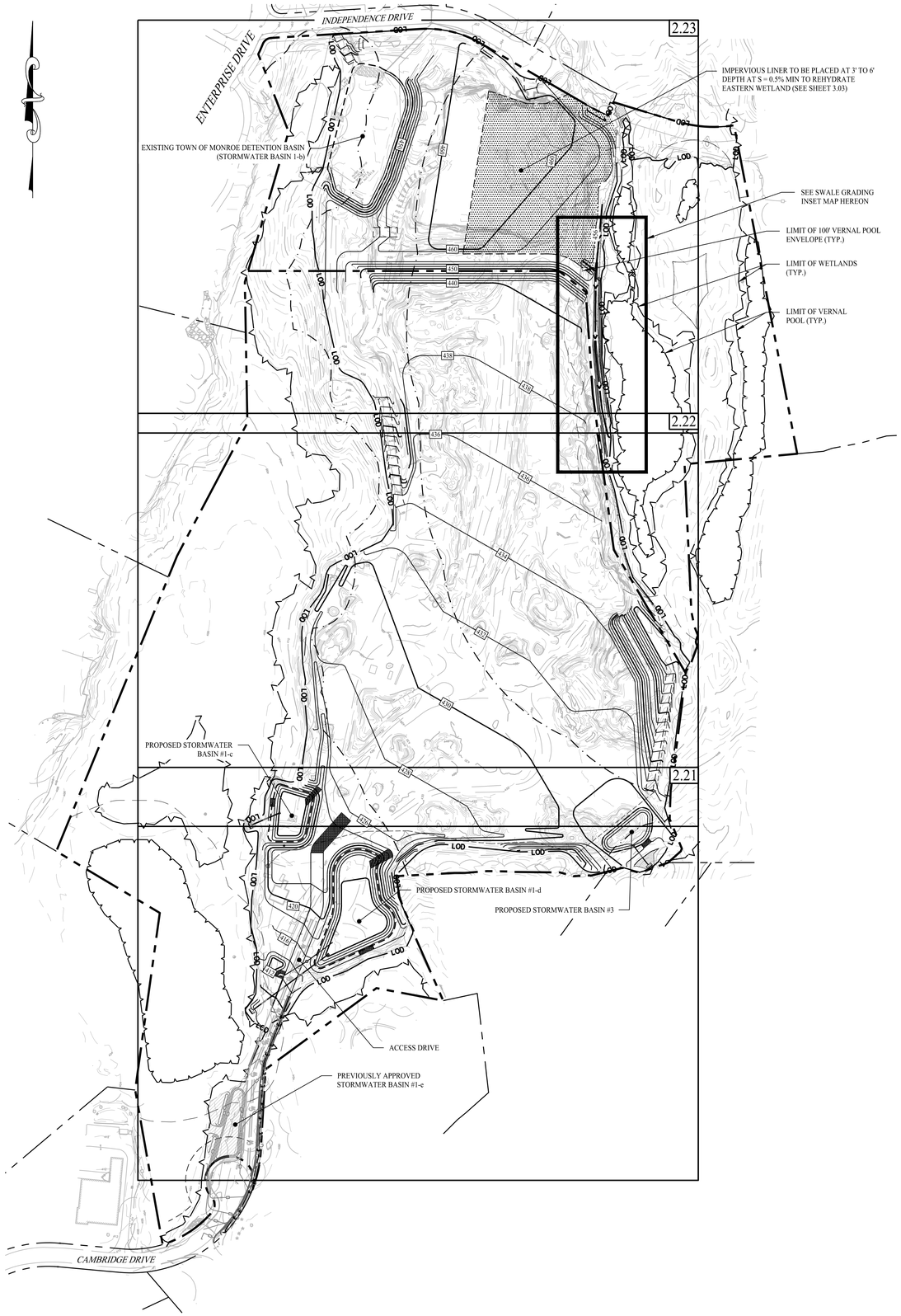
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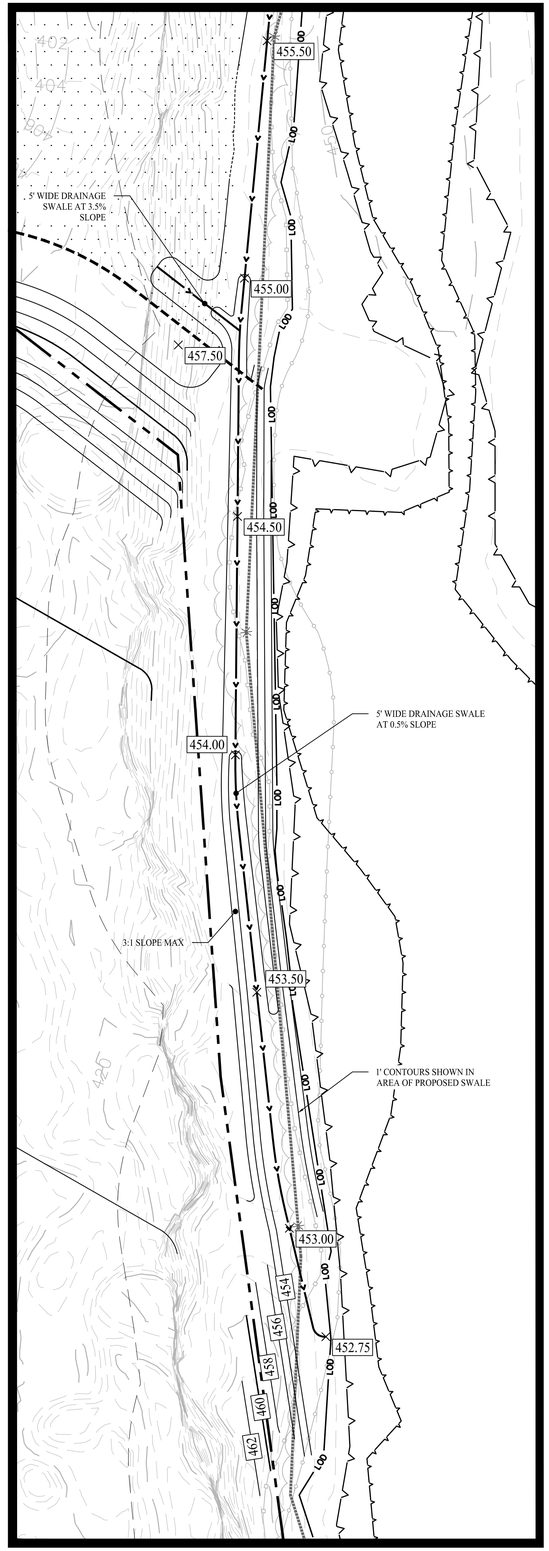
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
SITE LAYOUT PLAN	2.11

Oct 17, 2023 - 4:36pm chris
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SWALE GRADING INSET MAP - SCALE 1" = 30'

30 0 30 60

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
3. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES.
4. THE CONTRACTOR SHALL PRESERVE EXISTING VEGETATION WHERE POSSIBLE AND/OR AS NOTED ON DRAWINGS. REFER TO EROSION CONTROL PLAN FOR LIMIT OF DISTURBANCE AND EROSION CONTROL NOTES.
5. TOPSOIL SHALL BE STRIPPED AND STOCKPILE ON SITE FOR USE IN FINAL LANDSCAPING.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMITS REQUIRED BY GOVERNMENT AND LOCAL AGENCIES PRIOR TO CONSTRUCTION. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY CONSTRUCTION PERMITS FROM THE TOWN OF MONROE REQUIRED TO PERFORM ALL WORK, INCLUDING FOR STREET CUTS AND CONNECTIONS TO EXISTING UTILITIES. THE CONTRACTOR SHALL POST ALL BONDS, PAY ALL FEES, PROVIDE PROOF OF INSURANCE AND PROVIDE TRAFFIC CONTROL NECESSARY FOR THIS WORK.
7. THE CONTRACTOR SHALL PROVIDE AND MAINTAIN TRAFFIC DEVICES FOR PROTECTION OF VEHICLES AND PEDESTRIANS CONSISTING OF DRUMS, BARRIERS, SIGNS, LIGHTS, FENCES AND UNIFORMED TRAFFIC CONTROLLERS AS REQUIRED, ORDERED BY THE ENGINEER OR REQUIRED BY THE STATE AND LOCAL GOVERNING AUTHORITIES.
8. THE CONTRACTOR SHALL COMPACT FILL IN 12" MAXIMUM LIFTS UNDER ALL PARKING, BUILDING, AND DRIVE AREAS TO 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557 (MODIFIED PROCTOR TEST), OR AS DIRECTED BY THE GEOTECHNICAL ENGINEER.
9. UNDERDRAINS SHALL BE ADDED, IF DETERMINED NECESSARY IN THE FIELD BY THE OWNER/GEOTECHNICAL ENGINEER, AFTER SUBGRADE IS ROUGH GRADED.
10. ALL DISTURBANCE INCURRED TO TOWN OR STATE PROPERTY DUE TO CONSTRUCTION SHALL BE RESTORED TO ITS PREVIOUS CONDITION OR BETTER, TO THE SATISFACTION OF THE TOWN OF MONROE AUTHORITY.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- 520 MAJOR CONTOURS
- 522 MINOR CONTOURS
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- IMPERVIOUS LINER DEMARCATION LINE
- LOD LIMIT OF DISTURBANCE

VOLUME & AREA SUMMARY

AREA	AREA OF DISTURBANCE	CUT (CY)	FILL (CY)	NET (CY)
REGULATED AREA	1,129,484 SF (25.93 AC)	99,778	576,097	476,319 (IMPORT)
BALANCE OF SITE	599,861 SF (13.77 AC)	62,952	77,030	14,078 (IMPORT)
TOTAL	1,729,345 SF (39.70 AC)	162,730	653,127	490,397 (IMPORT)

Rev. #: Date Description

Graphic Scale: 150 0 150 300

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 150'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: OVERALL GRADING & DRAINAGE PLAN

Sheet #: 2.20

Oct. 17, 2023 - 4:37pm chris
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MATCHLINE - SEE SHEET 2.22

PROPOSED STORMWATER BASIN #1-c
STORAGE CAPACITY = 41,305 CF

PROPOSED OUTLET CONTROL STRUCTURE 1c
GRATE = 413.00
KNOCK-OUT 6" INV (IN) = 409.00
2' x 0.5' RECTANGULAR WEIR = 411.30
24" INV (OUT) = 408.00
KNOCK-OUT ORIFICE AFTER FINAL SITE STABILIZATION

PROPOSED 15' WIDE LEVEL SPREADER

PROPOSED 24" FLARED END SECTION
INV = 407.30

70 LF OF 24" HDPE
@ S = 1.0 %

RIPRAP PROTECTION AT SWALE OUTLET

PROPOSED 20' WIDE EMERGENCY SPILLWAY
ELEV. = 414.00

PROPOSED 3:1 SLOPE (TYP.)

TP-2

LIMIT OF VERNAL
POOL (TYP.)

LIMIT OF
WETLANDS (TYP.)

PROTECT AND MAINTAIN
EXISTING SLOPE

68 LF OF 12" RCP @
S = 0.5%

PROPOSED WATER QUALITY BASIN #1
REQUIRED WATER QUALITY VOLUME STORAGE = 808 CF
PROVIDED STORAGE CAPACITY = 2,400 CF

INSTALL DOUBLE GRATE CATCH BASIN
TF = 411.90
12" INV (OUT) = 409.90

BOTTOM OF 18" CONCRETE CURB = 411.00
TOP OF 18" CONCRETE CURB = 412.50

235 LF OF 24" HDPE
@ S = 0.85 %

PROPOSED 24" FLARED END SECTION
INV = 406.00

PROPOSED 15' WIDE LEVEL SPREADER

RIPRAP PROTECTION AT SWALE OUTLET
(TYP.)

INSTALL PERMANENT CONSTRUCTION
ENTRANCE (TYP.)

PROPOSED STORMWATER BASIN #1-d
STORAGE CAPACITY = 174,187 CF

PROPOSED 3:1 SLOPE (TYP.)

TP-1

INSTALL FES
INV = 408.25

PROPOSED 35' WIDE
EMERGENCY SPILLWAY
ELEV. = 416.00

PROPOSED OUTLET CONTROL STRUCTURE 1d
GRATE = 415.00
KNOCK-OUT 2" INV (IN) = 408.00
KNOCK-OUT 4" INV (IN) = 410.00
1' x 2' RECTANGULAR WEIR = 412.00
INV (OUT) = 408.00
KNOCK-OUT ORIFICE AFTER FINAL SITE STABILIZATION

74 LF OF 12" RCP @ S = 1.77%

INSTALL CDS1515-3-C
HYDRODYNAMIC WITHIN MANHOLE
TF = 415.50
12" INV (IN) = 409.56
12" INV (OUT) = 409.56

LIMIT OF 100' VERNAL
POOL ENVELOPE (TYP.)

PREVIOUSLY APPROVED STORMWATER
DETENTION/BIOINFILTRATION BASIN 1e
(CURRENTLY UNDER CONSTRUCTION)

20' WIDE SPILLWAY OUTLET
ELEV. = 406.35

CAMBRIDGE DRIVE

PROPOSED 1' DEEP GRASS LINED
WATER QUALITY SWALE @ S = 1.33 %

PROPOSED 4:1 SLOPE (TYP.)

OVERALL EXTENT OF LIMIT
OF DISTURBANCE (TYP.)

PROPOSED 3:1 SLOPE (TYP.)

PROPOSED OUTLET CONTROL STRUCTURE #3
GRATE = 427.00
KNOCK-OUT 9" INV = 423.00
2.0' x 0.5' RECTANGULAR WEIR = 425.00
18" INV (OUT) = 423.00

PROPOSED 25' WIDE EMERGENCY SPILLWAY
ELEV. = 427.50

54 LF OF 18" HDPE @ S = 1.85 %

PROPOSED 18" FLARED END SECTION
INV = 422.00

PROPOSED 15' WIDE LEVEL SPREADER

PROPOSED STORMWATER BASIN #3
STORAGE CAPACITY = 27,991 CF

PROPOSED WETLAND
REMEDIATION AREA =
1,409 SF ± (SEE SHEET 2.64)

GENERAL NOTES

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11. REFER TO SHEET 2.20 FOR OVERALL GRADING LIMITS OF PROPOSED SITE REMEDIATION.

STORMWATER TEST PIT OBSERVATIONS

TESTING PERFORMED BY SOLLI ENGINEERING, LLC ON MARCH 27, 2020 AND MAY 5, 2020.

TEST PIT 1
0"-48" MISCELLANEOUS FILL
LEDGE @ 48"

TEST PIT 2
0"- 6" MISCELLANEOUS SEDIMENT/SILT
0"-72" OLIVE BROWN COARSE SANDY LOAM
MOTTLES (RESTRICTIVE LAYER) @ 32"
POSSIBLE LEDGE @ 72"

TEST PIT 3
0"-16" TOPSOIL
16"- 36" MISCELLANEOUS SEDIMENT/SILT
36"- 48" DARK YELLOW-BROWN FINE SANDY LOAM
48" - 110" OLIVE BROWN COARSE SANDY LOAM, LITTLE SILT
LEDGE @ 110"

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- MAJOR CONTOURS
- MINOR CONTOURS
- SITE ACCESS DRIVE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- LIMIT OF DISTURBANCE
- IMPERVIOUS LINER DEMARCATION LINE
- SWALE
- AREA OF IMPERVIOUS LINER
- WETLAND REMEDIATION AREA
- RIP RAP/CONSTRUCTION ENTRANCE
- SPOT ELEVATION
- GRADE TO DRAIN
- TEST PIT
- DRAINAGE PIPE
- DRAINAGE STRUCTURE
- LIMITS OF ACCESS RAMP

Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

SOLLI ENGINEERING
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Drawn By:	CJP
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Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: GRADING & DRAINAGE PLAN (1 OF 3)

Sheet #: 2.21

Oct 18, 2023 - 9:22am chris
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MATCHLINE - SEE SHEET 2.23

PROPOSED CROSS-SITE ACCESS RAMP @ S = 8.0%

OVERALL EXTENT OF LIMIT OF DISTURBANCE (TYP.)

LIMIT OF 100' WETLANDS ENVELOPE (TYP.)

LIMIT OF WETLANDS (TYP.)

PROPOSED 1' DEEP GRASS LINED WATER QUALITY SWALE @ S = 1.50%

PROPOSED 2' DEEP GRASS LINED WATER QUALITY SWALE @ S = 1.50%

END OF GRASS LINED SWALE

1' CONTOURS SHOWN IN AREA OF PROPOSED SWALE

LIMIT OF VERNAL POOL (TYP.)

LIMIT OF WETLANDS (TYP.)

LIMIT OF 100' VERNAL POOL ENVELOPE (TYP.)

PROTECT & MAINTAIN EXISTING FLOW DIFFUSER (TYP.)

PROTECT AND MAINTAIN PREVIOUSLY APPROVED AND INSTALLED IRRIGATION LINE

PROTECT & MAINTAIN EXISTING MANIFOLD & IRRIGATION TIMERS

PROTECT & MAINTAIN EXISTING YARD HYDRANT

PROPOSED 3:1 SLOPE WITH BENCH (TYP.)

PROPOSED CROSS-SITE ACCESS RAMP @ S = 8.0% ±

LOWER DEVELOPMENT PAD 64 CAMBRIDGE DRIVE APPROXIMATE ELEVATION = 430.00 ±

HP: 431.50

HP: 430.50

HP: 430.50

PROPOSED STORMWATER BASIN #1-c
STORAGE CAPACITY = 41,305 CF

PROPOSED OUTLET CONTROL STRUCTURE 1c
GRATE = 413.00
KNOCK-OUT 6" INV (IN) = 409.00
2' x 0.5' RECTANGULAR WEIR = 411.30
24" INV (OUT) = 408.00
KNOCK-OUT ORIFICE AFTER FINAL SITE STABILIZATION
OR
PROPOSED 15' WIDE LEVEL SPREADER
TO
PROPOSED 24" FLARED END SECTION
INV = 407.30

RIPRAP PROTECTION AT SWALE OUTLET

PROPOSED 20' WIDE EMERGENCY SPILLWAY
ELEV. = 414.00

PROPOSED 3:1 SLOPE (TYP.)

TP-2

MATCHLINE - SEE SHEET 2.21

GENERAL NOTES

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LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- 520 MAJOR CONTOURS
- 522 MINOR CONTOURS
- SITE ACCESS DRIVE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- LOD LIMIT OF DISTURBANCE
- IMPERVIOUS LINER DEMARCATION LINE
- SWALE
- AREA OF IMPERVIOUS LINER
- WETLAND REMEDIATION AREA
- RIP RAP/CONSTRUCTION ENTRANCE
- 568.85 SPOT ELEVATION
- GRADE TO DRAIN
- TP-103 TEST PIT
- DRAINAGE PIPE
- DRAINAGE STRUCTURE
- LIMITS OF ACCESS RAMP

Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 50'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: GRADING & DRAINAGE PLAN (2 OF 3)

Sheet #: 2.22

Oct 17, 2023 – 4:37pm chris
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GENERAL NOTES

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LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- MAJOR CONTOURS (520)
- MINOR CONTOURS (522)
- SITE ACCESS DRIVE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- LIMIT OF DISTURBANCE (LOD)
- IMPERVIOUS LINER DEMARCATION LINE
- SWALE
- AREA OF IMPERVIOUS LINER
- WETLAND REMEDIATION AREA
- RIP RAP/CONSTRUCTION ENTRANCE
- SPOT ELEVATION (568.85)
- GRADE TO DRAIN
- TEST PIT (TP-103)
- DRAINAGE PIPE
- DRAINAGE STRUCTURE
- LIMITS OF ACCESS RAMP

Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

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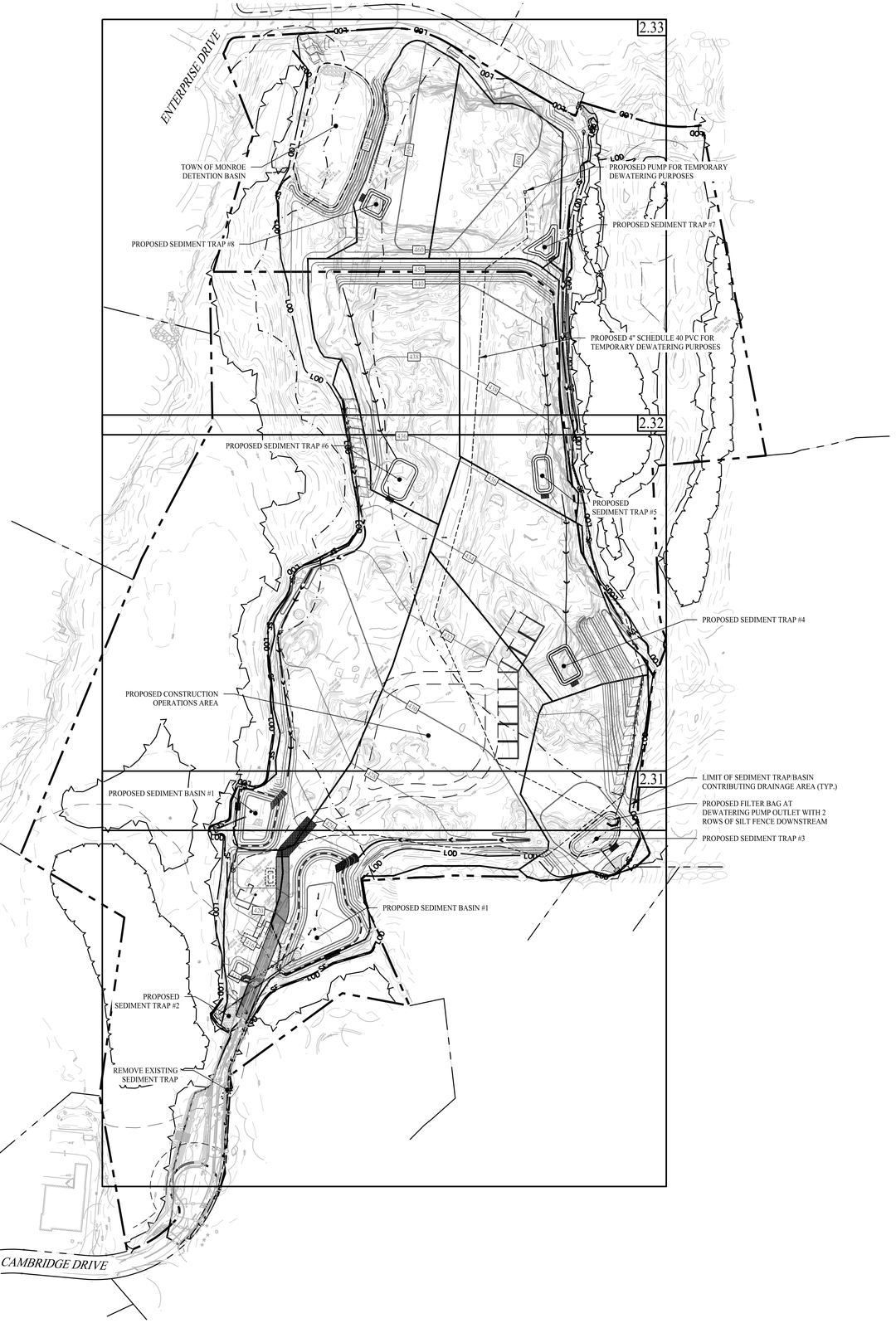
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: GRADING & DRAINAGE PLAN (3 OF 3)

Sheet #: 2.23

Oct 17, 2023 – 4:37pm chris
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LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- SILT FENCE
- DIVERSION SWALE
- CHECK DAM
- MAJOR CONTOURS
- MINOR CONTOURS
- LIMITS OF SEDIMENT TRAP CONTRIBUTING DRAINAGE AREA
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF DISTURBANCE

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Project:

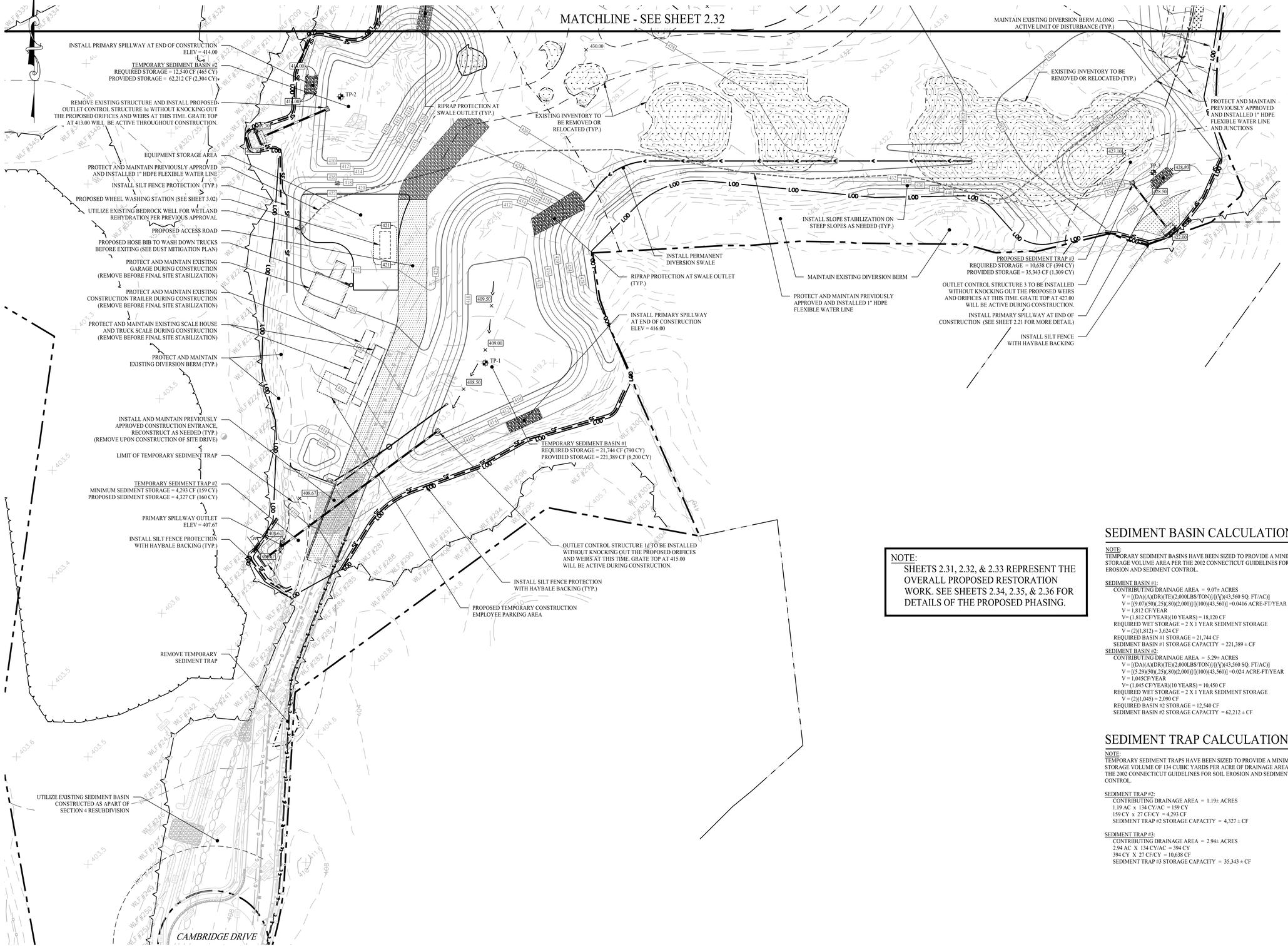
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: OVERALL SOIL EROSION & SEDIMENT CONTROL PLAN

Sheet #: 2.30

Oct 17, 2023 – 4:38pm chris
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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES AND ISSUANCE OF A DULY AUTHORIZED CERTIFIED OF ZONING COMPLIANCE AND BUILDING PERMIT FROM THE TOWN OF MONROE.
3. ALL SOIL EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN DESIGNED IN ACCORDANCE WITH THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.
4. REFER TO SHEET 2.41 FOR SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.REFER TO SHEET 2.30 FOR OVERALL LIMITS OF SOIL EROSION AND SEDIMENT CONTROL MEASURES ON SUBJECT SITE.
5. EXISTING INVENTORY STOCKPILES MAY BE EXPORTED OFFSITE AS A PART OF THE SOIL EROSION AND SEDIMENT CONTROL PLANS.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- 520 MAJOR CONTOURS
- 522 MINOR CONTOURS
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LOD LIMIT OF DISTURBANCE
- REHYDRATION / DEWATERING PIPE
- LIMIT OF EXISTING INVENTORY AREA
- LIMIT OF TEMPORARY PROCESSING AREA
- LIMIT OF TEMPORARY SITE PATH
- TEMPORARY DIVERSION BERM
- SF SILT FENCE WITH HAYBALE BACKING
- 568.85 SPOT ELEVATION
- GRADE TO DRAIN
- DIVERSION SWALE
- CHECK DAM
- RIP RAP
- EXISTING WELL

NOTE:
SHEETS 2.31, 2.32, & 2.33 REPRESENT THE OVERALL PROPOSED RESTORATION WORK. SEE SHEETS 2.34, 2.35, & 2.36 FOR DETAILS OF THE PROPOSED PHASING.

SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 9.07± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(9.07)(50)(.25)(.80)(2,000)]/[(100)(43,560)] =0.0416 ACRE-FT/YEAR
V = 1,812 CF/YEAR
V= (1,812 CF/YEAR)(10 YEARS) = 18,120 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,812) = 3,624 CF
REQUIRED BASIN #1 STORAGE = 21,744 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 5.29± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(5.29)(50)(.25)(.80)(2,000)]/[(100)(43,560)] =0.024 ACRE-FT/YEAR
V = 1,045CF/YEAR
V= (1,045 CF/YEAR)(10 YEARS) = 10,450 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,045) = 2,090 CF
REQUIRED BASIN #2 STORAGE = 12,540 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC x 134 CY/AC = 159 CY
159 CY x 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 2.94± ACRES
2.94 AC X 134 CY/AC = 394 CY
394 CY X 27 CF/CY = 10,638 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 50'

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CT 25759

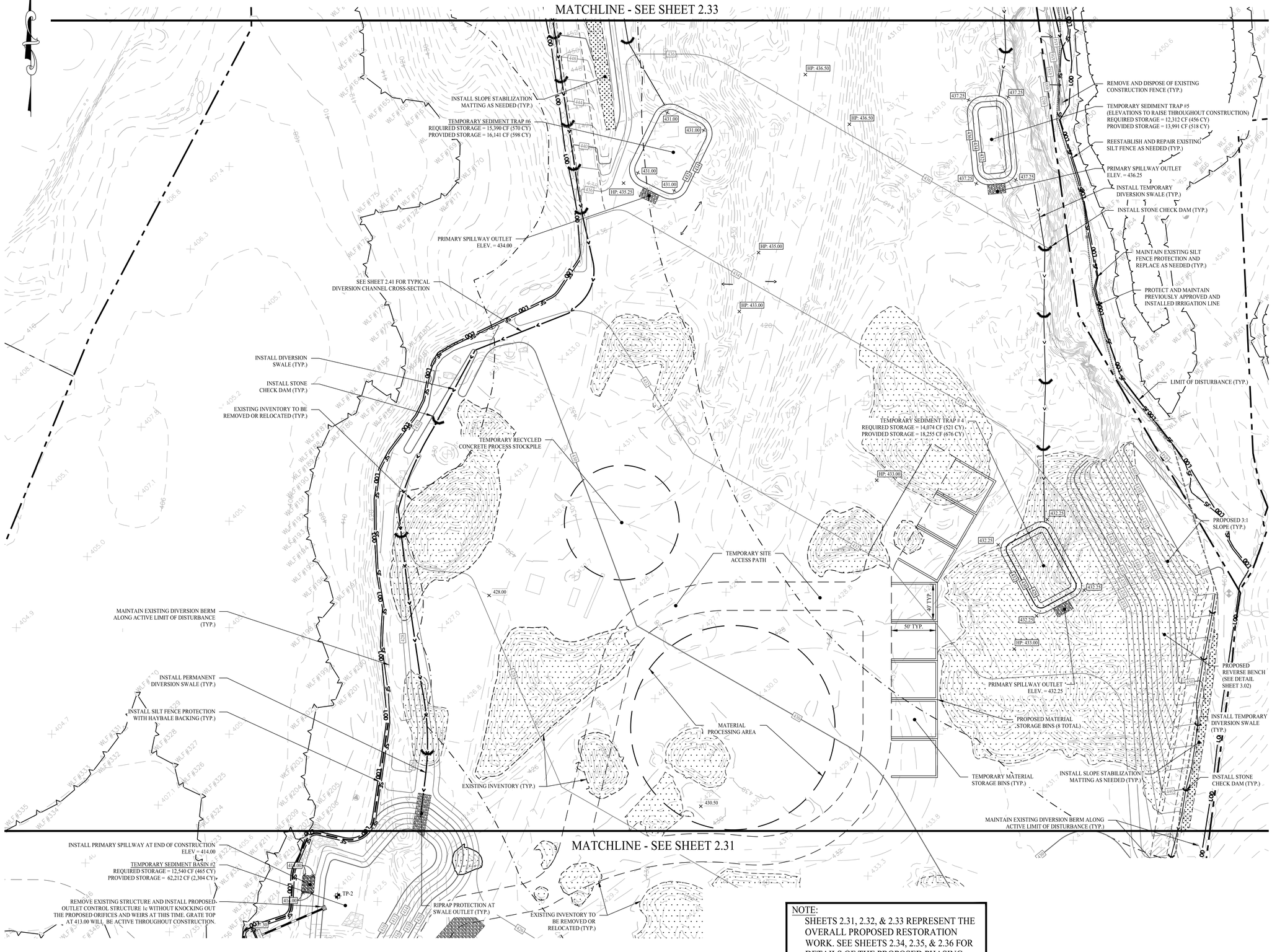
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
SOIL EROSION & SEDIMENT CONTROL PLAN (1 OF 3)	2.31

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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
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4. REFER TO SHEET 2.41 FOR SOIL EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.REFER TO SHEET 2.30 FOR OVERALL LIMITS OF SOIL EROSION AND SEDIMENT CONTROL MEASURES ON SUBJECT SITE.
5. EXISTING INVENTORY STOCKPILES MAY BE EXPORTED OFFSITE AS A PART OF THE SOIL EROSION AND SEDIMENT CONTROL PLANS.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- 520 — MAJOR CONTOURS
- 522 — MINOR CONTOURS
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LOD — LIMIT OF DISTURBANCE
- REHYDRATION / DEWATERING PIPE
- LIMIT OF EXISTING INVENTORY AREA
- LIMIT OF TEMPORARY PROCESSING AREA
- LIMIT OF TEMPORARY SITE PATH
- TEMPORARY DIVERSION BERM
- SF SF — SILT FENCE WITH HAYBALE BACKING
- 568.85 — SPOT ELEVATION
- GRADE TO DRAIN
- DIVERSION SWALE
- CHECK DAM
- RIP RAP
- EXISTING WELL

SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #4:
CONTRIBUTING DRAINAGE AREA = 3.89± ACRES
3.89 AC X 134 CY/AC = 521 CY
521 CY X 27 CF/CY = 14,074 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 18,255 ± CF

SEDIMENT TRAP #5:
CONTRIBUTING DRAINAGE AREA = 3.40± ACRES
3.40 AC X 134 CY/AC = 456 CY
456 CY X 27 CF/CY = 12,312 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 13,991 ± CF

SEDIMENT TRAP #6:
CONTRIBUTING DRAINAGE AREA = 4.25± ACRES
4.25 AC X 134 CY/AC = 570 CY
570 CY X 27 CF/CY = 15,390 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 16,141 ± CF

NOTE:
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Rev. #:	Date	Description

Graphic Scale: 50 0 50 100

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Drawn By:	CJP
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Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 50'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PLAN (2 OF 3)

Sheet #: 2.32

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NOTE:
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GENERAL NOTES

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LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- 520 — MAJOR CONTOURS
- 522 — MINOR CONTOURS
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LOD — LIMIT OF DISTURBANCE
- REHYDRATION / DEWATERING PIPE
- LIMIT OF EXISTING INVENTORY AREA
- LIMIT OF TEMPORARY PROCESSING AREA
- LIMIT OF TEMPORARY SITE PATH
- TEMPORARY DIVERSION BERM
- SF — SILT FENCE WITH HAYBALE BACKING
- 568.85 — SPOT ELEVATION
- GRADE TO DRAIN
- DIVERSION SWALE
- CHECK DAM
- RIP RAP
- EXISTING WELL

SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #7:
CONTRIBUTING DRAINAGE AREA = 2.78± ACRES
2.78 AC X 134 CY/AC = 372 CY
372 CY X 27 CF/CY = 10,044 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 10,070 ± CF

SEDIMENT TRAP #8:
CONTRIBUTING DRAINAGE AREA = 2.27± ACRES
2.27 AC X 134 CY/AC = 305 CY
305 CY X 27 CF/CY = 8,235 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 10,599 ± CF

Rev. #:	Date	Description

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Kevin Solli, P.E.
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Project:

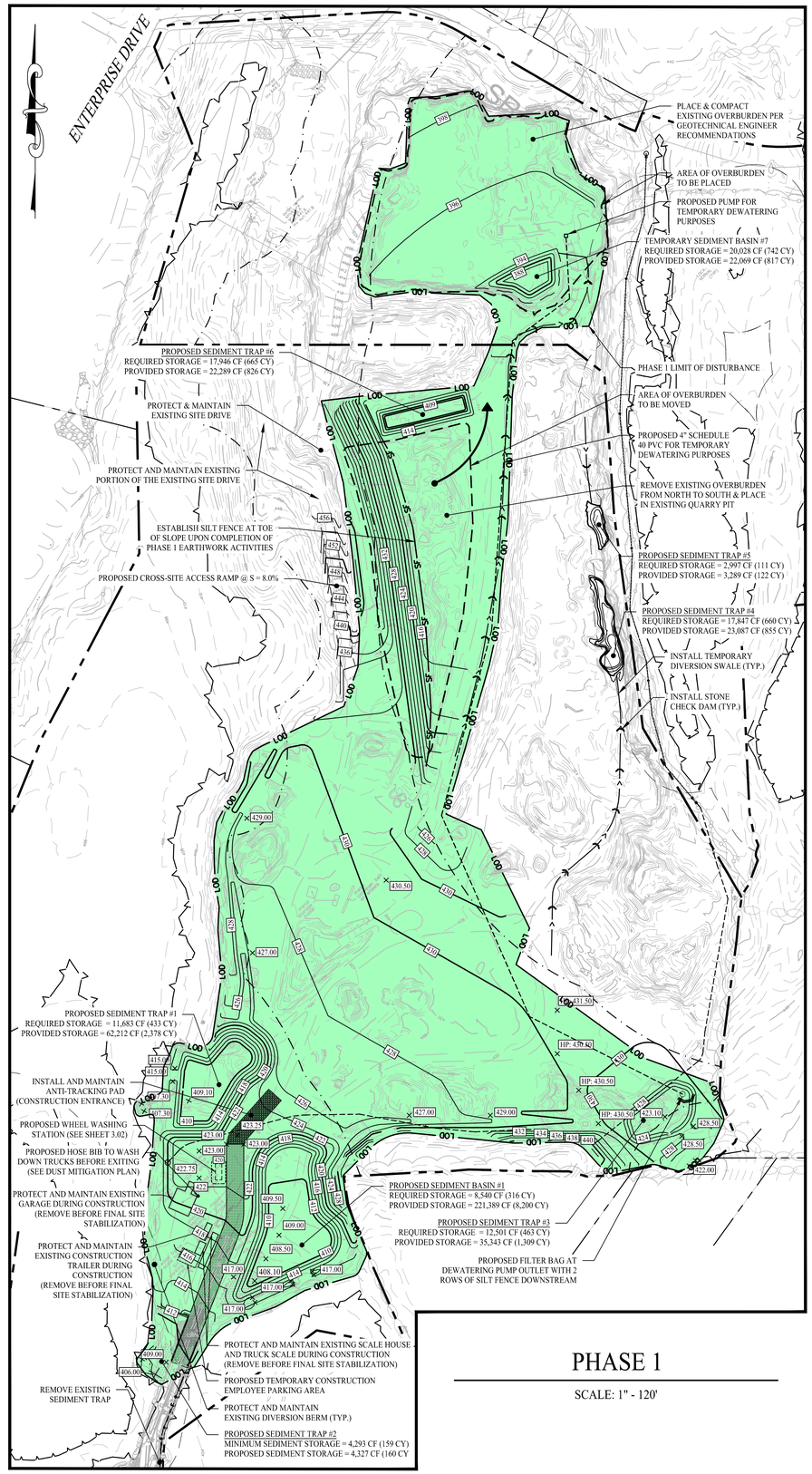
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PLAN (3 OF 3)

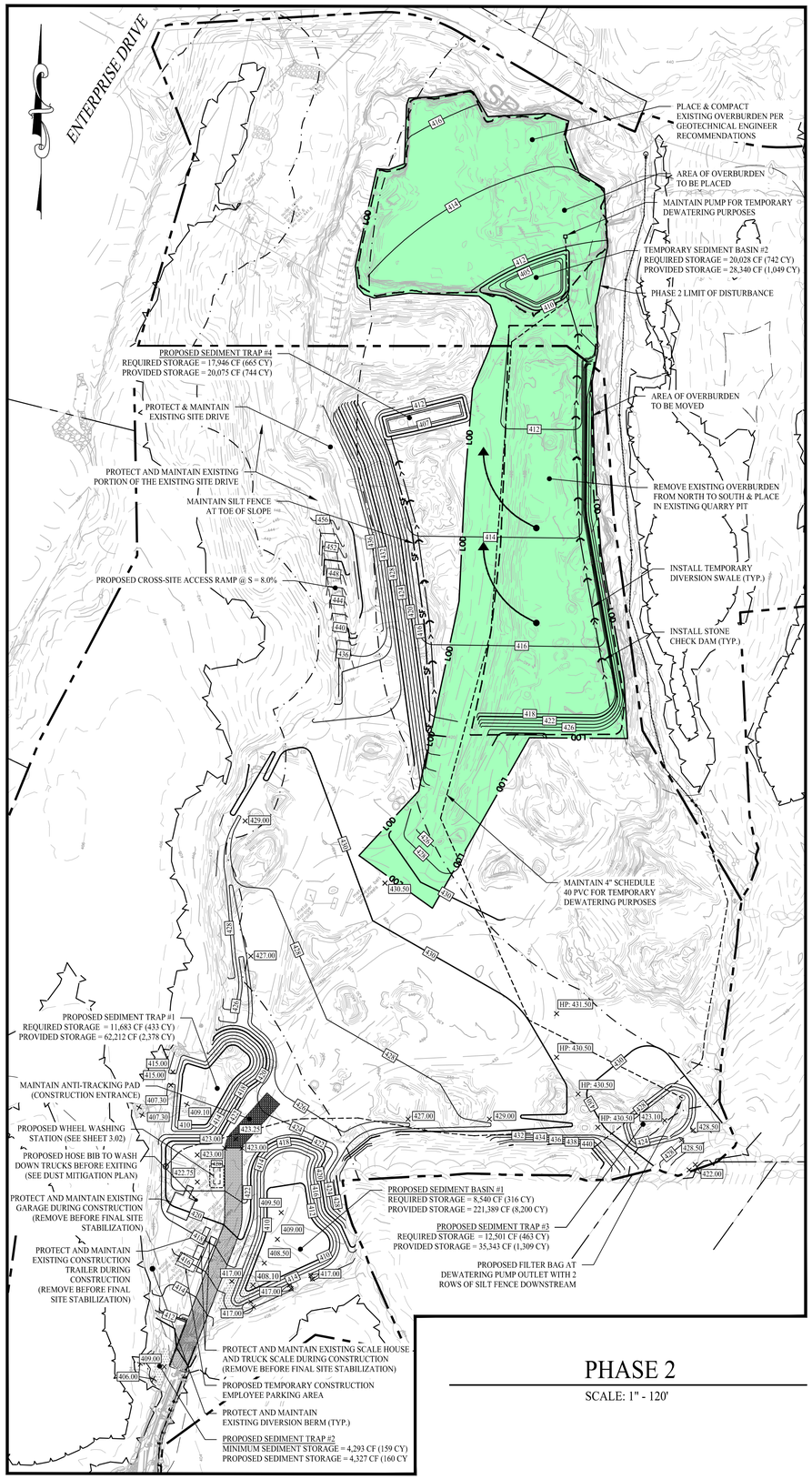
Sheet #: 2.33

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PHASE 1

SCALE: 1" - 120'



PHASE 2

SCALE: 1" - 120'

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- SILT FENCE
- DIVERSION SWALE
- CHECK DAM
- MAJOR CONTOURS
- MINOR CONTOURS
- MATERIAL AREA
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF DISTURBANCE

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
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PHASE 1 OPERATIONS SEQUENCE

1. CONTACT TOWN OF MONROE AGENT AT LEAST FORTY-EIGHT (48) HOURS PRIOR TO COMMENCEMENT OF ANY DEMOLITION, CONSTRUCTION OR REGULATED ACTIVITY ON THIS PROJECT.
2. EXISTING OVERBURDEN MATERIAL ALONG WESTERN SIDE OF HAUL ROAD TO BE MOVED AND PLACED/COMPACTED INTO EXISTING QUARRY PIT PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.
3. BASED OFF MATERIAL TAKEOFFS, ELEVATION ACHIEVED WITHIN QUARRY PIT TO BE APPROXIMATELY 394.00-398.00.
4. MOVEMENT OF MATERIAL IS TO TAKE PLACE FROM NORTH TO SOUTH AND A 3:1 SLOPE IS TO BE ESTABLISHED AT THE WESTERN EDGE OF THE EXISTING OVERBURDEN.
5. DEWATERING OF QUARRY PIT INTO FILTER BAG WITHIN SEDIMENT BASIN TO REMAIN ACTIVE DURING THIS PHASE.
6. SILT FENCE TO BE ESTABLISHED AT TOE OF 3:1 SLOPE UPON COMPLETION OF OVERBURDEN MATERIAL MOVEMENT.
7. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
8. INSTALL AND MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE) AND WRAP FILTER FABRIC AROUND GRATES OF CATCH BASINS OR INSTALL SILT SACKS ON CATCH BASIN INLETS ON OFF SITE ROADS.
9. INSTALL SEDIMENT BASINS AND SEDIMENT TRAPS IF REQUIRED AT LOW AREAS OF SITE OR AS ORDERED BY THE ENGINEER OR AS SHOWN ON THESE PLANS.
10. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 2 MONTHS.

PHASE 2 OPERATIONS SEQUENCE

1. EXISTING OVERBURDEN MATERIAL ALONG EASTERN SIDE OF HAUL ROAD TO BE MOVED AND PLACED/COMPACTED INTO EXISTING QUARRY PIT PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.
2. BASED OFF MATERIAL TAKEOFFS, ELEVATION ACHIEVED WITHIN QUARRY PIT TO BE APPROXIMATELY 412.0-416.00, ABOVE THE APPROXIMATE GROUNDWATER ELEVATION OF 411.00.
3. MOVEMENT OF MATERIAL IS TO TAKE PLACE FROM NORTH TO SOUTH AND THE EXISTING ROCKFACE ALONG THE EASTERN EDGE OF THE OVERBURDEN IS TO BE MAINTAINED.
4. DEWATERING OF QUARRY PIT INTO FILTER BAG WITHIN SEDIMENT BASIN TO REMAIN ACTIVE DURING THIS PHASE.
5. MAINTAIN SILT FENCE ESTABLISHED AT TOE OF 3:1 SLOPE OF OVERBURDEN MATERIAL .
6. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
7. MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE).
8. THROUGHOUT CONSTRUCTION SEQUENCE, REMOVE SEDIMENT FROM BEHIND SILT FENCES, HAY BALES AND OTHER EROSION CONTROL DEVICES, AND FROM SEDIMENTATION BASINS AND SEDIMENT TRAPS AS REQUIRED. REMOVAL SHALL BE ON A PERIODIC BASIS (EVERY SIGNIFICANT RAINFALL OF 0.25 INCH OR GREATER). INSPECTION OF EROSION CONTROL MEASURES SHALL BE ON A WEEKLY BASIS AND AFTER EACH RAINFALL OF 0.25 INCHES OR GREATER. SEDIMENT COLLECTED SHALL BE DEPOSITED AND SPREAD EVENLY UPLAND ON SLOPES DURING CONSTRUCTION.
9. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 4 MONTHS.

PHASE 2 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.59± ACRES
4.59 AC X 134 CY/AC = 615 CY
615 CY x 27 CF/CY = 16,605 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC x 134 CY/AC = 159 CY
159 CY x 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 3.45± ACRES
3.45 AC X 134 CY/AC = 463 CY
463 CY X 27 CF/CY = 12,501 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

SEDIMENT TRAP #4:
CONTRIBUTING DRAINAGE AREA = 4.93± ACRES
4.93 AC X 134 CY/AC = 661 CY
661 CY X 27 CF/CY = 17,847 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 20,075 ± CF

PHASE 1 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.59± ACRES
4.59 AC X 134 CY/AC = 615 CY
615 CY x 27 CF/CY = 16,605 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC x 134 CY/AC = 159 CY
159 CY x 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 3.45± ACRES
3.45 AC X 134 CY/AC = 463 CY
463 CY X 27 CF/CY = 12,501 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 23,880 ± CF

SEDIMENT TRAP #4:
CONTRIBUTING DRAINAGE AREA = 4.93± ACRES
4.93 AC X 134 CY/AC = 661 CY
661 CY X 27 CF/CY = 17,847 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 35,343 ± CF

SEDIMENT TRAP #5:
CONTRIBUTING DRAINAGE AREA = 0.83 ± ACRES
0.83 AC X 134 CY/AC = 111 CY
111 CY X 27 CF/CY = 2,997 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 3,289 ± CF

SEDIMENT TRAP #6:
CONTRIBUTING DRAINAGE AREA = 4.93± ACRES
4.93 AC X 134 CY/AC = 661 CY
661 CY X 27 CF/CY = 17,847 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 22,289 ± CF

PHASE 1 SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 6.11± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(6.11)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.028 ACRE-FT/YEAR
V = 1,220 CF/YEAR
V= (1,220 CF/YEAR)(5 YEARS) = 6,100 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,220) = 8,540 CF
REQUIRED BASIN #1 STORAGE = 8,540 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 8.52± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(8.52)(50)(.25)(.80)(2,000)]/[(100)(43,560)] =0.039 ACRE-FT/YEAR
V = 1,669 CF/YEAR
V= (1,669 CF/YEAR)(5 YEARS) = 8,345 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,669) = 3,338 CF
REQUIRED BASIN #2 STORAGE = 11,683 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 22,069 ± CF

PHASE 2 SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 6.11± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(6.11)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.028 ACRE-FT/YEAR
V = 1,220 CF/YEAR
V= (1,220 CF/YEAR)(5 YEARS) = 6,100 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,220) = 8,540 CF
REQUIRED BASIN #1 STORAGE = 8,540 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 14.27± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(14.27)(50)(.25)(.80)(2,000)]/[(100)(43,560)] =0.065 ACRE-FT/YEAR
V = 2,831 CF/YEAR
V= (2,831 CF/YEAR)(5 YEARS) = 14,155 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(2,831) = 5,662 CF
REQUIRED BASIN #2 STORAGE = 19,817 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 22,069 ± CF

Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

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CT 25759

Project:

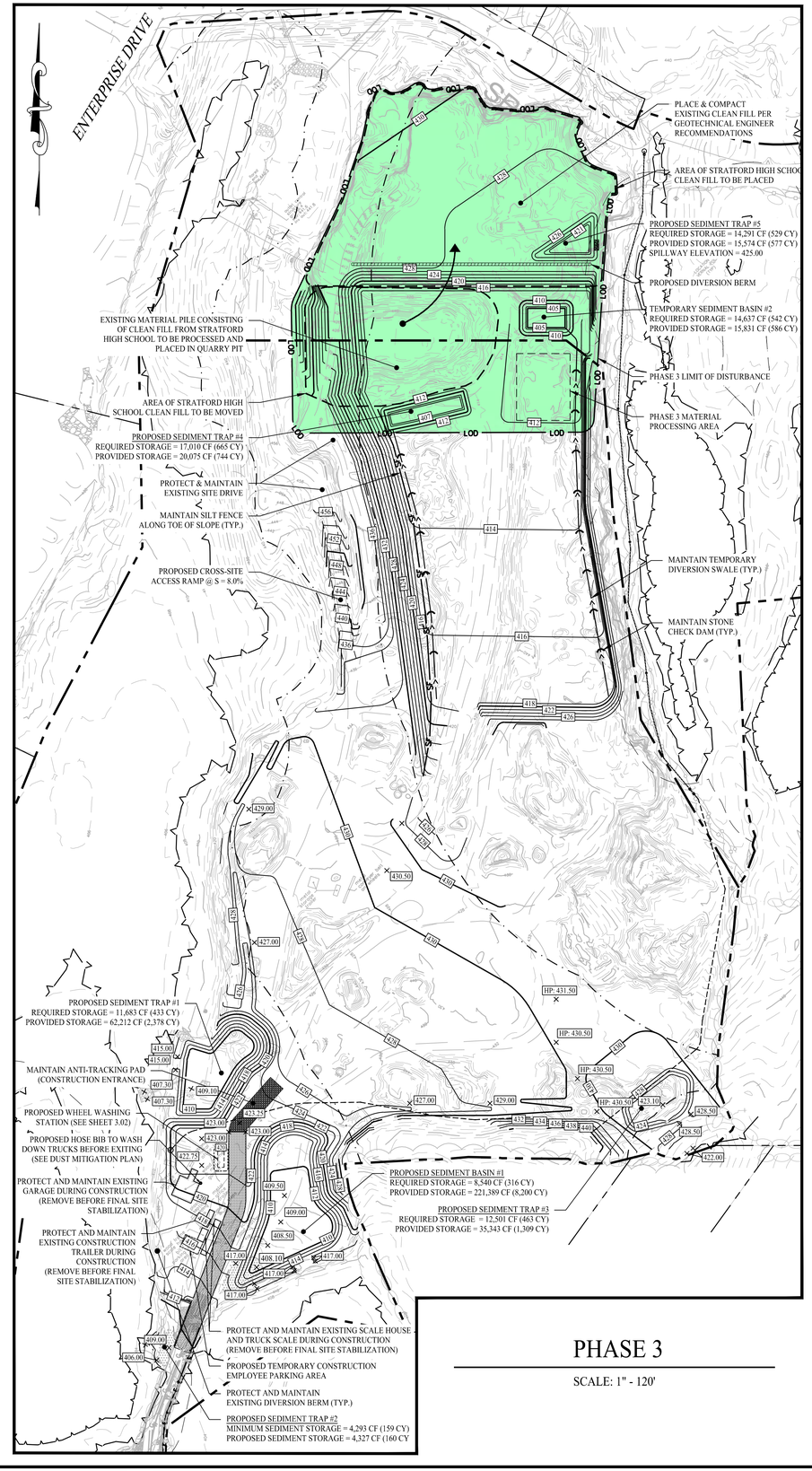
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:
SOIL EROSION & SEDIMENT CONTROL PHASING PLANS 1 & 2

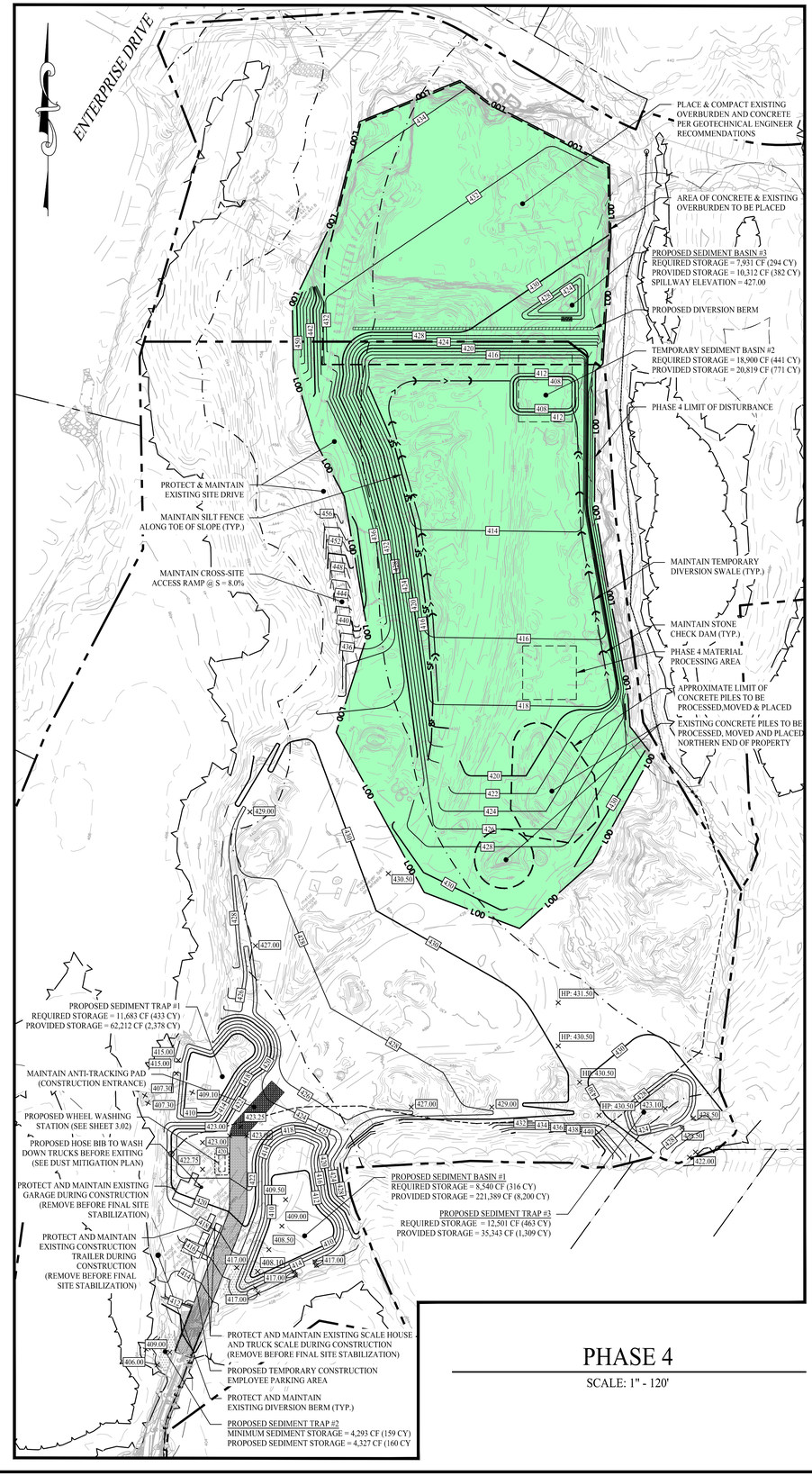
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2.34

Oct 17, 2023 - 4:28pm chris
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PHASE 3

SCALE: 1" - 120'



PHASE 4

SCALE: 1" - 120'

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- SF — SF — SILT FENCE
- DIVERSION SWALE
- CHECK DAM
- 520 — MAJOR CONTOURS
- 523 — MINOR CONTOURS
- MATERIAL AREA
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LOD — LIMIT OF DISTURBANCE

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES AND ISSUANCE OF A DULY AUTHORIZED CERTIFIED OF ZONING COMPLIANCE AND BUILDING PERMIT FROM THE TOWN OF MONROE.

PHASE 3 SEQUENCE

1. EXISTING CLEAN FILL MATERIAL PILE FROM STRATFORD HIGH SCHOOL TO BE PROCESSED, MOVED AND PLACED/COMPACTED INTO EXISTING QUARRY PIT PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.
2. BASED OFF MATERIAL TAKEOFFS, ELEVATION ACHIEVED WITHIN QUARRY PIT TO BE APPROXIMATELY 426.00-430.00.
3. MOVEMENT OF MATERIAL IS TO TAKE PLACE FROM EAST TO WEST AND A 3:1 SLOPE IS TO BE ESTABLISHED AT THE WESTERN EDGE OF THE EXISTING PILE.
4. AS THE ELEVATION OF THE QUARRY PIT WILL BE ABOVE APPROXIMATE GROUNDWATER ELEVATION OF 411.00, DEWATERING WILL NO LONGER BE REQUIRED.
5. MAINTAIN SILT FENCE ESTABLISHED AT TOE OF 3:1 SLOPE OF OVERBURDEN MATERIAL.
6. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
7. A DIVERSION BERM IS TO BE INSTALLED AND MAINTAINED AT THE SOUTHERN END OF THE 4 INDEPENDENCE DRIVE PARCEL AS FILLING OF THE QUARRY HOLE PROGRESSES IN ORDER TO DIRECT SEDIMENT LADEN RUNOFF TO THE PROPOSED SEDIMENT TRAP.
8. INSTALL AND MAINTAIN SEDIMENT TRAPS AND BASINS AS INDICATED ON THIS PLAN SHEET.
9. MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE).
10. THROUGHOUT CONSTRUCTION SEQUENCE, REMOVE SEDIMENT FROM BEHIND SILT FENCES, HAY BALES AND OTHER EROSION CONTROL DEVICES, AND FROM SEDIMENTATION BASINS AND SEDIMENT TRAPS AS REQUIRED. REMOVAL SHALL BE ON A PERIODIC BASIS (EVERY SIGNIFICANT RAINFALL OF 0.25 INCH OR GREATER). INSPECTION OF EROSION CONTROL MEASURES SHALL BE ON A WEEKLY BASIS AND AFTER EACH RAINFALL OF 0.25 INCHES OR GREATER. SEDIMENT COLLECTED SHALL BE DEPOSITED AND SPREAD EVENLY UPLAND ON SLOPES DURING CONSTRUCTION.
11. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 2 MONTHS.

PHASE 4 SEQUENCE

1. EXISTING CONCRETE PILES TO BE PROCESSED, MOVED AND PLACED/COMPACTED INTO EXISTING QUARRY PIT PER GEOTECHNICAL ENGINEER RECOMMENDATIONS.
2. BASED OFF MATERIAL TAKEOFFS, ELEVATION ACHIEVED WITHIN QUARRY PIT TO BE APPROXIMATELY 430.00-434.00.
3. REMAINING EXISTING OVERBURDEN ON THE EASTERN SIDE OF THE EXISTING HAUL ROAD AS DEPICTED ON THIS PLAN WILL BE PLACED AND COMPACTED TOWARDS THE NORTHERN END OF THE SITE.
4. MAINTAIN SILT FENCE ESTABLISHED AT TOE OF 3:1 SLOPE OF OVERBURDEN MATERIAL.
5. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
6. THE DIVERSION BERM IS TO BE MAINTAINED AT THE SOUTHERN END OF THE 4 INDEPENDENCE DRIVE PARCEL AS FILLING OF THE QUARRY HOLE PROGRESSES IN ORDER TO DIRECT SEDIMENT LADEN RUNOFF TO THE PROPOSED SEDIMENT BASIN.
7. INSTALL AND MAINTAIN SEDIMENT TRAPS AND BASINS AS INDICATED ON THIS PLAN SHEET.
8. MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE).
9. THROUGHOUT CONSTRUCTION SEQUENCE, REMOVE SEDIMENT FROM BEHIND SILT FENCES, HAY BALES AND OTHER EROSION CONTROL DEVICES, AND FROM SEDIMENTATION BASINS AND SEDIMENT TRAPS AS REQUIRED. REMOVAL SHALL BE ON A PERIODIC BASIS (EVERY SIGNIFICANT RAINFALL OF 0.25 INCH OR GREATER). INSPECTION OF EROSION CONTROL MEASURES SHALL BE ON A WEEKLY BASIS AND AFTER EACH RAINFALL OF 0.25 INCHES OR GREATER. SEDIMENT COLLECTED SHALL BE DEPOSITED AND SPREAD EVENLY UPLAND ON SLOPES DURING CONSTRUCTION.
10. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 1-2 MONTHS.

PHASE 3 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.59± ACRES
4.59 AC X 134 CY/AC = 615 CY
615 CY x 27 CF/CY = 16,605 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC X 134 CY/AC = 159 CY
159 CY X 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 3.45± ACRES
3.45 AC X 134 CY/AC = 463 CY
463 CY X 27 CF/CY = 12,501 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

SEDIMENT TRAP #4:
CONTRIBUTING DRAINAGE AREA = 4.70± ACRES
4.70 AC X 134 CY/AC = 630 CY
630 CY X 27 CF/CY = 17,010 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 20,075 ± CF

SEDIMENT TRAP #5:
CONTRIBUTING DRAINAGE AREA = 3.95± ACRES
3.95AC X 134 CY/AC = 529 CY
529 CY X 27 CF/CY = 14,291 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 15,574 ± CF

PHASE 4 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.59± ACRES
4.59 AC X 134 CY/AC = 615 CY
615 CY X 27 CF/CY = 16,605 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC X 134 CY/AC = 159 CY
159 CY X 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 3.45± ACRES
3.45 AC X 134 CY/AC = 463 CY
463 CY X 27 CF/CY = 12,501 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

PHASE 3 SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 6.11± ACRES
V = [(DA)(AA)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(6.11)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.028 ACRE-FT/YEAR
V = 1,220 CF/YEAR
V= (1,220 CF/YEAR)(5 YEARS) = 6,100 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,220) = 8,540 CF
REQUIRED BASIN #1 STORAGE = 8,540 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 10.55± ACRES
V = [(DA)(AA)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(10.55)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.048 ACRE-FT/YEAR
V = 2,091 CF/YEAR
V= (2,091 CF/YEAR)(5 YEARS) = 10,455 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(2,091) = 4,182 CF
REQUIRED BASIN #2 STORAGE = 14,637 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 22,069 ± CF

PHASE 4 SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 6.11± ACRES
V = [(DA)(AA)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(6.11)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.028 ACRE-FT/YEAR
V = 1,220 CF/YEAR
V= (1,220 CF/YEAR)(5 YEARS) = 6,100 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,220) = 8,540 CF
REQUIRED BASIN #1 STORAGE = 8,540 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 13.52± ACRES
V = [(DA)(AA)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(13.52)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.062 ACRE-FT/YEAR
V = 2,700 CF/YEAR
V= (2,700 CF/YEAR)(5 YEARS) = 13,500 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(2,700) = 5,400 CF
REQUIRED BASIN #2 STORAGE = 18,900 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 20,819 ± CF

SEDIMENT BASIN #3:
CONTRIBUTING DRAINAGE AREA = 5.68± ACRES
V = [(DA)(AA)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(5.68)(50)(.25)(.80)(2,000)]/[(100)(43,560)] = 0.026 ACRE-FT/YEAR
V = 1,133 CF/YEAR
V= (1,133 CF/YEAR)(5 YEARS) = 5,665 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,133) = 2,266 CF
REQUIRED BASIN #3 STORAGE = 7,931 CF
SEDIMENT BASIN #3 STORAGE CAPACITY = 10,312 ± CF

Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695

Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 120'

Kevin Solli, P.E.
CT 25759

Project:

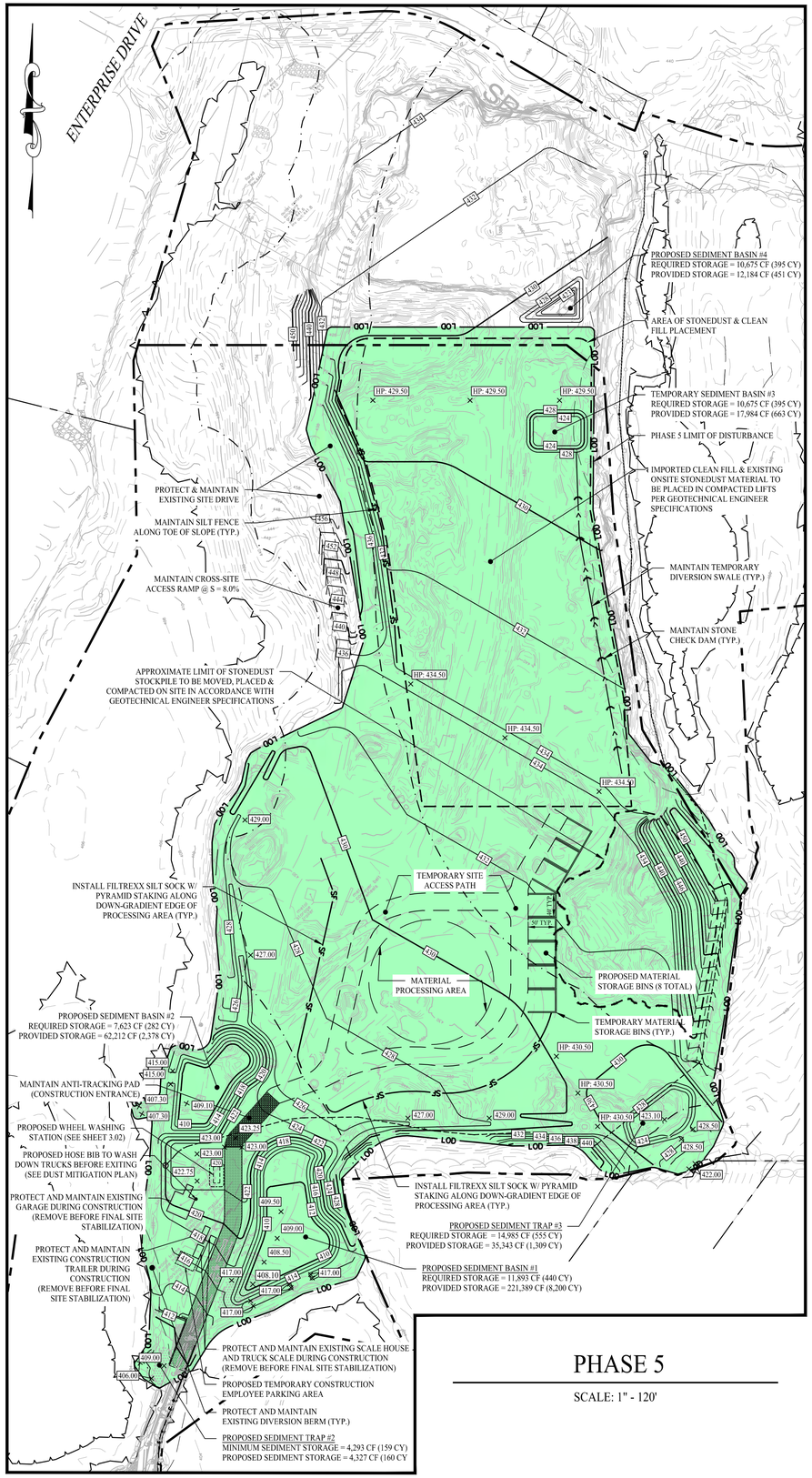
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT CONTROL PHASING PLANS 3 & 4

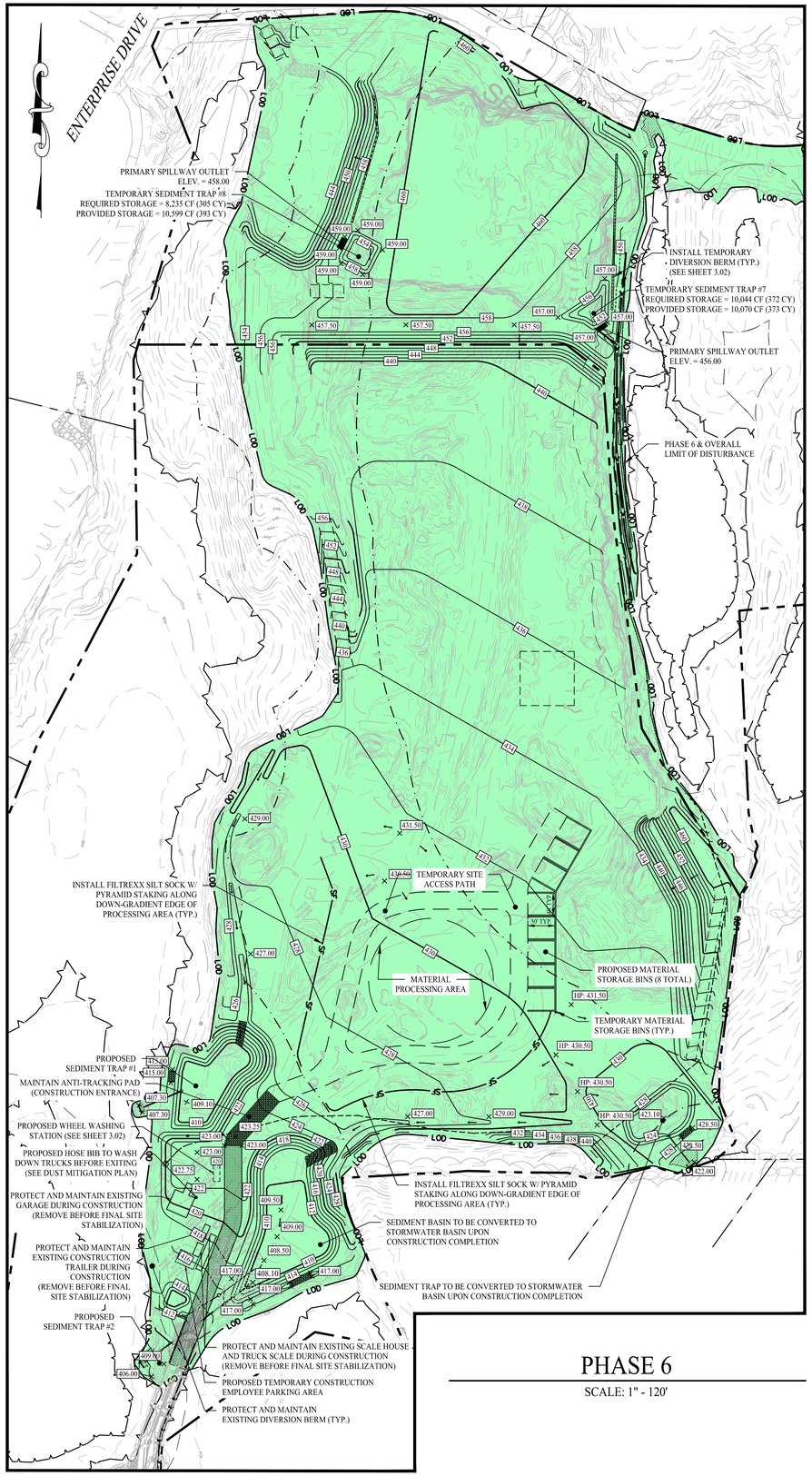
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PHASE 5

SCALE: 1" - 120'



PHASE 6

SCALE: 1" - 120'

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- SILT FENCE
- DIVERSION SWALE
- CHECK DAM
- MAJOR CONTOURS
- MINOR CONTOURS
- MATERIAL AREA
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF DISTURBANCE

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20, REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
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PHASE 6 SEDIMENT BASIN CALCULATIONS

NNOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 9.07± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(9.07)(50)(.25(.80)(2,000)]/[(100)(43,560)] =0.0416 ACRE-FT/YEAR
V = 1,812 CF/YEAR
V= (1,812 CF/YEAR)(10 YEARS) = 18,120 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,812) = 3,624 CF
REQUIRED BASIN #1 STORAGE = 21,744 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

PHASE 6 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.24± ACRES
4.24 AC X 134 CY/AC = 568 CY
568 CY X 27 CF/CY = 15,336 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 41,305 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC X 134 CY/AC = 159 CY
159 CY X 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 2.94± ACRES
2.94 AC X 134 CY/AC = 394 CY
394 CY X 27 CF/CY = 10,638 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

SEDIMENT TRAP #4:
CONTRIBUTING DRAINAGE AREA = 3.89± ACRES
3.89 AC X 134 CY/AC = 521 CY
521 CY X 27 CF/CY = 14,074 CF
SEDIMENT TRAP #4 STORAGE CAPACITY = 18,255 ± CF

SEDIMENT TRAP #5:
CONTRIBUTING DRAINAGE AREA = 3.40± ACRES
3.40 AC X 134 CY/AC = 456 CY
456 CY X 27 CF/CY = 12,312 CF
SEDIMENT TRAP #5 STORAGE CAPACITY = 13,991 ± CF

SEDIMENT TRAP #6:
CONTRIBUTING DRAINAGE AREA = 4.25± ACRES
4.25 AC X 134 CY/AC = 570 CY
570 CY X 27 CF/CY = 15,390 CF
SEDIMENT TRAP #6 STORAGE CAPACITY = 16,141 ± CF

SEDIMENT TRAP #7:
CONTRIBUTING DRAINAGE AREA = 2.78± ACRES
2.78 AC X 134 CY/AC = 372 CY
372 CY X 27 CF/CY = 10,044 CF
SEDIMENT TRAP #7 STORAGE CAPACITY = 10,070 ± CF

SEDIMENT TRAP #8:
CONTRIBUTING DRAINAGE AREA = 2.27± ACRES
2.27 AC X 134 CY/AC = 305 CY
305 CY X 27 CF/CY = 8,235 CF
SEDIMENT TRAP #8 STORAGE CAPACITY = 10,599 ± CF

PHASE 5 SEDIMENT TRAP CALCULATIONS

NOTE:
TEMPORARY SEDIMENT TRAPS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT TRAP #1:
CONTRIBUTING DRAINAGE AREA = 4.59± ACRES
4.59 AC X 134 CY/AC = 615 CY
615 CY x 27 CF/CY = 16,605 CF
SEDIMENT TRAP #1 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT TRAP #2:
CONTRIBUTING DRAINAGE AREA = 1.19± ACRES
1.19 AC x 134 CY/AC = 159 CY
159 CY x 27 CF/CY = 4,293 CF
SEDIMENT TRAP #2 STORAGE CAPACITY = 4,327 ± CF

SEDIMENT TRAP #3:
CONTRIBUTING DRAINAGE AREA = 4.14± ACRES
4.14 AC X 134 CY/AC = 555 CY
555 CY X 27 CF/CY = 14,985 CF
SEDIMENT TRAP #3 STORAGE CAPACITY = 35,343 ± CF

PHASE 5 SEDIMENT BASIN CALCULATIONS

NOTE:
TEMPORARY SEDIMENT BASINS HAVE BEEN SIZED TO PROVIDE A MINIMUM STORAGE VOLUME AREA PER THE 2002 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.

SEDIMENT BASIN #1:
CONTRIBUTING DRAINAGE AREA = 8.58± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(8.58)(50)(.25(.80)(2,000)]/[(100)(43,560)] = 0.039 ACRE-FT/YEAR
V = 1,699 CF/YEAR
V= (1,699 CF/YEAR)(5 YEARS) = 8,495 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,699) = 3,398 CF
REQUIRED BASIN #1 STORAGE = 11,893 CF
SEDIMENT BASIN #1 STORAGE CAPACITY = 221,389 ± CF

SEDIMENT BASIN #2:
CONTRIBUTING DRAINAGE AREA = 5.35± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(5.35)(50)(.25(.80)(2,000)]/[(100)(43,560)] = 0.025 ACRE-FT/YEAR
V = 1,089 CF/YEAR
V= (1,089 CF/YEAR)(5 YEARS) = 5,445 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,089) = 2,178 CF
REQUIRED BASIN #2 STORAGE = 7,623 CF
SEDIMENT BASIN #2 STORAGE CAPACITY = 62,212 ± CF

SEDIMENT BASIN #3:
CONTRIBUTING DRAINAGE AREA = 7.70± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(7.70)(50)(.25(.80)(2,000)]/[(100)(43,560)] = 0.035 ACRE-FT/YEAR
V = 1,525 CF/YEAR
V= (1,525 CF/YEAR)(5 YEARS) = 7,625 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,525) = 3,050 CF
REQUIRED BASIN #3 STORAGE = 10,675 CF
SEDIMENT BASIN #3 STORAGE CAPACITY = 17,984 ± CF

SEDIMENT BASIN #4:
CONTRIBUTING DRAINAGE AREA = 7.56± ACRES
V = [(DA)(A)(DR)(TE)(2,000LBS/TON)]/[(Y)(43,560 SQ. FT/AC)]
V = [(7.56)(50)(.25(.80)(2,000)]/[(100)(43,560)] = 0.035 ACRE-FT/YEAR
V = 1,525 CF/YEAR
V= (1,525 CF/YEAR)(5 YEARS) = 7,625 CF
REQUIRED WET STORAGE = 2 X 1 YEAR SEDIMENT STORAGE
V = (2)(1,525) = 3,050 CF
REQUIRED BASIN #4 STORAGE = 10,675 CF
SEDIMENT BASIN #4 STORAGE CAPACITY = 12,184 ± CF

PHASE 5 SEQUENCE

1. DURING PHASE 5, "CLEAN FILL" TO BE IMPORTED, PROCESSED AND PLACED BASED OFF MATERIAL PROTOCOL.
2. STONEDUST PILE LOCATED ON EASTERN EDGE OF SITE IS TO BE PLACED AND COMPACTED THROUGHOUT 64 CAMBRIDGE PARCEL IN ACCORDANCE WITH GEOTECHNICAL ENGINEER SPECIFICATIONS.
3. MATERIAL IS TO BE PLACED SOUTH TO NORTH TO BRING THE ENTER 64 CAMBRIDGE DRIVE PARCEL UP TO AN ELEVATION BETWEEN 428.00-434.00.
4. MAINTAIN SILT FENCE ESTABLISHED AT TOE OF 3:1 SLOPE OF OVERBURDEN MATERIAL.
5. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
6. INSTALL AND MAINTAIN SEDIMENT TRAPS AND BASINS AS INDICATED ON THIS PLAN SHEET.
7. MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE).
8. THROUGHOUT CONSTRUCTION SEQUENCE, REMOVE SEDIMENT FROM BEHIND SILT FENCES, HAY BALES AND OTHER EROSION CONTROL DEVICES, AND FROM SEDIMENTATION BASINS AND SEDIMENT TRAPS AS REQUIRED. REMOVAL SHALL BE ON A PERIODIC BASIS (EVERY SIGNIFICANT RAINFALL OF 0.25 INCH OR GREATER). INSPECTION OF EROSION CONTROL MEASURES SHALL BE ON A WEEKLY BASIS AND AFTER EACH RAINFALL OF 0.25 INCHES OR GREATER. SEDIMENT COLLECTED SHALL BE DEPOSITED AND SPREAD EVENLY UPLAND ON SLOPES DURING CONSTRUCTION.
9. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 1 YEAR.

PHASE 6 SEQUENCE

1. FILLING WITHIN 64 CAMBRIDGE DRIVE IS TO BE FINALIZED AND THEN THE REMAINING BALANCE OF 4 INDEPENDENCE IS TO BE FILLED TO FINAL ELEVATIONS.
2. ALL MATERIAL PLACED DURING THIS PHASE WILL BE IMPORTED CLEAN FILL IN ACCORDANCE WITH THE MATERIAL INTAKE PROTOCOL.
3. MAINTAIN SILT FENCE ESTABLISHED AT TOE OF 3:1 SLOPE OF OVERBURDEN MATERIAL.
4. DIVERSION SWALES WITH STONE CHECK DAMS TO BE INSTALLED AS INDICATED ON THIS PLAN SHEET.
5. INSTALL AND MAINTAIN SEDIMENT TRAPS AND BASINS AS INDICATED ON THIS PLAN SHEET.
6. MAINTAIN ANTI-TRACKING PAD (CONSTRUCTION ENTRANCE).
7. AT THE COMPLETION OF FILLING OPERATIONS WITHIN THE 64 CAMBRIDGE PARCEL THE ORIFICES WITHIN THE PROPOSED BASINS WILL BE KNOCKED OUT AND THE SPILLWAYS WILL BE INSTALLED AS NOTED ON THE PLANS.
8. THROUGHOUT CONSTRUCTION SEQUENCE, REMOVE SEDIMENT FROM BEHIND SILT FENCES, HAY BALES AND OTHER EROSION CONTROL DEVICES, AND FROM SEDIMENTATION BASINS AND SEDIMENT TRAPS AS REQUIRED. REMOVAL SHALL BE ON A PERIODIC BASIS (EVERY SIGNIFICANT RAINFALL OF 0.25 INCH OR GREATER). INSPECTION OF EROSION CONTROL MEASURES SHALL BE ON A WEEKLY BASIS AND AFTER EACH RAINFALL OF 0.25 INCHES OR GREATER. SEDIMENT COLLECTED SHALL BE DEPOSITED AND SPREAD EVENLY UPLAND ON SLOPES DURING CONSTRUCTION.
9. THE TIMELINE FOR THIS PHASE IS APPROXIMATELY 2-3 YEARS DEPENDING UPON MATERIAL AVAILABILITY.

Rev. #:	Date	Description

Graphic Scale: 120 0 120 240

SOLLI ENGINEERING
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Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 120'

Kevin Solli, P.E.
CT 25759

Project:

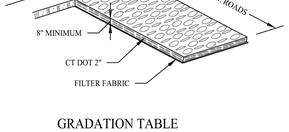
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SOIL EROSION & SEDIMENT PHASING PLANS 5 & 6

Sheet #: 2.36

Oct 17, 2023 - 4:19pm chris
X:\SE Files\Project Data\2019\1903601 - 64 Cambridge Drive - Monroe\Cadd Data\P & Z Submission (06-30-2021)\1903601-2.34.dwg



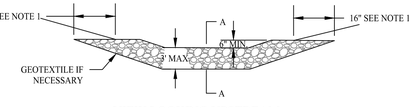
GRADATION TABLE

SQUARE MESH SIEVES	CONN. DOT 2" CRUSHED GRAVEL % FINER	ASTM C-33 NO. 2 % FINER	ASTM C-33 NO. 3 % FINER
2 1/2 INCHES	100	90-100	100
2 INCHES	95-100	35-70	90-100
1 1/2 INCHES	35-70	0-15	35-70
1 1/4 INCHES	0-25	---	---
1 INCHES	0-10	---	0-15
3/4 INCHES	---	0-5	---
1/2 INCHES	---	---	0-5
3/8 INCHES	---	---	---

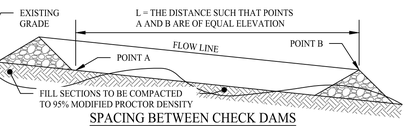
SOURCE:
U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE, STORRS, CONNECTICUT

CONSTRUCTION ENTRANCE

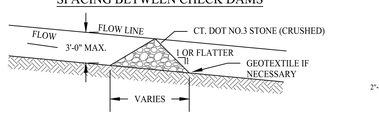
SCALE: NTS



VIEW LOOKING UPSTREAM

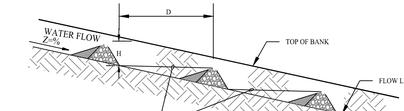


SPACING BETWEEN CHECK DAMS



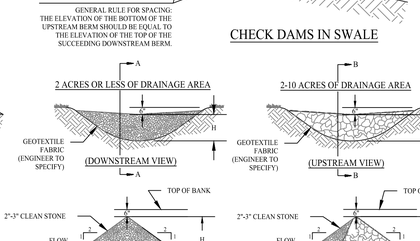
SECTION A-A

NOTES
1. KEY STONE INTO THE DITCH BANKS AND EXTEND INTO THE ABUTMENTS A MINIMUM OF 18" TO PREVENT FLOW FROM FLANKING THE DAM.
2. THE MINIMUM DESIGN CAPACITY SHALL CONVEY A 2 YEAR-24 HOUR PEAK FLOW.



GENERAL RULE FOR SPACING:
THE ELEVATION OF THE BOTTOM OF THE UPSTREAM BERM SHOULD BE EQUAL TO THE ELEVATION OF THE TOP OF THE SUCCEEDING DOWNSTREAM BERM.

CHECK DAMS IN SWALE



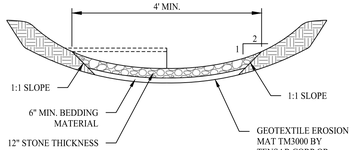
ELEVATION A

ELEVATION B

NOTE: SEE SITE MAP FOR LOCATION OF CHECK DAM(S).

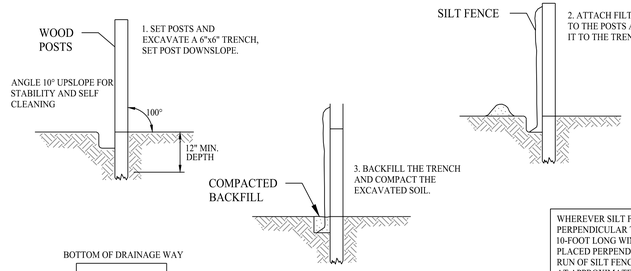
STONE CHECK DAM DETAIL

SCALE: NTS

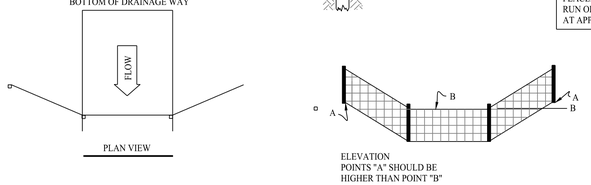


TEMPORARY DIVERSION SWALE DETAIL

SCALE: NTS

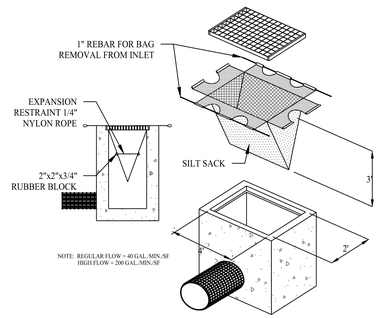


WHEREVER SILT FENCE RUNS ACROSS OR PERPENDICULAR TO SURFACE CONTOURS, 10-FOOT LONG WINGS OF SILT FENCE PLACED PERPENDICULAR TO THE MAIN RUN OF SILT FENCE SHOULD BE PROVIDED AT APPROXIMATE INTERVALS OF 50-FEET.



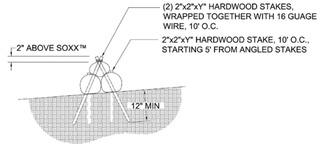
SILT FENCE PROTECTION DETAIL

SCALE: NTS



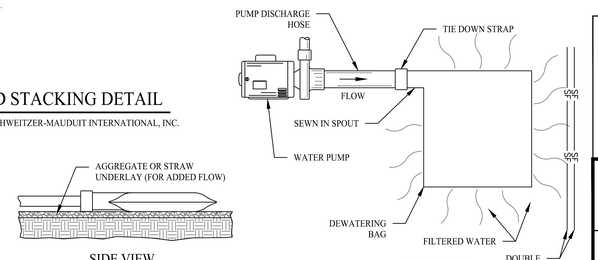
SILT SACK DETAIL

SCALE: NTS



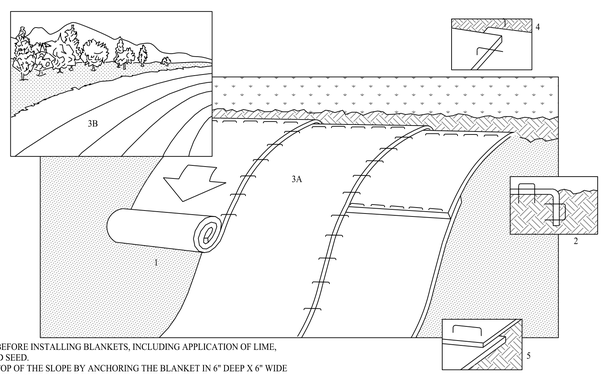
FILTREXX SILT SOXX PYRAMID STACKING DETAIL

SCALE: NTS DETAIL PROVIDED BY SCHWEITZER-MAUDUIT INTERNATIONAL, INC.



DEWATERING BAG DETAIL

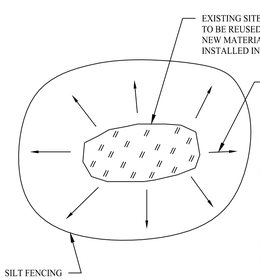
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NOTES:
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING APPLICATION OF LIME, FERTILIZER,AND SEED.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE BLANKET IN 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
3. ROLL THE BLANKETS (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 2" OVERLAP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 4" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.

SLOPE STABILIZATION DETAIL

SCALE: NTS



NOTES:
1. ALL EXISTING EXCAVATED MATERIAL THAT IS NOT TO BE REUSED IN THE WORK IS TO BE IMMEDIATELY REMOVED FROM THE SITE AND PROPERLY DISPOSED OF.

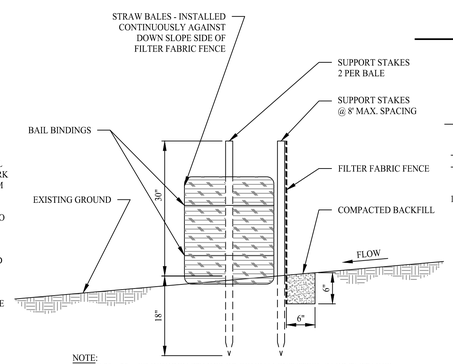
2. SOIL/AGGREGATE STOCKPILE SITES TO BE WHERE SHOWN ON THE DRAWINGS.

3. RESTORE STOCKPILE SITES TO PRE-EXISTING PROJECT CONDITION AND RESEED AS REQUIRED.

4. STOCKPILE HEIGHTS MUST NOT EXCEED 35'. STOCKPILE SLOPES MUST BE 2:1 OR FLATTER.

STOCKPILE AREA DETAIL

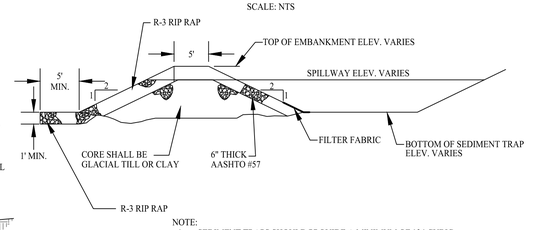
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NOTE:
1. USE 2" x 2" x 48" WOODEN STAKES OR EQUIVALENT STEEL (U OR T) STAKES.

SILT FENCE WITH HAYBALE BACKING

SCALE: NTS



NOTE:
1. SEDIMENT TRAPS SHOULD PROVIDE A MINIMUM OF 134 CUBIC YARDS OF SEDIMENT STORAGE PER DISTURBED ACRE CONTRIBUTING TO THE TRAP. SEE SAID VOLUMES ON SOIL, EROSION AND SEDIMENT CONTROL SHEETS.
2. THE OUTLET EMBANKMENT SHELL IS TO BE ENTIRELY OF ROCK. THE DOWNSTREAM SLOPE SHOULD BE LARGER ROCK (R-3) WITH AN UPSTREAM LAYER OF SMALLER STONE (AASHTO #57)

TYPICAL SEDIMENT TRAP DETAIL

SCALE: N.T.S

SOIL EROSION AND SEDIMENT CONTROL GENERAL NOTES

SEDIMENT & EROSION CONTROL NARRATIVE
THE SEDIMENT AND EROSION CONTROL PLAN WAS DEVELOPED TO PROTECT THE EXISTING ROADWAY AND STORM DRAINAGE SYSTEMS, ADJACENT PROPERTIES, AND ANY ADJACENT WETLAND AREA AND WATER COURSE FROM SEDIMENT LADEN SURFACE RUNOFF AND EROSION.

CONSTRUCTION SCHEDULE
THE ANTICIPATED STARTING DATE FOR CONSTRUCTION IS SPRING 2022 WITH COMPLETION ANTICIPATED BY FALL 2026. APPROPRIATE EROSION CONTROL MEASURES AS DESCRIBED HEREIN, SHALL BE INSTALLED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ALL SITE CLEARING OR CONSTRUCTION ACTIVITY. SCHEDULE WORK TO MINIMIZE THE LENGTH OF TIME THAT BARE SOIL WILL BE EXPOSED.

CONTINGENCY EROSION PLAN
THE CONTRACTOR SHALL INSTALL ALL SPECIFIED EROSION CONTROL MEASURES AND WILL BE REQUIRED TO MAINTAIN THEM IN THEIR INTENDED FUNCTIONING CONDITION. THE LAND USE AGENTS OF THE TOWN OF MONROE AND PROJECT ENGINEER SHALL HAVE THE AUTHORITY TO REQUIRE SUPPLEMENTAL MAINTENANCE OR ADDITIONAL MEASURES IF FIELD CONDITIONS ARE ENCOUNTERED BEYOND WHAT WOULD NORMALLY BE ANTICIPATED.

OPERATION REQUIREMENTS
CLEARING AND GRUBBING OPERATIONS:
1. ALL SEDIMENTATION AND EROSION CONTROL MEASURES, INCLUDING THE CONSTRUCTION OF TEMPORARY SEDIMENTATION TRAPS AND STONE CONSTRUCTION ENTRANCE ANTI-TRACKING PADS, WILL BE INSTALLED PRIOR TO THE START OF CLEARING AND GRUBBING OPERATIONS.
2. FOLLOWING INSTALLATION OF ALL SEDIMENTATION AND EROSION CONTROL MEASURES, THE CONTRACTOR SHALL NOT PROCEED WITH CLEARING, FILLING OR ANY OTHER CONSTRUCTION OPERATIONS UNTIL THE ENGINEER HAS INSPECTED AND APPROVED ALL INSTALLATIONS.
3. THE CONTRACTOR SHALL TAKE EXTREME CARE DURING CLEARING AND GRUBBING OPERATIONS SO AS NOT TO DISTURB UNPROTECTED WETLAND AREAS OR SEDIMENTATION AND EROSION CONTROL DEVICES.
4. FOLLOWING THE COMPLETION OF CLEARING AND GRUBBING OPERATIONS, ALL AREAS SHALL BE STABILIZED WITH TOPSOIL AND SEEDING OR PROCESSED AGGREGATE STONE AS SOON AS PRACTICAL.
5. ALL REMOVED INVASIVE PLANT SPECIES MATERIAL SHALL BE FULLY REMOVED FROM THE SITE AND TAKEN TO AN APPROVED AND/OR ACCEPTABLE DISPOSAL LOCATION.

ROUGH GRADING OPERATIONS:
1. DURING THE REMOVAL AND/OR PLACEMENT OF EARTH AS INDICATED ON THE GRADING PLAN, TOPSOIL SHALL BE STRIPPED AND APPROPRIATELY STOCKPILED FOR REUSE.
2. ALL EXPOSED TOPSOIL SHALL BE SEEDED, MULCHED WITH HAY, AND ENCLOSED BY A SILTATION FENCE.

FILLING OPERATIONS:
1. PRIOR TO FILLING, ALL SEDIMENTATION AND EROSION CONTROL DEVICES SHALL BE PROPERLY IMPLEMENTED, MAINTAINED AND FULLY INSTALLED, AS DIRECTED BY THE ENGINEER AND AS SHOWN ON THIS PLAN.
2. ALL FILL MATERIAL ADJACENT TO ANY WETLAND AREAS, IF APPLICABLE TO THIS PROJECT, SHALL BE GOOD QUALITY, WITH LESS THAN 10% FINES PASSING THROUGH A #200 SIEVE (BANK RUN), SHALL BE PLACED IN LIFT THICKNESS NOT GREATER THAN THAT SPECIFIED IN PROJECT SPECIFICATIONS. LIFTS SHALL BE COMPACTED TO 95% MAX. DRY DENSITY MODIFIED PROCTOR OR AS SPECIFIED IN THE CONTRACT SPECIFICATIONS OR IN THE GEOTECHNICAL REPORT.
3. AS GENERAL GRADING OPERATIONS PROGRESS, ANY TEMPORARY DIVERSION DITCHES SHALL BE RAISED OR LOWERED, AS NECESSARY, TO DIVERT SURFACE RUNOFF TO THE SEDIMENT TRAPS AND BASIN.

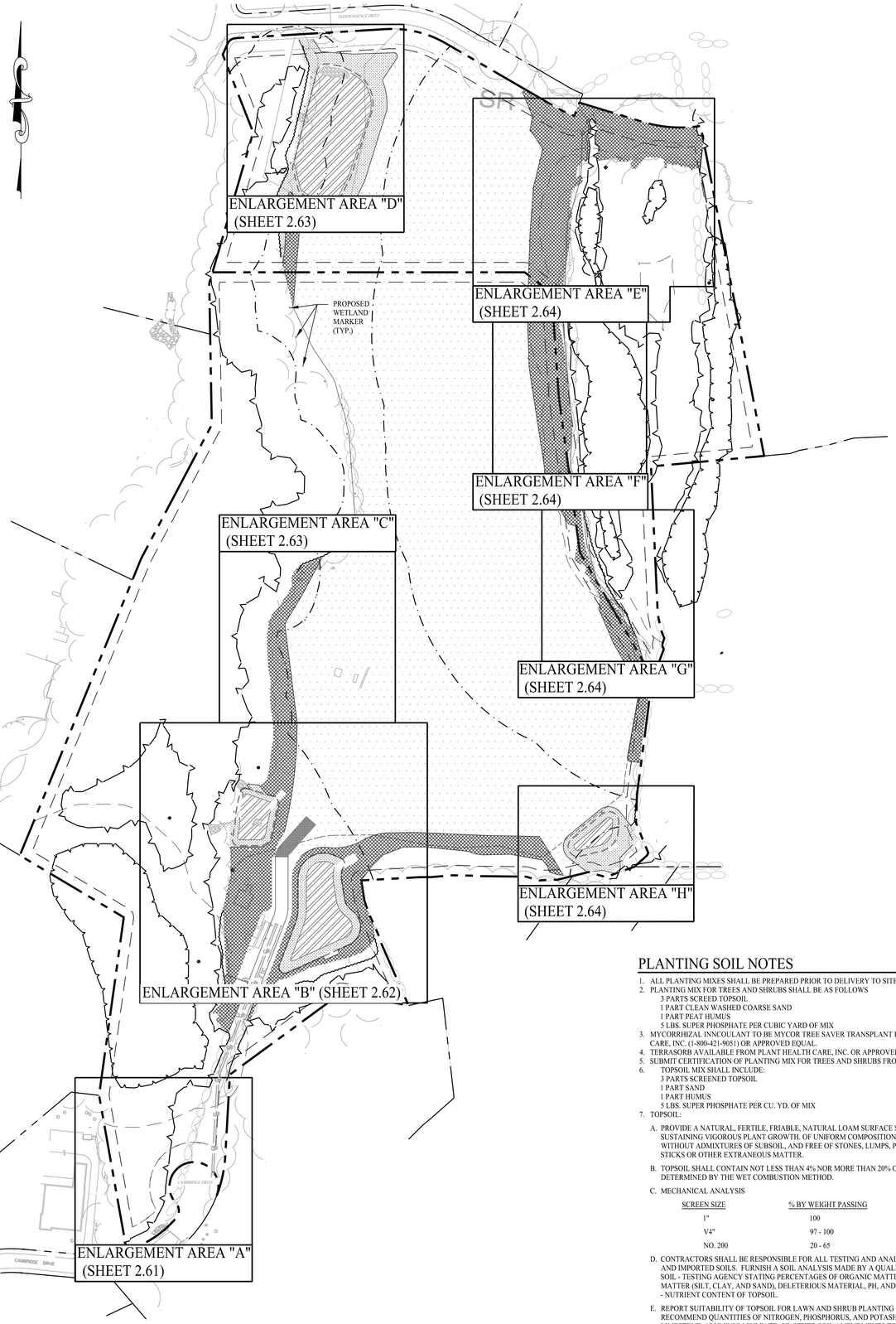
PLACEMENT OF DRAINAGE STRUCTURES, UTILITIES, AND ROADWAY CONSTRUCTION OPERATIONS:
1. SILT FENCES SHALL BE INSTALLED AT THE DOWNHILL SIDES OF TEMPORARY SEDIMENT TRAP AND BASIN SLOPES, MUD PUMP DISCHARGES, AND UTILITY TRENCH MATERIAL STOCKPILES. HAY BALES MAY BE USED IF SHOWN ON THE EROSION CONTROL PLANS OR IF DIRECTED BY THE PROJECT ENGINEER.

FINAL GRADING AND PAVING OPERATIONS:
1. ALL INLET AND OUTLET PROTECTION SHALL BE PLACED AND MAINTAINED AS SHOWN ON EROSION CONTROL PLANS AND DETAILS, AND AS DESCRIBED IN SPECIFICATIONS AND AS DESCRIBED HEREIN.
2. NO CUT OR FILL SLOPES SHALL EXCEED 2:1 EXCEPT WHERE STABILIZED BY ROCK FACED EMBANKMENTS OR EROSION CONTROL BLANKETS, JUTE MESH AND VEGETATION. ALL SLOPES SHALL BE SEEDED, AND ANY ROAD OR DRIVEWAY SHOULDER AND BANKS SHALL BE STABILIZED IMMEDIATELY UPON COMPLETION OF FINAL GRADING UNTIL TURF IS ESTABLISHED.
3. PAVEMENT SUB-BASE AND BASE COURSES SHALL BE INSTALLED OVER AREAS TO BE PAVED AS SOON AS FINAL SUB-GRADES ARE ESTABLISHED AND UNDERGROUND UTILITIES AND STORM DRAINAGE SYSTEMS HAVE BEEN INSTALLED.
4. AFTER CONSTRUCTION OF PAVEMENT, TOPSOIL, FINAL SEED, MULCH AND LANDSCAPING, REMOVE ALL TEMPORARY EROSION CONTROL MEASURES ONLY AFTER ALL AREAS HAVE BEEN PAVED AND/OR GRASS HAS BEEN WELL ESTABLISHED AND THE SITE HAS BEEN INSPECTED AND APPROVED BY THE TOWN OF MONROE AND TOWN OF MONROE INLAND WETLANDS COMMISSION.

INSTALLATION OF SEDIMENTATION AND EROSION CONTROL MEASURES
I. SILTATION FENCE:
   A. DIG A SIX INCH TRENCH ON THE UPHILL SIDE OF THE DESIGNATED FENCE LINE LOCATION.
   B. POSITION THE POST AT THE BACK OF THE TRENCH (DOWNHILL SIDE), AND HAMMER THE POST AT LEAST 1.5 FEET INTO THE GROUND.
   C. LAY THE BOTTOM SIX INCHES OF THE FABRIC INTO THE TRENCH TO PREVENT UNDERMINING BY STORM WATER RUN-OFF.
   D. BACKFILL THE TRENCH AND COMPACT.
II. HAY BALES
   A. BALES SHALL BE PLACED IN A SINGLE ROW, LENGTHWISE, ORIENTED PARALLEL TO THE CONTOUR, WITH ENDS OF ADJACENT BALES TIGHTLY ABUTTING ONE ANOTHER.
   B. BALES SHALL BE ENTRENCHED AND BACKFILLED. A TRENCH SHALL BE EXCAVATED THE WIDTH OF A BALE AND THE LENGTH OF THE PROPOSED BARRIER TO A MINIMUM DEPTH OF FOUR INCHES. AFTER THE BALES ARE STAKED, THE EXCAVATED SOIL SHALL BE BACKFILLED AGAINST THE BARRIER.
   C. EACH BALE SHALL BE SECURELY ANCHORED BY AT LEAST TWO (2) STAKES.
   D. THE GAPS BETWEEN BALES SHALL BE WEDGED WITH STRAW TO PREVENT WATER LEAKAGE.
   E. THE BARRIER SHALL BE EXTENDED TO SUCH A LENGTH THAT THE BOTTOMS OF THE END BALES ARE HIGHER IN ELEVATION THAN THE TOP OF THE LOWEST MIDDLE BALE, TO ENSURE THAT RUN-OFF WILL FLOW EITHER THROUGH OR OVER THE BARRIER, BUT NOT AROUND IT.
III. CHECK DAM
   A. CHECK DAMS MAY BE CONSTRUCTED OF ROCK, SAND BAGS FILLED WITH PEA GRAVEL, OR LOGS.
   B. ENSURE DAMS ARE SPACED SO THAT THE ELEVATION OF THE TOE OF THE UPSTREAM DAM IS EQUAL TO THE ELEVATION OF THE TOP OF THE DOWNSTREAM DAM.
   C. LOG DAMS SHALL BE CONSTRUCTED OF TO 6-INCH DIAMETER LOGS EMBEDDED AT LEAST 18 INCHES DEEP INTO THE SOIL.
   D. PLACE ROCK BY HAND OR MECHANICALLY TO ENSURE COMPLETE COVERAGE OF SWALE.

OPERATION AND MAINTENANCE OF SEDIMENTATION AND EROSION CONTROL MEASURES
I. SILTATION FENCE:
   VI. ALL SILTATION FENCES SHALL BE INSPECTED AS A MINIMUM WEEKLY OR AFTER EACH RAINFALL. ALL DETERIORATED FABRIC AND DAMAGED POSTS SHALL BE REPLACED AND PROPERLY REPOSITIONED IN ACCORDANCE WITH THIS PLAN.
   VI. SEDIMENT DEPOSITS SHALL BE REMOVED FROM BEHIND THE FENCE WHEN THEY EXCEED A HEIGHT OF ONE FOOT.
II. HAY BALES
   A. ALL HAY BALE RINGS SHALL BE INSPECTED FOLLOWING EACH RAINFALL. REPAIR OR REPLACEMENT SHALL BE PROMPTLY MADE AS NEEDED.
   B. DEPOSITS SHALL BE REMOVED AND CLEANED-OUT IF ONE HALF OF THE ORIGINAL HEIGHT OF THE BALES BECOMES FILLED WITH SEDIMENT.
III. CHECK DAMS:
   A. ALL STONE CHECK DAMS SHALL BE INSPECTED FOLLOWING EACH RAINFALL. REPAIR OF STONE CHECK DAMS SHALL BE PROMPTLY MADE AND ACCUMULATED SEDIMENT REMOVED WHEN IT REACHES ONE HALF OF THE HEIGHT OF THE CHECK DAM.
IV. TEMPORARY/PERMANENT DRAINAGE SWALES AND DITCHES:
   A. SWALES SHALL BE INSPECTED FOLLOWING EACH RAINFALL. REPAIR OF ANY WASHED OUT OR ERODED SLOPES SHALL BE MADE PROMPTLY AND THE AREA SHALL BE RESEEDED AS NECESSARY.
V. SEDIMENT TRAPS:
   A. CONTRACTOR TO KEEP WEEKLY CHECKLIST LOGS FOR INSPECTIONS OF ALL SEDIMENT AND EROSION CONTROL DEVICES AND HAVE THEM READILY AVAILABLE ON-SITE AT ALL TIMES FOR INSPECTION BY CT DEEP, LOCAL AUTHORITIES OR ENGINEER.
   B. ALL SEDIMENT TRAPS SHALL BE INSPECTED FOLLOWING EACH RAINFALL. REPAIR OF SLOPES SHALL BE PROMPTLY MADE AS NEEDED. EROSION CONTROL BLANKETS MAY BE USED FOLLOWING REPAIR OF SLOPE AS DIRECTED BY THE ENGINEER.
   C. SEDIMENT DEPOSITS SHALL BE REMOVED FROM SEDIMENT TRAPS AND OR SEDIMENT TRAPS WHEN THEY EXCEED A HEIGHT OF ONE FOOT UNLESS OTHERWISE INDICATED ON THE EROSION CONTROL PLANS AND DETAILS TO BE AT A SPECIFIC ELEVATION PER CLEAN OUT MARKERS.
   D. SEDIMENT SHALL BE DISPOSED OF ON-SITE OR AS DIRECTED BY THE ENGINEER AND LOCAL GOVERNING OFFICIALS. SEE SEDIMENT AND EROSION CONTROL NOTES HEREIN REGARDING DISPOSAL REQUIREMENTS AT OFF SITE SPOIL DISPOSAL.

EROSION AND SEDIMENT CONTROL PLAN
1. HAY BALE FILTERS OR SILTATION FENCE WILL BE INSTALLED AT ALL CULVERT OUTLETS IF CULVERT OUTLETS ARE APPLICABLE TO THIS PROJECT AND ALONG THE TOE OF ALL CRITICAL CUT AND FILL SLOPES.
2. CULVERT DISCHARGE AREAS WILL BE PROTECTED WITH RIP RAP CHANNELS; ENERGY DISSIPATERS WILL BE INSTALLED AS SHOWN ON THESE PLANS AND AS NECESSARY.
3. CATCH BASINS WILL BE PROTECTED WITH HAY BALE FILTERS, SILT SACKS, SILTATION FENCE, OR OTHER INLET PROTECTION DEVICES PER DETAILS, THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL ALL DISTURBED AREAS ARE THOROUGHLY STABILIZED.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL MANUAL, LATEST EDITION.
5. EROSION AND SEDIMENT CONTROL MEASURES WILL BE INSTALLED PRIOR TO CONSTRUCTION WHENEVER POSSIBLE
6. ALL CONTROL MEASURES WILL BE MAINTAINED IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
7. ADDITIONAL CONTROL MEASURES WILL BE INSTALLED DURING THE CONSTRUCTION PERIOD, IF NECESSARY OR REQUIRED OR AS DIRECTED BY THE CIVIL ENGINEER OR BY LOCAL GOVERNING OFFICIALS.
8. SEDIMENT REMOVED FROM EROSION CONTROL STRUCTURES WILL BE DISPOSED IN A MANNER WHICH IS CONSISTENT WITH THE INTENT AND REQUIREMENTS OF THE EROSION CONTROL PLANS, NOTES, AND DETAILS.
9. THE OWNER IS ASSIGNED THE RESPONSIBILITY FOR IMPLEMENTING THIS EROSION AND SEDIMENT CONTROL PLAN. THIS RESPONSIBILITY INCLUDES THE INSTALLATION AND MAINTENANCE OF CONTROL MEASURES, INFORMING ALL PARTIES ENGAGED WITH CONSTRUCTION ON THE SITE OF THE REQUIREMENTS AND OBJECTIVES OF THIS PLAN, INFORMING THE GOVERNING AUTHORITY OR INLAND WETLANDS AGENCY OF ANY TRANSFER OF THIS RESPONSIBILITY, AND FOR CONVEYING A COPY OF THE SEDIMENT & EROSION CONTROL PLAN IF THE TITLE TO THE LAND IS TRANSFERRED.
10. AN EROSION CONTROL BOND MAY BE REQUIRED TO BE POSTED WITH THE TOWN OF MONROE TO ENSURE IMPLEMENTATION OF THE EROSION CONTROL MEASURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE POSTING OF THIS BOND AND FOR INQUIRES TO THE TOWN OF MONROE FOR INFORMATION ON THE METHOD, TYPE AND AMOUNT OF THE BOND POSTING UNLESS OTHERWISE DIRECTED BY THE OWNER.
11. VISUAL SITE INSPECTIONS SHALL BE CONDUCTED WEEKLY, AND AFTER EACH MEASURABLE PRECIPITATION EVENT OF 0.10 INCHES OR GREATER BY QUALIFIED PERSONNEL, TRAINED AND EXPERIENCED IN EROSION AND SEDIMENT CONTROL, TO ASCERTAIN THAT THE EROSION AND SEDIMENT CONTROL (E&S) BMPS ARE OPERATIONAL AND EFFECTIVE IN PREVENTING POLLUTION. A WRITTEN REPORT OF EACH INSPECTION SHALL BE KEPT, AND INCLUDE:
    A) A SUMMARY OF THE SITE CONDITIONS, E&S BMPS, AND COMPLIANCE; AND
    B) THE DATE, TIME, AND THE NAME OF THE PERSON CONDUCTING THE INSPECTION
12. THE CONTRACTOR SHALL CONSTRUCT ALL SEDIMENT AND EROSION CONTROLS IN ACCORDANCE WITH THE CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL, PREPARED BY CTDEEP, LATEST EDITION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, AND AS DIRECTED BY THE TOWN OF MONROE. THE CONTRACTOR SHALL KEEP A COPY OF THE GUIDELINES ON-SITE FOR REFERENCE DURING CONSTRUCTION.
13. ADDITIONAL AND/OR ALTERNATIVE SEDIMENT AND EROSION CONTROL MEASURES MAY BE INSTALLED DURING THE CONSTRUCTION PERIOD IF FOUND NECESSARY BY THE CONTRACTOR, OWNER, CIVIL ENGINEER, TOWN OF MONROE, TOWN OF MONROE INLAND WETLANDS COMMISSION, OR GOVERNING AGENCIES. THE CONTRACTOR SHALL CONTACT THE OWNER AND APPROPRIATE GOVERNING AGENCIES FOR APPROVAL IF ALTERNATIVE CONTROLS OTHER THAN THOSE SHOWN ON THE PLANS ARE PROPOSED.
14. THE CONTRACTOR SHALL INSPECT ALL SEDIMENT AND EROSION CONTROLS BEFORE AND AFTER EACH STORM (0.25 INCHES OR GREATER RAINFALL), OR AT LEAST WEEKLY, TO VERIFY THAT THE CONTROLS ARE OPERATING PROPERLY AND MAKE REPAIRS WHERE NECESSARY.
15. THE CONTRACTOR SHALL KEEP A SUPPLY OF EROSION CONTROL MATERIAL (HAY BALES, SILT FENCE, JUTE MESH, RIP RAP ETC.) ON-SITE FOR MAINTENANCE AND EMERGENCY REPAIRS.
16. INSTALL PERIMETER SEDIMENT CONTROLS PRIOR TO CLEARING OR CONSTRUCTION. ALL CONSTRUCTION SHALL BE CONTAINED WITHIN THE LIMIT OF DISTURBANCE, WHICH SHALL BE MARKED WITH SILT FENCE, SAFETY FENCE, HAY BALES, RIBBONS, OR OTHER MEANS PRIOR TO CLEARING. CONSTRUCTION ACTIVITY SHALL REMAIN ON THE UPHILL SIDE OF THE SILT FENCE UNLESS WORK IS SPECIFICALLY CALLED FOR ON THE DOWNHILL SIDE OF THE FENCE.
17. STONE CONSTRUCTION ENTRANCE ANTI-TRACKING PADS SHALL BE INSTALLED AT START OF CONSTRUCTION AND MAINTAINED THROUGHOUT THE DURATION OF CONSTRUCTION. THE LOCATION OF THE TRACKING PADS MAY CHANGE AS VARIOUS PHASES OF CONSTRUCTION ARE COMPLETED.
18. TOPSOIL SHALL BE STRIPPED AND STOCKPILED FOR USE IN FINAL LANDSCAPING. ALL EARTH STOCKPILES SHALL HAVE HAY BALES OR SILT FENCE AROUND THE LIMIT OF PILE. PILES SHALL BE TEMPORARILY SEEDED IF PILE IS TO REMAIN IN PLACE FOR MORE THAN 7 DAYS.
19. SEDIMENTATION TRAPS SHALL PROVIDE 134 CUBIC YARDS OF SEDIMENT STORAGE PER DISTURBED ACRE CONTRIBUTING TO THE BASIN. PROVIDE BASIN VOLUMES FOR ALL DISTURBANCE ON SITE. SEDIMENTATION BASINS SHALL BE DESIGNED TO HANDLE THE TOTAL SEDIMENT STORAGE VOLUME THROUGHOUT THE DURATION OF THE PROJECT PLUS THE REQUIRED WET STORAGE VOLUME WITH 6" OF FREEBOARD FROM THE PRIMARY OUTLET.
20. MINIMIZE LAND DISTURBANCES. SEED AND MULCH DISTURBED AREAS WITH TEMPORARY MIX AS SOON AS PRACTICABLE (2 WEEK MAXIMUM UNSTABILIZED PERIOD) USING PERENNIAL RYEGRASS AT 40 LBS PER ACRE. MULCH ALL CUT AND FILL SLOPES AND SWALES WITH LOOSE HAY AT A RATE OF 2 TONS PER ACRE. IF NECESSARY, REPLACE LOOSE HAY ON SLOPES WITH EROSION CONTROL BLANKETS OR JUTE CLOTH. MODERATELY GRADED AREAS, ISLANDS, AND TEMPORARY CONSTRUCTION STAGING AREAS MAY BE HYDROSEEDED WITH TACKIFIER.
21. SILT FENCE AND OTHER SEDIMENT CONTROL MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT DRAWINGS AND MANUFACTURER'S RECOMMENDATIONS PRIOR TO WORK IN ANY UPLAND AREAS.
22. EXCAVATED MATERIAL FROM TEMPORARY SEDIMENT TRAPS MUST BE STOCKPILED ON UPHILL SIDE OF SILT FENCE.
23. INSTALL SILT FENCE ACCORDING TO MANUFACTURERS INSTRUCTION, PARTICULARLY, BURY LOWER EDGE OF FABRIC INTO GROUND. SILT FENCE SHALL BE MIRAFI ENVIROFENCE, AMOCO SILT STOP OR EQUIVALENT APPROVED BY THE CIVIL ENGINEER. FILTER FABRIC USED SHALL BE MIRAFI 100X OR EQUIVALENT. SEE SPECIFICATIONS FOR FURTHER INFORMATION.
24. WHERE INDICATED ON EROSION CONTROL PLANS USE NEW HAY BALES AND REPLACE THEM WHENEVER THEIR CONDITION DETERIORATES BEYOND REASONABLE USABILITY. STAKE HAY BALES SECURELY INTO GROUND AND BUTT TIGHTLY TOGETHER TO PREVENT UNDERCUTTING AND BYPASSING.
25. INSTALL TEMPORARY DIVERSION DITCHES, PLUNGE POOLS, SEDIMENT TRAPS, AND DEWATERING PITS AS SHOWN AND AS NECESSARY DURING VARIOUS PHASES OF CONSTRUCTION TO CONTROL RUNOFF UNTIL UPHILL AREAS ARE STABILIZED. LOCATION OF SEDIMENT TRAPS WILL REQUIRE REVIEW AND APPROVAL BY THE CIVIL ENGINEER AND GOVERNING OFFICIALS.
26. DIRECT ALL DEWATERING PUMP DISCHARGE TO A SEDIMENT CONTROL DEVICE SUCH AS TEMPORARY PITS, SEDIMENT TRAPS OR CATCH BASINS WITHIN THE APPROVED LIMIT OF DISTURBANCE. DISCHARGE DIRECTLY TO STORM DRAINAGE SYSTEM OR SURFACE WATERS FROM SEDIMENT CONTROLS SHALL BE CLEAR.
27. BLOCK THE OPEN UPSTREAM ENDS OF SEDIMENTATION TRAP OUTLET CONTROL ORIFICE UNTIL SITE IS STABILIZED. CONVERT TEMPORARY SEDIMENT TRAPS TO PERMANENT DETENTION BASINS ONCE SITE HAS BEEN STABILIZED. CLEAN OUTLET CONTROL STRUCTURES AS NECESSARY AND REMOVE ACCUMULATED SEDIMENT FROM BOTTOM OF TRAP & BASIN. BLOCK END OF STORM SEWERS IN EXPOSED TRENCHES WITH BOARDS AND SANDBAGS AT THE END OF EACH WORKING DAY WHEN RAIN IS EXPECTED.
28. SWEEP AFFECTED PORTIONS OF SITE ROADS ONE OR MORE TIMES A DAY (OR LESS FREQUENTLY IF TRACKING IS NOT A PROBLEM) DURING CONSTRUCTION. OTHER DUST CONTROL MEASURES TO BE USED AS NECESSARY INCLUDE WATERING DOWN DISTURBED AREAS, USING CALCIUM CHLORIDE, AND COVERING LOADS ON DUMP TRUCKS.
29. PERIODICALLY CHECK ACCUMULATED SEDIMENT LEVELS IN THE SEDIMENT TRAPS AND BASINS DURING CONSTRUCTION AND CLEAN ACCUMULATED SILT WHEN NECESSARY OR WHEN ONE FOOT OF SEDIMENT HAS ACCUMULATED OR PER SPECIFIC CLEANOUT MARKER ELEVATION. CLEAN ACCUMULATED SEDIMENT FROM CATCH BASIN SUMPS AS NECESSARY AND AS DIRECTED BY THE CIVIL ENGINEER OR OWNER'S CONSTRUCTION REPRESENTATIVE. REMOVE ACCUMULATED SEDIMENT FROM BEHIND HAY BALES AND SILT FENCE WHEN LEVEL REACHES HALF THE HEIGHT OF THE HAY BALE OR ONE FOOT AT SILT FENCE. DISPOSE OF SEDIMENT LEGALLY EITHER ON OR OFF SITE.
30. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO ELIMINATE THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION.
31. ALL EXCAVATED MATERIAL SHALL BE PLACED ON THE HIGH SIDE OF UTILITY AND STORM PI



OVERALL PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	COMMENTS
TREES						
AC	3	ABIES CONCOLOR	WHITE FIR	B&B	6'-8' HT	FULL, EXTRA HEAVY
AR	8	ACER RUBRUM	RED MAPLE	CONT	6' HT	FULL, EXTRA HEAVY
AS	8	ACER SACCHARUM	SUGAR MAPLE	CONT	6' HT	FULL, EXTRA HEAVY
BL	11	BETULA LENTA	BLACK BIRCH	CONT	6' HT	MULTI-STEM
BP	4	BETULA POPULIFOLIA	GRAY BIRCH	CONT	6' HT	MULTI-STEM
CE	2	CELTIS OCCIDENTALIS	HACKBERRY	CONT	6' HT	FULL, EXTRA HEAVY
CG	7	CARYA GLABRA	PIGNUT HICKORY	CONT	6' HT	FULL, EXTRA HEAVY
CO	7	CARYA OVATA	SHAGBARK HICKORY	CONT	6' HT	FULL, EXTRA HEAVY
LT	5	LIRIODENDRON TULIPIFERA	TULIP TREE	B&B	2"-3" CAL	FULL, EXTRA HEAVY
NS	4	NYSSA SYLVATICA	BLACK TUPELO	CONT	6' HT	FULL, EXTRA HEAVY
OV	5	OSTRYA VIRGINIANA	AMERICAN HOPHORNBEAM	B&B	3"-3 1/2" DBH	FULL, EXTRA HEAVY
PS	6	PINUS STROBUS	WHITE PINE	B&B	6' - 8' HT	FULL, EXTRA HEAVY
PG	4	POPULUS GRANDIDENTATA	BIGTOOTH ASPEN	CONT	6' HT	FULL, EXTRA HEAVY
PT	4	POPULUS TREMULOIDES	QUAKING ASPEN	CONT	6' HT	FULL, EXTRA HEAVY
QA	7	QUERCUS ALBA	WHITE OAK	CONT	6' HT	FULL, EXTRA HEAVY
QR	8	QUERCUS RUBRA	RED OAK	CONT	6' HT	FULL, EXTRA HEAVY
QV	7	QUERCUS VELUTINA	BLACK OAK	CONT	6' HT	FULL, EXTRA HEAVY
QB	2	QUERCUS BICOLOR	SWAMP WHITE OAK	CONT	6' HT	FULL, EXTRA HEAVY
UA	6	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	CONT	6' HT	FULL, EXTRA HEAVY
UNDERSTORY TREES						
AL	4	AMELANCHIER LAEVIS	SMOOTH SHADBUSH	CONT	6' HT	FULL, EXTRA HEAVY
CF	3	CORNUS FLORIDA	FLOWERING DOGWOOD	CONT	6' HT	FULL, EXTRA HEAVY
PV	5	PRUNUS VIRGINIANA	CHOKE CHERRY	CONT	6' HT	FULL, EXTRA HEAVY
UPLAND SHRUBS / GRASSES / VINES						
AA	5	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
AM	6	ARONIA MELANOCARPA	BLACK CHOKEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
CA	34	CLETHRA ALNIFOLIA	SUMMERSWEET	CONT	18"-24" HT	FULL, EXTRA HEAVY
CO	21	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	CONT	18"-24" HT	FULL, EXTRA HEAVY
CR	5	CORNUS RACEMOSA	GRAY DOGWOOD	CONT	18"-24" HT	FULL, EXTRA HEAVY
HV	7	HAMAMMELIS VIRGINIANA 'SPRING BLOOMER'	SPRING BLOOMER WITCHHAZEL	CONT	18"-24" HT	FULL, EXTRA HEAVY
IP	3	ILEX PEDUNCULOSA	LONGSTALK HOLLY	CONT	18"-24" HT	FULL, EXTRA HEAVY
IV	13	ILEX VERTICILLATA	WINTERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
MP	5	MORELLA PENSYLVANICA	NORTHERN BAYBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
SB	18	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
VA	7	VACCINIUM ANGUSTIFOLIUM	LOW-BUSH BLUEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
VD	15	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	CONT	18"-24" HT	FULL, EXTRA HEAVY
VC	4	VACCINIUM CORYMBOSUM	HIGH-BUSH BLUEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY

SEED MIX	
NEW ENGLAND WETMIX (NEW ENGLAND WETLAND PLANTS, INC.)	
	APPLICATION RATE: 1 LB/2,500 S.F.
NEW ENGLAND ROADSIDE MATRIX UPLAND MIX	
	APPLICATION RATE: 1 LB/2,500 S.F.
NEW ENGLAND EROSION CONTROL/RESTORATION MIX	
	APPLICATION RATE: 1 LB/2,500 S.F.
50:50 MIX OF NEW ENGLAND EROSION CONTROL/RESTORATION MIX & NEW ENGLAND CONSERVATION/WILDLIFE MIX	
	APPLICATION RATE: 1 LB/ 1,250 S.F. (EROSION CONTROL/RESTORATION MIX)
	APPLICATION RATE: 1 LB/ 725 S.F. (CONSERVATION WILDLIFE MIX)
LAWN: PENNINGTON SMART SEED SUN AND SHADE	
	APPLICATION RATE PER MFR. RECOMMENDATIONS

PLANTING SOIL NOTES

1. ALL PLANTING MIXES SHALL BE PREPARED PRIOR TO DELIVERY TO SITE
2. PLANTING MIX FOR TREES AND SHRUBS SHALL BE AS FOLLOWS
   3 PARTS SCREED TOPSOIL
   1 PART CLEAN WASHED COARSE SAND
   1 PART PEAT HUMUS
   5 LBS. SUPER PHOSPHATE PER CUBIC YARD OF MIX
3. MYCORRHIZAL INNCOULANT TO BE MYCOR TREE SAVER TRANSPLANT BY PLANT HEALTH CARE, INC. (1-800-421-9051) OR APPROVED EQUAL.
4. TERRASORB AVAILABLE FROM PLANT HEALTH CARE, INC. OR APPROVED EQUAL
5. SUBMIT CERTIFICATION OF PLANTING MIX FOR TREES AND SHRUBS FROM SOIL DISTRIBUTOR.
6. TOPSOIL MIX SHALL INCLUDE:
   3 PARTS SCREENED TOPSOIL
   1 PART SAND
   1 PART HUMUS
   5 LBS. SUPER PHOSPHATE PER CU. YD. OF MIX
7. TOPSOIL:
   A. PROVIDE A NATURAL, FERTILE, FRIABLE, NATURAL LOAM SURFACE SOIL CAPABLE OF SUSTAINING VIGOROUS PLANT GROWTH. OF UNIFORM COMPOSITION THROUGHOUT AND WITHOUT ADMIXTURES OF SUBSOIL, AND FREE OF STONES, LUMPS, PLANTS, ROOTS, STICKS OR OTHER EXTRANEOUS MATTER.
   B. TOPSOIL SHALL CONTAIN NOT LESS THAN 4% NOR MORE THAN 20% ORGANIC MATTER AS DETERMINED BY THE WET COMBUSTION METHOD.
   C. MECHANICAL ANALYSIS

SCREEN SIZE	% BY WEIGHT PASSING
1"	100
V4"	97 - 100
NO. 200	20 - 65

   D. CONTRACTORS SHALL BE RESPONSIBLE FOR ALL TESTING AND ANALYSIS OF EXISTING AND IMPORTED SOILS. FURNISH A SOIL ANALYSIS MADE BY A QUALIFIED INDEPENDENT SOIL - TESTING AGENCY STATING PERCENTAGES OF ORGANIC MATTER, INORGANIC MATTER (SILT, CLAY, AND SAND), DELETERIOUS MATERIAL, PH, AND MINERAL AND PLANT - NUTRIENT CONTENT OF TOPSOIL.
   E. REPORT SUITABILITY OF TOPSOIL FOR LAWN AND SHRUB PLANTING GROWTH. RECOMMEND QUANTITIES OF NITROGEN, PHOSPHORUS, AND POTASH NUTRIENT AND ANY LIMESTONE, ALUMINUM SULFATE, OR OTHER SOIL AMENDMENTS TO BE ADDED TO PRODUCE A SATISFACTORY TOPSOIL.

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22 SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION.
3. REFER TO PREVIOUSLY APPROVED PLANTING TAKEN FROM A PLAN ENTITLED "PLANTING PLAN"; SHEET 4.61; DATED: 12/07/15; REVISED: 08/15/16; APPROVED: 09/04/16; PREPARED BY SOLLI ENGINEERING, LLC.
4. SEE SHEET 2.61 FOR PLANTING DETAILS.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- EDGE OF PAVEMENT
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LAWN
- NEW ENGLAND WETMIX
- NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX
- 50/50 MIX OF NEW ENGLAND EROSION CONTROL RESTORATION MIX AND NEW ENGLAND CONSERVATION WILDLIFE MIX
- NEW ENGLAND EROSION CONTROL RESTORATION MIX FOR DRY SITES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- LOD — LIMIT OF DISTURBANCE
- WETLAND MARKER

PLANTING NOTES

1. INVASIVE NON-NATIVE SPECIES SHALL BE ERADICATED OR REMOVED FROM WETLAND BUFFER AND DETENTION BASIN AREAS AFTER BEING IDENTIFIED AND TAGGED BY EPS STAFF.
2. ANY HERBICIDE USED FOR INVASIVE ERADICATION OR CONTROL SHALL BE APPROVED BY PROJECT WETLAND SCIENTIST AND APPLIED BY A LICENSED PROFESSIONAL.
3. A MARKER DYE SHALL BE ADDED TO ANY HERBICIDES USED FOR SELECTIVE INVASIVE PLANT REMOVAL.
4. DISPOSE OF INVASIVE PLANT MATERIAL OFF SITE.
5. MAXIMIZE THE PROTECTION OF NATIVE TREES AND SHRUBS AT THE LIMIT OF DISTURBANCE USING ORANGE CONSTRUCTION FENCING OR EQUIVALENT.
6. A 50:50 MIX OF WEED-FREE LEAF COMPOST AND SAND SHALL BE AN ACCEPTABLE SUBSTITUTE FOR NATURAL TOPSOIL. IF USED, THE COMPOST SHALL BE TESTED FOR GERMINATION OF WEED SEEDS.
7. BASIN BOTTOM SOIL MIX SHALL CONSIST OF 50-60% SAND, 20-30% TOPSOIL, AND 20-30% WELL AGED COMPOST (AT LEAST ONE YEAR) OR PEAT MOSS.
8. BASIN SOIL MIX SHALL BE PLACED 18"-30" DEEP.
9. BASIN SLOPES SHALL BE AMENDED WITH 6" OF TOPSOIL, WHICH SHALL BE FREE FROM PURPLE LOOSESTRIFE (LYTHRUM SALICARIA), COMMON REED (PHRAGMITES AUSTRALIS), OR REED CANARYGRASS (PHALARIS ARUNDINACEA).
10. COMPACTION OF BASIN REQUIRED BACKFILL SHALL BE MINIMIZED TO THE MAXIMUM EXTENT FEASIBLE BY THE USE OF EXCAVATION HOES, LIGHT EQUIPMENT WITH TURF TYPE TIRES, OR WIDE TRACK EQUIPMENT.
11. IF COMPACTION DOES OCCUR IN A RAIN GARDEN, THE COMPACTED ZONE SHALL BE TILLED TO REFRACTURE AT LEAST 12" OF NATURAL SOIL BEFORE BACKFILLED WITH SOIL MIX.
12. WHEN BACKFILLING BASIN, PLACE SOIL IN LIFTS OF 12-18" AND USE LIGHT EQUIPMENT ONLY WHEN GRADING WITHIN THE BASIN. HEAVY EQUIPMENT CAN BE USED AROUND THE PERIMETER OF THE BASIN.
13. ALLOW SOIL MIXTURE TO SETTLE NATURALLY THROUGH RAIN EVENTS OR PRESOAK AFTER PLACEMENT.
14. PLANTS SHALL BE NATIVE SPECIES FROM NEW ENGLAND SOURCES TO THE EXTENT FEASIBLE. CULTIVARS OR HYBRIDS ARE NOT ACCEPTABLE.
15. PLANT AT LEAST ONE MALE WINTERBERRY IN THE BACKGROUND OF EACH WINTERBERRY GROUPING AT A RATIO OF APPROXIMATELY 1 MALE PER 5 FEMALE.
16. PLANT TREES AND SHRUBS AROUND EXISTING NATIVE VEGETATION IN BEDS AND MULCH WITH PINE BARK MULCH. MULCH AROUND TREES WITH PINE BARK MULCH.
17. AVERAGE DENSITY OF TREES SHALL BE 15-20 FEET O.C.
18. AVERAGE DENSITY OF SHRUBS SHALL BE IN GROUPINGS 4-6 FEET O.C.
19. PLANT TREES AND SHRUBS IN BEDS AND MULCH WITH PINE BARK MULCH. MULCH AROUND TREES WITH PINE BARK MULCH.
20. MULCH IS NOT TO BE RENEWED.
21. SEED BASIN BOTTOM, SLOPES, AND OTHER DISTURBED SOILS WITH NEW ENGLAND EROSION CONTROL/RESTORATION MIX (FOR DETENTION BASINS AND MOIST SITES) AT 1 LB/1250 S.F.
22. SEED UPLAND REVIEW ENHANCEMENT AREAS AND DISTURBED UPLAND SOILS WITH NEW ENGLAND ROADSIDE MATRIX UPLAND MIX AT 1 LB/1250SQ FT OR NEW ENGLAND SEMI-SHADE GRASS AND FORBS MIX PER SUNLIGHT CONDITIONS.
23. IN UPLAND REVIEW ENHANCEMENT AREAS INSTALL TREES AND SHRUBS IN AREAS WHERE INVASIVES HAVE BEEN ERADICATED.
24. IN UPLAND REVIEW ENHANCEMENT AREAS, AVERAGE DENSITY OF TREES SHALL BE 15-20 FEET O.C.
25. IN UPLAND REVIEW ENHANCEMENT AREAS, AVERAGE DENSITY OF SHRUBS SHALL BE IN GROUPINGS 4-6 FEET O.C.
26. TREES AND SHRUBS SHALL BE PROTECTED FROM DEER BROWSE WITH REPELLANT OR CAGES.
27. FINAL PLANT & SEED MIX LOCATIONS SHOULD BE DETERMINED IN THE FIELD BY EPS STAFF.
28. ANY SUBSTITUTIONS SHALL BE REVIEWED AND APPROVED BY EPS STAFF.
29. INSTALL LOGS AND COARSE WOODY DEBRIS SCATTERED ON SLOPE. PLACE LOGS TO MAXIMIZE SOIL CONTACT TO PROVIDE ENHANCED AMPHIBIAN HABITAT.

Rev. #:	Date	Description

Graphic Scale: 150 0 150 300

SOLLI ENGINEERING
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Drawn By:	FLO
Checked By:	MFB
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 150'

Mary Blackburn, P.L.A.
CT 1499

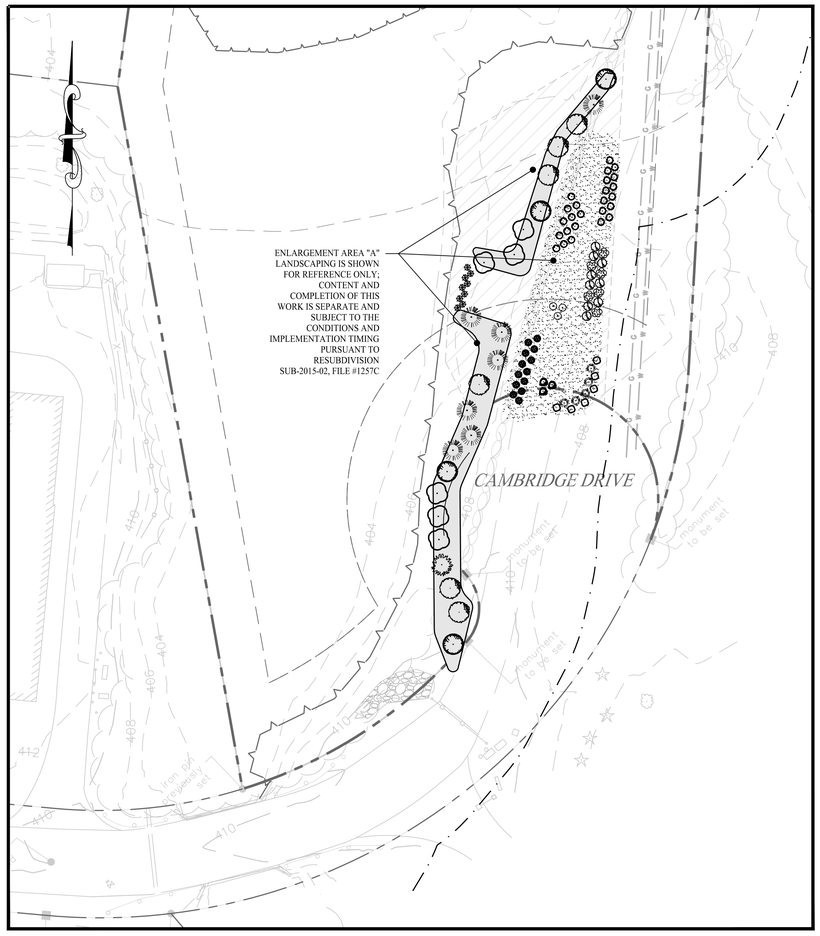
Project:

PROPOSED SITE RESTORATION

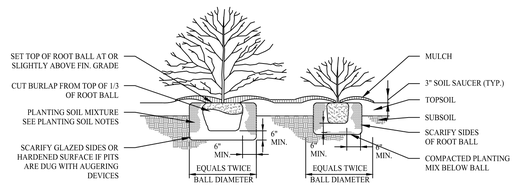
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
OVERALL LANDSCAPE PLAN	2.60

Oct. 17, 2023 - 5:06pm chris
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ENLARGEMENT AREA "A"

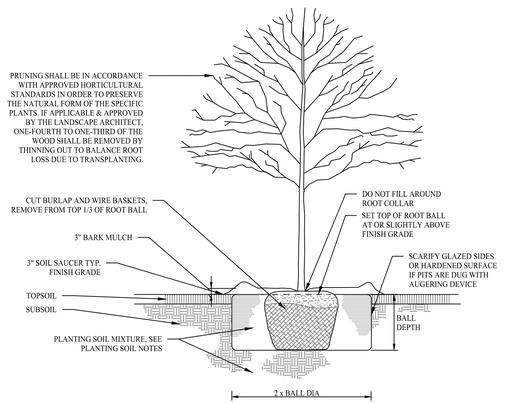


BALLED AND BURLAPPED CONTAINER GROWN

NOTE
1. IN AREAS OF MASS PLANTING, CONTINUOUSLY EXCAVATE AND MULCH ENTIRE BED.

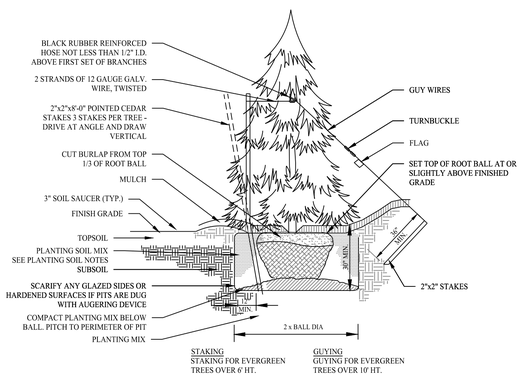
SHRUB / GROUNDCOVER PLANTING

SCALE: NTS



TREE PLANTING

SCALE: NTS



EVERGREEN TREE PLANTING

SCALE: NTS

GENERAL NOTES

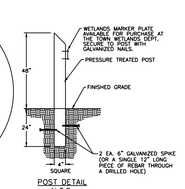
1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION.
3. REFER TO PREVIOUSLY APPROVED PLANTING TAKEN FROM A PLAN ENTITLED "PLANTING PLAN"; SHEET 4.61; DATED: 12/07/15; REVISED: 08/15/16; APPROVED: 09/04/16; PREPARED BY SOLLI ENGINEERING, LLC.
4. IMPROVEMENTS TO BE COMPLETED OUTSIDE OF THIS APPLICATION.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- WM — WETLAND MARKER



MARKER PLATE DETAIL
N.T.S.



POST DETAIL
N.T.S.

NOTE: THIS MARKER POST SHOULD BE INSTALLED ALONG THE WETLAND UPLAND REVIEW LINE (100 FT. OUTSIDE THE ACTUAL WETLANDS) AT A MAX. DISTANCE OF 75 FT. APART, AND/OR AT POINTS OF CURVATURE, CHANGES IN ALIGNMENT OR ANGLE POINTS.

INLAND WETLANDS MARKER AND POST DETAIL (WM)

SCALE: NTS

Rev. #:	Date	Description

Graphic Scale: 40 0 40 80

SOLLI ENGINEERING
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Drawn By:	FLO
Checked By:	MFB
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 40'

Mary Blackburn, P.L.A.
CT 1499

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: LANDSCAPE ENLARGEMENT AREA PLAN

Sheet #: 2.61

Oct 17, 2023 – 5:06pm chris
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ENLARGEMENT AREA "B"

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION.
3. REFER TO PREVIOUSLY APPROVED PLANTING TAKEN FROM A PLAN ENTITLED "PLANTING PLAN"; SHEET 4.61; DATED: 12/07/15; REVISED: 08/15/16; APPROVED: 09/04/16; PREPARED BY SOLLI ENGINEERING, LLC.
4. SEE SHEET 2.60 FOR OVERALL PLANT SCHEDULE, PLANTING NOTES & PLANTING SOIL NOTES.
5. SEE SHEET 2.61 FOR PLANTING DETAILS.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- WM — WETLAND MARKER
- OVERSTORY TREE
- UNDERSTORY TREE
- EVERGREEN TREE
- SHRUBS & GROUNDCOVER
- LAWN
- NEW ENGLAND WETMIX
- NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX
- 50/50 MIX OF NEW ENGLAND EROSION CONTROL RESTORATION MIX AND NEW ENGLAND CONSERVATION WILDLIFE MIX
- NEW ENGLAND EROSION CONTROL RESTORATION MIX FOR DRY SITES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- LOD — LIMIT OF DISTURBANCE

PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	COMMENTS
TREES						
BP	2	BETULA POPULIFOLIA	GRAY BIRCH	CONT	6' HT	MULTI-STEM
NS	1	NYSSA SYLVATICA	BLACK TUPELO	CONT	6' HT	FULL, EXTRA HEAVY
OV	5	OSTRYA VIRGINIANA	AMERICAN HOPHORNBEAM	B&B	3"-2 1/2" DBH	FULL, EXTRA HEAVY
QB	1	QUERCUS BICOLOR	SWAMP WHITE OAK	CONT	6' HT	FULL, EXTRA HEAVY
UPLAND SHRUBS / GRASSES / VINES						
CA	5	CLETHRA ALNIFOLIA	SUMMERSWEET	CONT	18"-24" HT	FULL, EXTRA HEAVY
CO	3	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	CONT	18"-24" HT	FULL, EXTRA HEAVY
IV	6	ILEX VERTICILLATA	WINTERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
SB	4	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY

SEED MIX

NEW ENGLAND WETMIX (NEW ENGLAND WETLAND PLANTS, INC.)
APPLICATION RATE: 1 LB/2,500 S.F.

NEW ENGLAND ROADSIDE MATRIX UPLAND MIX
APPLICATION RATE: 1 LB/2,500 S.F.

NEW ENGLAND EROSION CONTROL/RESTORATION MIX
APPLICATION RATE: 1 LB/2,500 S.F.

50:50 MIX OF NEW ENGLAND EROSION CONTROL/RESTORATION MIX & NEW ENGLAND CONSERVATION/WILDLIFE MIX
APPLICATION RATE: 1 LB/ 1,250 S.F. (EROSION CONTROL/RESTORATION MIX)
APPLICATION RATE: 1 LB/ 725 S.F. (CONSERVATION WILDLIFE MIX)

LAWN: PENNINGTON SMART SEED SUN AND SHADE
APPLICATION RATE PER MFR. RECOMMENDATIONS

Rev. #:	Date	Description

Graphic Scale: 40 0 40 80

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	FLO
Checked By:	MFB
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 40'

Mary Blackburn, P.L.A.
CT 1499

Project:

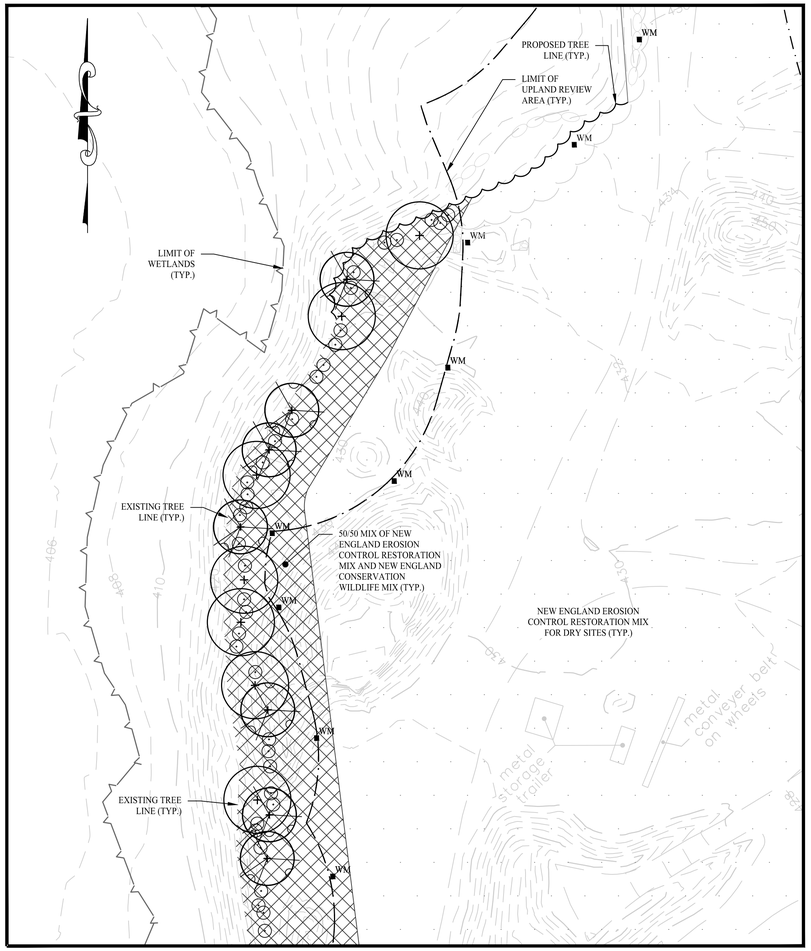
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

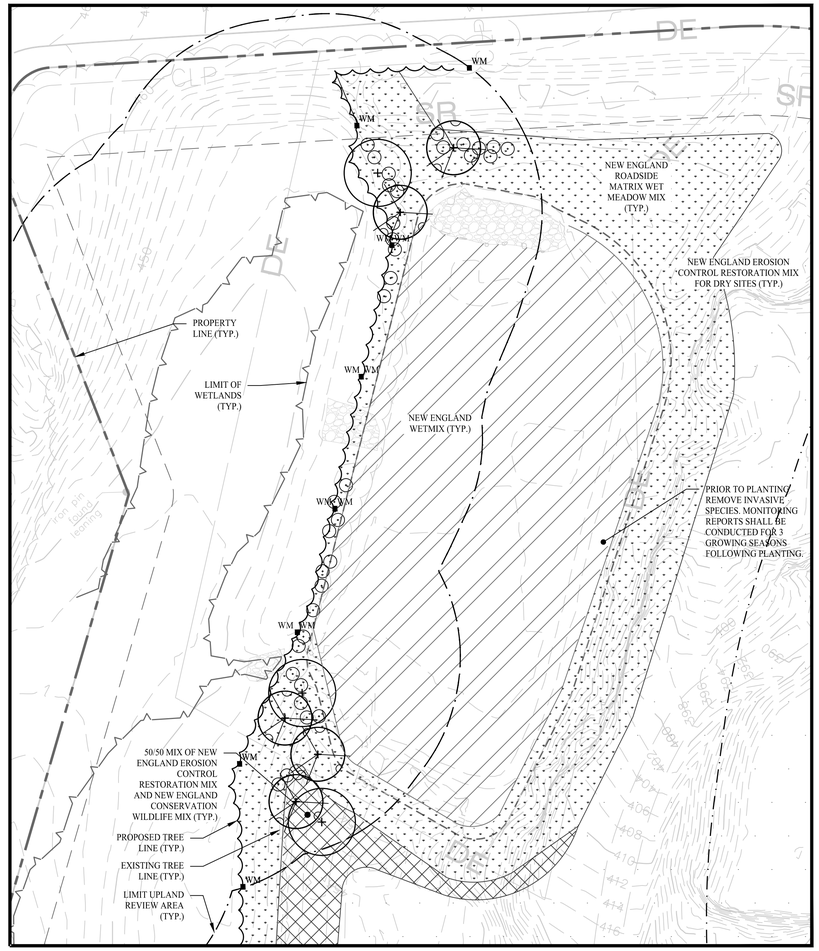
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Sheet #: 2.62

Oct 17, 2023 - 5:06pm chris
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ENLARGEMENT AREA "C"



ENLARGEMENT AREA "D"

PLANT SCHEDULE

KEY	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	COMMENTS
TREES						
AC	3	AMELANCHIER CANADENSIS	SERVISCE BERRY	CONT	6' HT	FULL, EXTRA HEAVY
AR	2	ACER RUBRUM	RED MAPLE	CONT	6' HT	FULL, EXTRA HEAVY
BP	2	BETULA POPULIFOLIA	GRAY BIRCH	CONT	6' HT	MULTI-STEM
CE	2	CELTIS OCCIDENTALIS	HACKBERRY	CONT	6' HT	FULL, EXTRA HEAVY
NS	3	NYSSA SYLVATICA	BLACK TUPELO	CONT	6' HT	FULL, EXTRA HEAVY
QB	1	QUERCUS BICOLOR	SWAMP WHITE OAK	CONT	6' HT	FULL, EXTRA HEAVY
UNDERSTORY TREES						
AL	4	AMELANCHIER LAEVIS	SMOOTH SHADBUSH	CONT	6' HT	FULL, EXTRA HEAVY
CF	3	CORNUS FLORIDA	FLOWERING DOGWOOD	CONT	6' HT	FULL, EXTRA HEAVY
PV	5	PRUNUS VIRGINIANA	CHOKE CHERRY	CONT	6' HT	FULL, EXTRA HEAVY
UPLAND SHRUBS / GRASSES / VINES						
AA	5	ARONIA ARBUTIFOLIA	RED CHOKEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
AM	6	ARONIA MELANOCARPA	BLACK CHOKEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
CA	5	CLETHRA ALNIFOLIA	SUMMERSWEET	CONT	18"-24" HT	FULL, EXTRA HEAVY
CO	7	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	CONT	18"-24" HT	FULL, EXTRA HEAVY
CR	5	CORNUS RACEMOSA	GRAY DOGWOOD	CONT	18"-24" HT	FULL, EXTRA HEAVY
HV	7	HAMAMMELIS VIRGINIANA 'SPRING BLOOMER'	SPRING BLOOMER WITCHHAZEL	CONT	18"-24" HT	FULL, EXTRA HEAVY
IP	3	ILEX PEDUNCULOSA	LONGSTALK HOLLY	CONT	18"-24" HT	FULL, EXTRA HEAVY
IV	7	ILEX VERTICILLATA	WINTERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
MP	5	MORELLA PENSYLVANICA	NORTHERN BAYBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
SB	5	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
VA	7	VACCINIUM ANGUSTIFOLIUM	LOW-BUSH BLUEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
VD	6	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	CONT	18"-24" HT	FULL, EXTRA HEAVY
VC	4	VACCINIUM CORYMBOSUM	HIGH-BUSH BLUEBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY

SEED MIX

NEW ENGLAND WETMIX (NEW ENGLAND WETLAND PLANTS, INC.)
APPLICATION RATE: 1 LB/2,500 S.F.

NEW ENGLAND ROADSIDE MATRIX UPLAND MIX
APPLICATION RATE: 1 LB/2,500 S.F.

NEW ENGLAND EROSION CONTROL/RESTORATION MIX
APPLICATION RATE: 1 LB/2,500 S.F.

50:50 MIX OF NEW ENGLAND EROSION CONTROL/RESTORATION MIX & NEW ENGLAND CONSERVATION/WILDLIFE MIX
APPLICATION RATE: 1 LB/ 1,250 S.F. (EROSION CONTROL/RESTORATION MIX)
APPLICATION RATE: 1 LB/ 725 S.F. (CONSERVATION WILDLIFE MIX)

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22 SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION.
3. SEE SHEET 2.60 FOR OVERALL PLANT SCHEDULE, PLANTING NOTES & PLANTING SOIL NOTES.
4. SEE SHEET 2.61 FOR PLANTING DETAILS.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- WM — WETLAND MARKER
- OVERSTORY TREE
- UNDERSTORY TREE
- EVERGREEN TREE
- SHRUBS & GROUNDCOVER
- LAWN
- NEW ENGLAND WETMIX
- NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX
- 50/50 MIX OF NEW ENGLAND EROSION CONTROL RESTORATION MIX AND NEW ENGLAND CONSERVATION WILDLIFE MIX
- NEW ENGLAND EROSION CONTROL RESTORATION MIX FOR DRY SITES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- LOD — LIMIT OF DISTURBANCE

Rev. #:	Date	Description

Graphic Scale: 40 0 40 80

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Drawn By:	FLO
Checked By:	MFB
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 40'

Mary Blackburn, P.L.A.
CT 1499

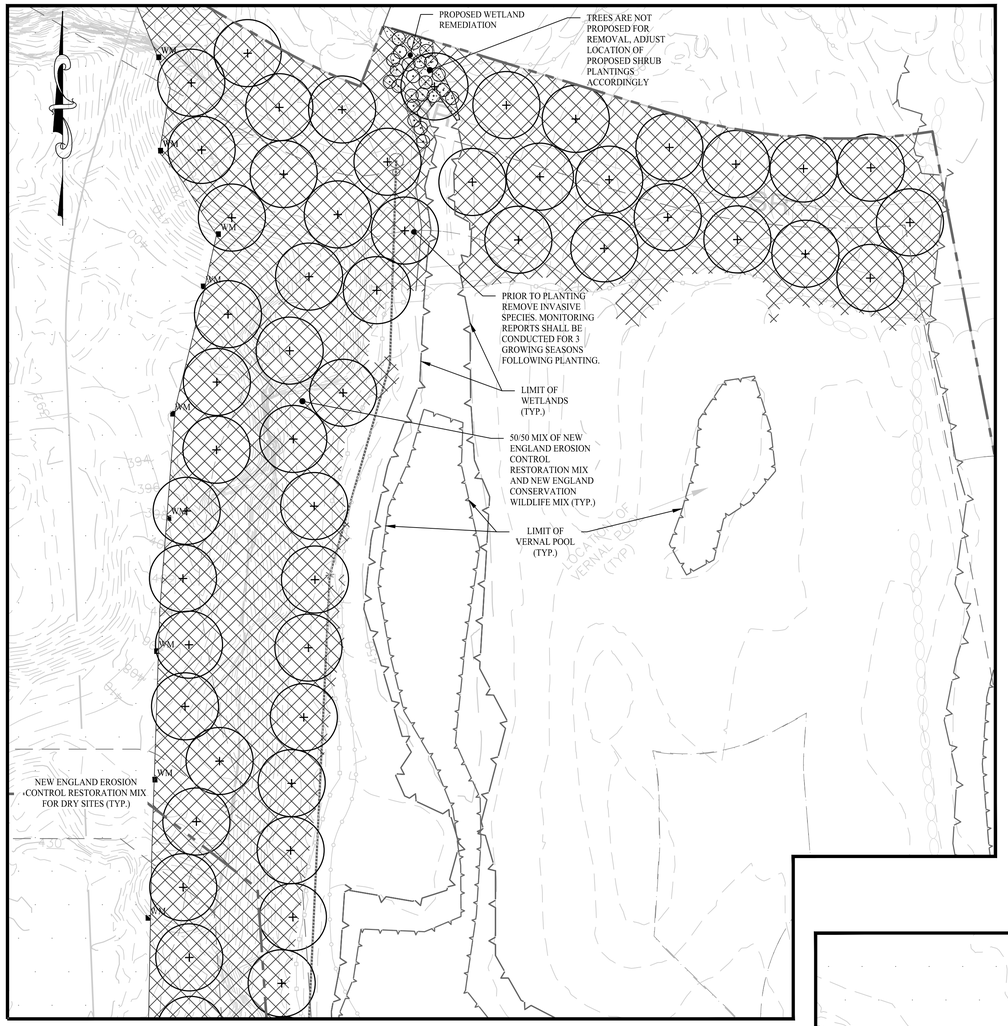
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PROPOSED SITE RESTORATION

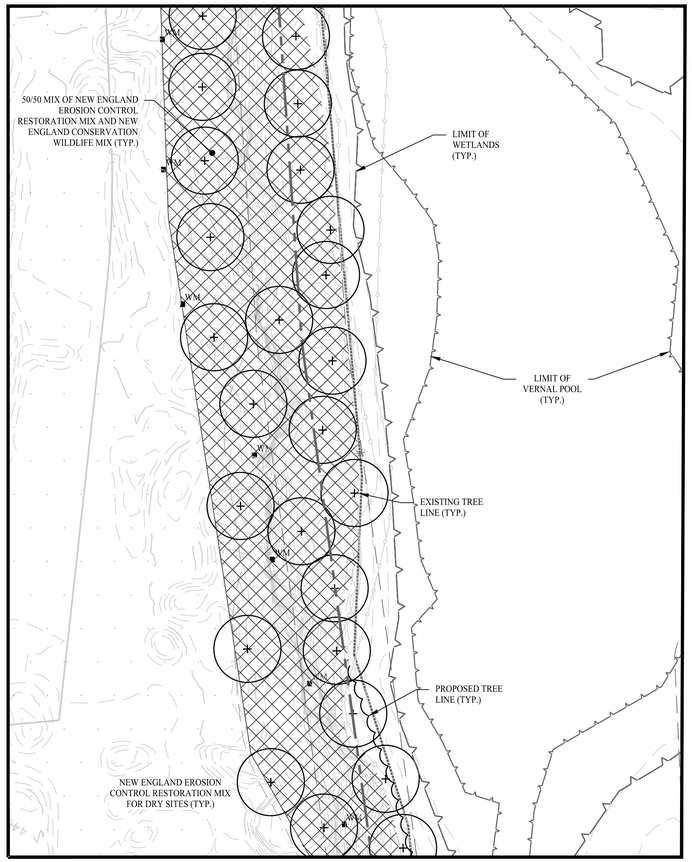
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
LANDSCAPE ENLARGEMENT AREA PLAN	2.63

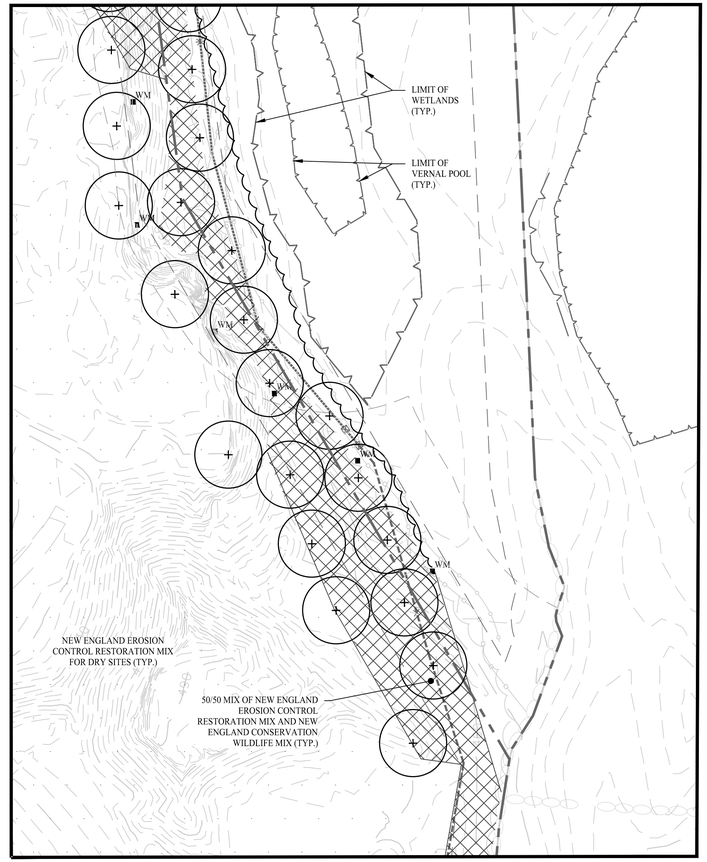
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ENLARGEMENT AREA "E"



ENLARGEMENT AREA "F"



ENLARGEMENT AREA "G"

GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION.
3. SEE SHEET 2.60 FOR OVERALL PLANT SCHEDULE, PLANTING NOTES & PLANTING SOIL NOTES.
4. SEE SHEET 2.61 FOR PLANTING DETAILS.

PLANT SCHEDULE

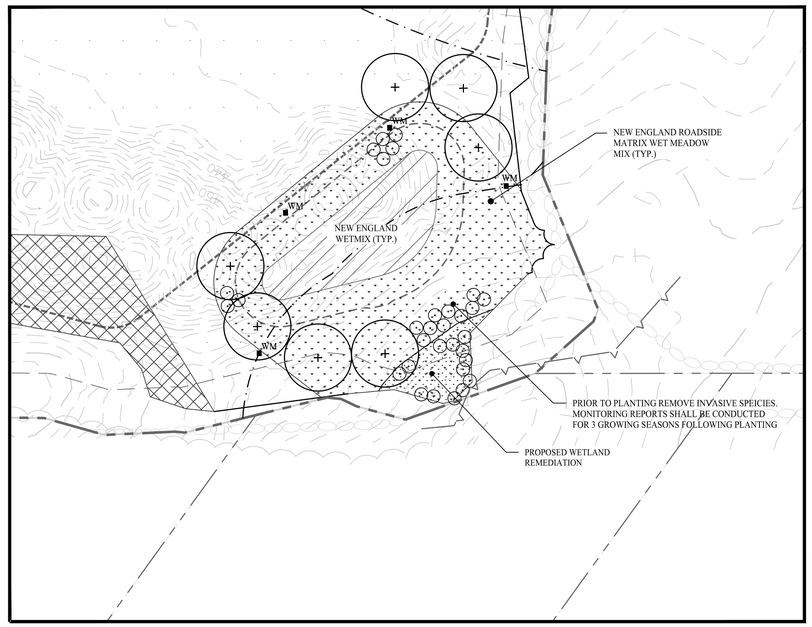
KEY	QTY	BOTANICAL NAME	COMMON NAME	ROOT	SIZE	COMMENTS
TREES						
AC	3	AMELANCHIER CANADENSIS	SERVICE BERRY	CONT	6' HT	FULL, EXTRA HEAVY
AR	6	ACER RUBRUM	RED MAPLE	CONT	6' HT	FULL, EXTRA HEAVY
AS	8	ACER SACCHARUM	SUGAR MAPLE	CONT	6' HT	FULL, EXTRA HEAVY
BL	11	BETULA LENTA	BLACK BIRCH	CONT	6' HT	MULTI-STEM
CG	7	CARYA GLABRA	PIGNUT HICKORY	CONT	6' HT	FULL, EXTRA HEAVY
CO	7	CARYA OVATA	SHAGBARK HICKORY	CONT	6' HT	FULL, EXTRA HEAVY
LT	5	LIRIODENDRON TULIPIFERA	TULIP TREE	CONT	6' HT	FULL, EXTRA HEAVY
PS	6	PINUS STROBUS	WHITE PINE	B&B	6' - 8' HT	FULL, EXTRA HEAVY
PG	4	POPULUS GRANDIDENTATA	BIGTOOTH ASPEN	CONT	6' HT	FULL, EXTRA HEAVY
PT	4	POPULUS TREMULOIDES	QUAKING ASPEN	CONT	6' HT	FULL, EXTRA HEAVY
QA	7	QUERCUS ALBA	WHITE OAK	CONT	6' HT	FULL, EXTRA HEAVY
QR	8	QUERCUS RUBRA	RED OAK	CONT	6' HT	FULL, EXTRA HEAVY
QV	7	QUERCUS VELUTINA	BLACK OAK	CONT	6' HT	FULL, EXTRA HEAVY
UA	6	ULMUS AMERICANA 'PRINCETON'	PRINCETON ELM	CONT	6' HT	FULL, EXTRA HEAVY
UPLAND SHRUBS / GRASSES / VINES						
CA	24	CLETHRA ACNIFOLIA	SUMMERSWEET	CONT	18"-24" HT	FULL, EXTRA HEAVY
CO	11	CEPHALANTHUS OCCIDENTALIS	BUTTONBUSH	CONT	18"-24" HT	FULL, EXTRA HEAVY
SB	9	SAMBUCUS CANADENSIS	COMMON ELDERBERRY	CONT	18"-24" HT	FULL, EXTRA HEAVY
VD	9	VIBURNUM DENTATUM	ARROWWOOD VIBURNUM	CONT	18"-24" HT	FULL, EXTRA HEAVY

SEED MIX

NEW ENGLAND WETMIX (NEW ENGLAND WETLAND PLANTS, INC.)
APPLICATION RATE: 1 LB/2,500 S.F.

NEW ENGLAND EROSION CONTROL/RESTORATION MIX
APPLICATION RATE: 1 LB/2,500 S.F.

50:50 MIX OF NEW ENGLAND EROSION CONTROL/RESTORATION MIX & NEW ENGLAND CONSERVATION/WILDLIFE MIX
APPLICATION RATE: 1 LB/ 1,250 S.F. (EROSION CONTROL/RESTORATION MIX)
APPLICATION RATE: 1 LB/ 725 S.F. (CONSERVATION WILDLIFE MIX)



ENLARGEMENT AREA "H"

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- ADJOINING LOT LINE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- WM — WETLAND MARKER
- OVERSTORY TREE
- UNDERSTORY TREE
- EVERGREEN TREE
- SHRUBS & GROUNDCOVER
- LAWN
- NEW ENGLAND WETMIX
- NEW ENGLAND ROADSIDE MATRIX WET MEADOW MIX
- 50/50 MIX OF NEW ENGLAND EROSION CONTROL RESTORATION MIX AND NEW ENGLAND CONSERVATION WILDLIFE MIX
- NEW ENGLAND EROSION CONTROL RESTORATION MIX FOR DRY SITES
- EXISTING TREE LINE
- PROPOSED TREE LINE
- LOD — LIMIT OF DISTURBANCE

Rev. #:	Date	Description

Graphic Scale: 40 0 40 80

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501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	FLO
Checked By:	MFB
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 40'

Mary Blackburn, P.L.A.
CT 1499

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: LANDSCAPE ENLARGEMENT AREA PLAN

Sheet #: 2.64

Oct 17, 2023 – 5:07pm chris
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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM PLANS ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE (1 OF 2 & 2 OF 2)" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC. REFER TO SAID PLAN FOR ALL DIMENSIONS, BEARINGS OR ANGLES OF PROPERTY LINES, EASEMENTS AND RIGHTS-OF-WAY.
3. THESE PLANS ARE FOR PERMITTING PURPOSES ONLY AND ARE NOT FOR CONSTRUCTION. NO CONSTRUCTION OR DEMOLITION SHALL BEGIN UNTIL APPROVAL OF THE FINAL PLANS IS GRANTED BY ALL GOVERNING AND REGULATORY AGENCIES AND ISSUANCE OF A DULY AUTHORIZED CERTIFIED OF ZONING COMPLIANCE AND BUILDING PERMIT FROM THE TOWN OF MONROE.

LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SECTION LINE
- LIMIT OF DISTURBANCE
- LIMIT OF WETLANDS
- LIMIT OF UPLAND REVIEW AREA
- LIMIT OF VERNAL POOL
- LIMIT OF VERNAL POOL ENVELOPE
- TYPICAL CROSS SECTION

Rev. #:	Date	Description

Graphic Scale: 150 0 150 300

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Drawn By:	AWC
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Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 150'

Kevin Solli, P.E.
CT 25759

Project:

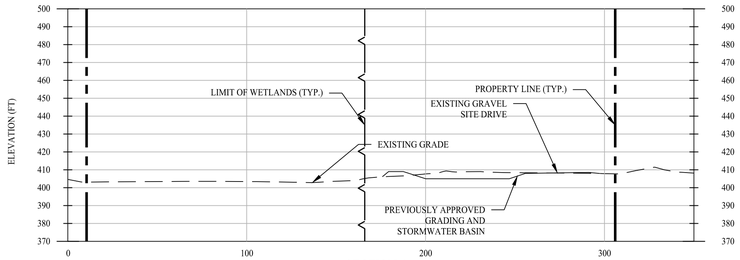
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: CROSS SECTION LOCATION PLAN

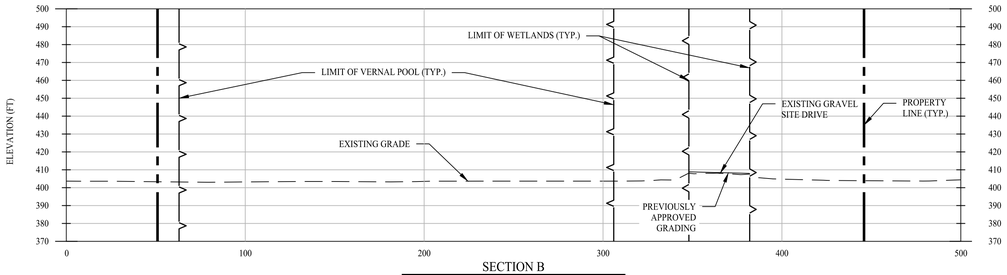
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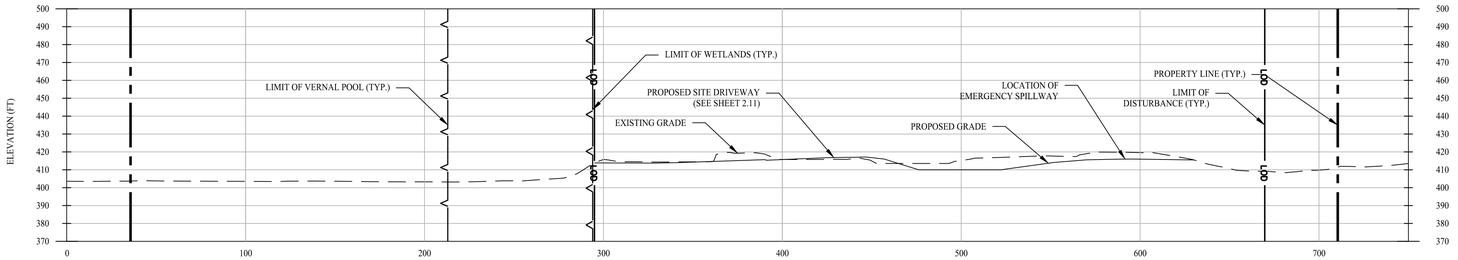
SECTION A

SCALE: H:1" = 40'
V:1" = 40'



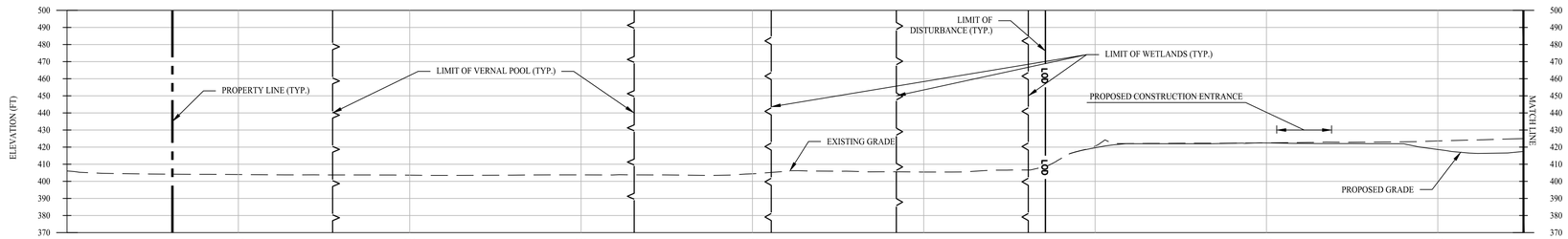
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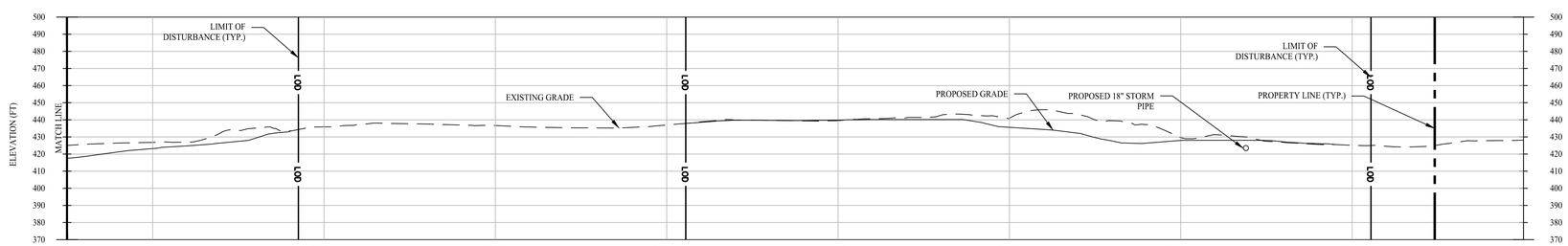
SECTION C

SCALE: H:1" = 40'
V:1" = 40'



SECTION D

SCALE: H:1" = 40'
V:1" = 40'



SECTION D (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'

Rev. #:	Date	Description

Graphic Scale:

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501 Main Street, Monroe, CT 06468 T: (203) 880-5455 F: (203) 880-9695

Drawn By:	AWC
Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	AS SHOWN

Kevin Solli, P.E.
CT 25759

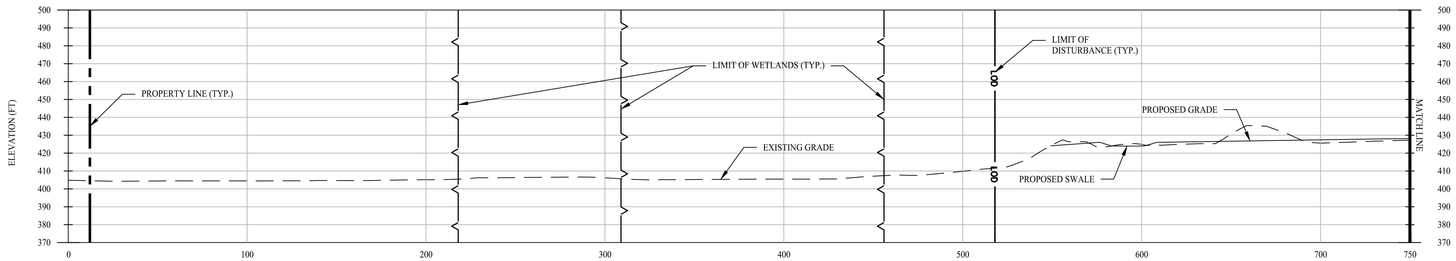
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

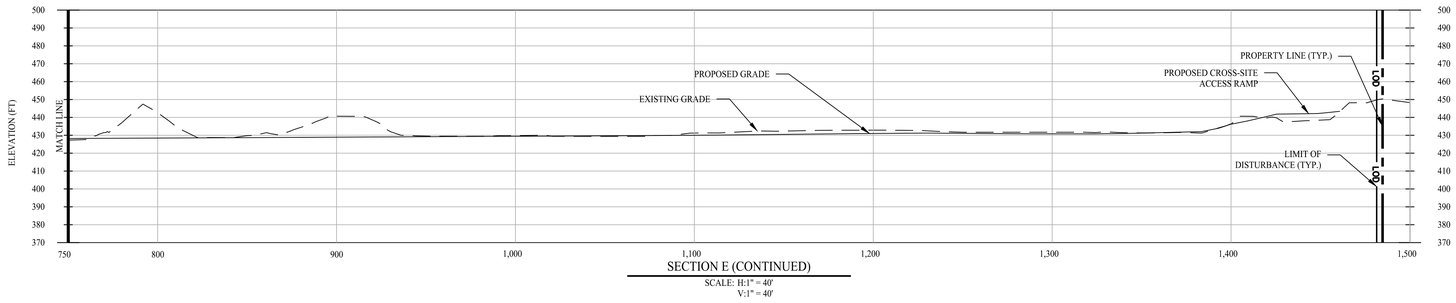
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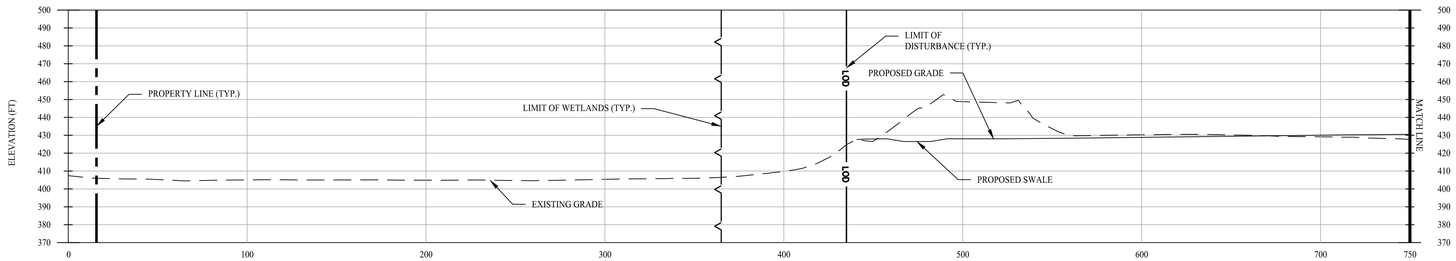
SECTION E

SCALE: H:1" = 40'
V:1" = 40'



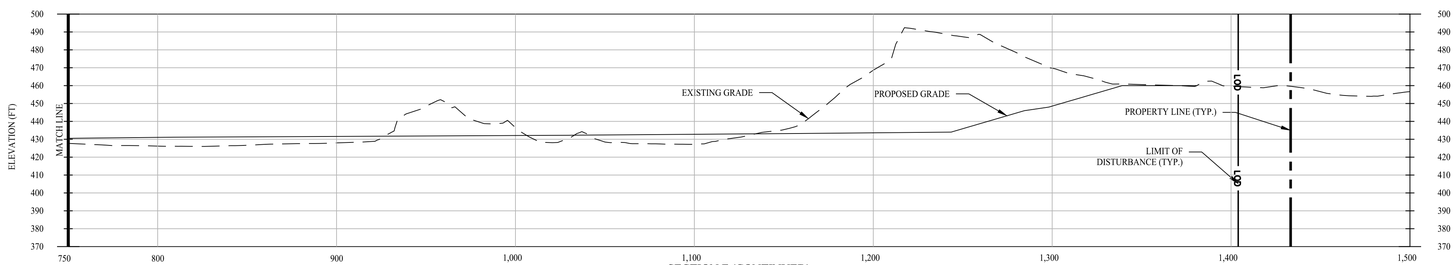
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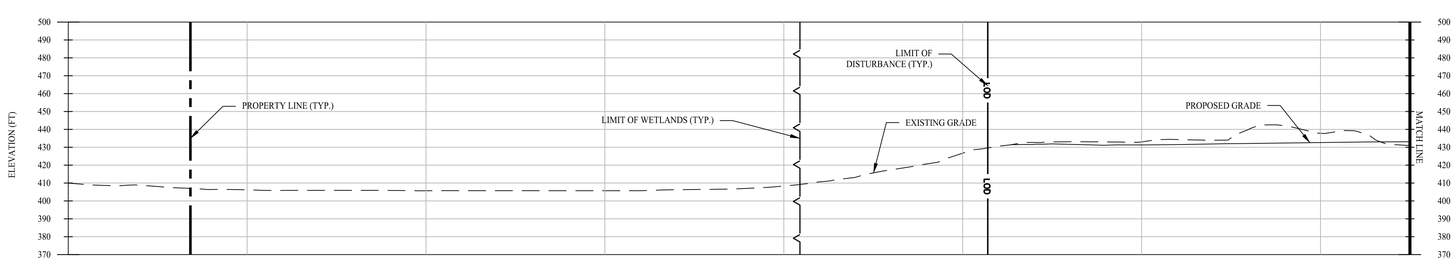
SECTION F

SCALE: H:1" = 40'
V:1" = 40'



SECTION F (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION G

SCALE: H:1" = 40'
V:1" = 40'

Rev. #:	Date	Description

Graphic Scale:

SOLLI ENGINEERING
501 Main Street, Monroe, CT 06468 T: (203) 880-5455 | F: (203) 880-9695

Drawn By:	AWC
Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	AS SHOWN

Kevin Solli, P.E.
CT 25759

Project:

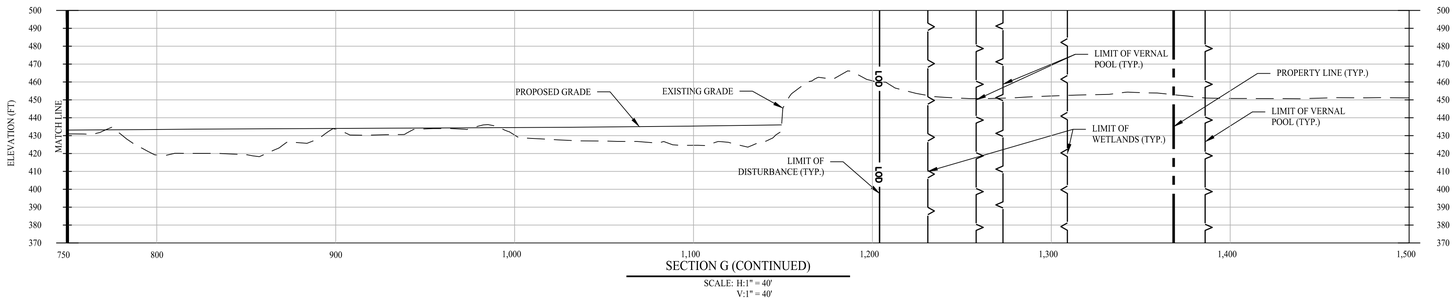
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SITE CROSS SECTIONS

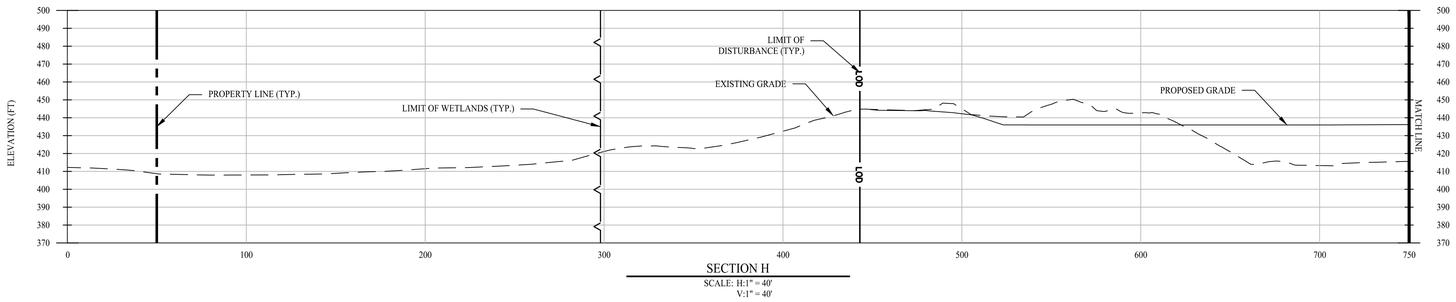
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Oct 17, 2023 – 5:07pm chris
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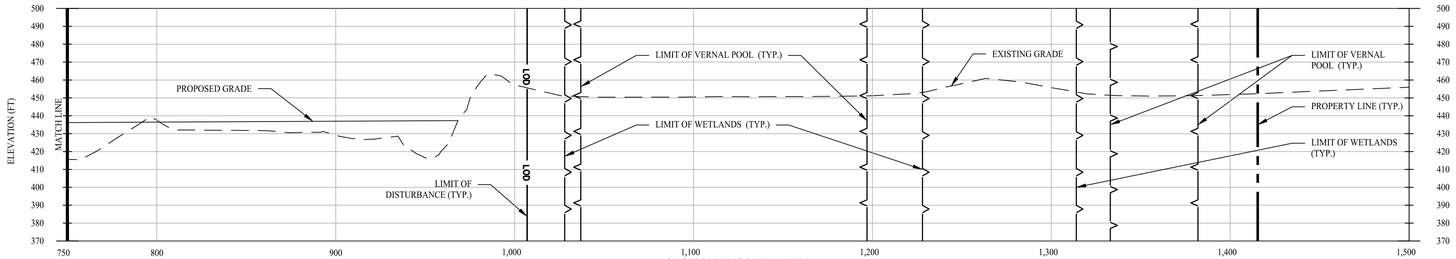
SECTION G (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



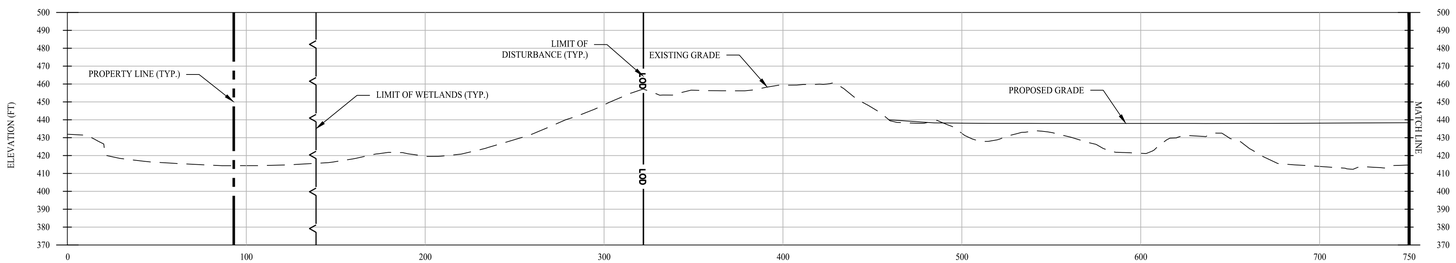
SECTION H

SCALE: H:1" = 40'
V:1" = 40'



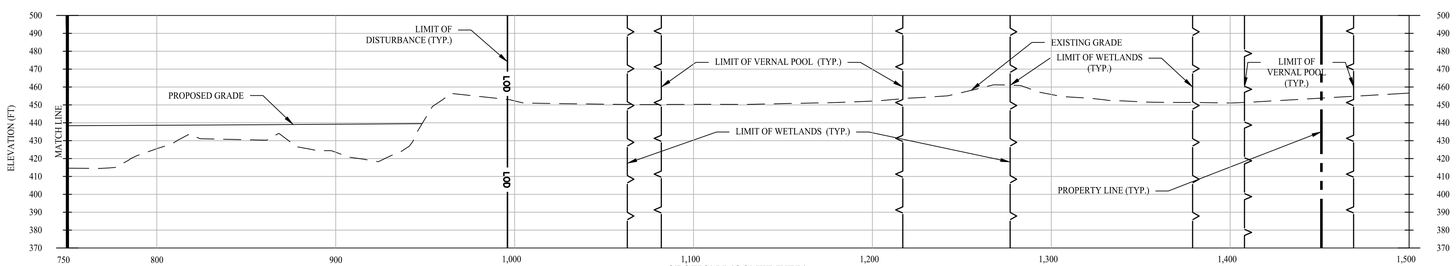
SECTION H (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION I

SCALE: H:1" = 40'
V:1" = 40'



SECTION I (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'

Rev. #:	Date	Description

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Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	AS SHOWN

Kevin Solli, P.E.
CT 25759

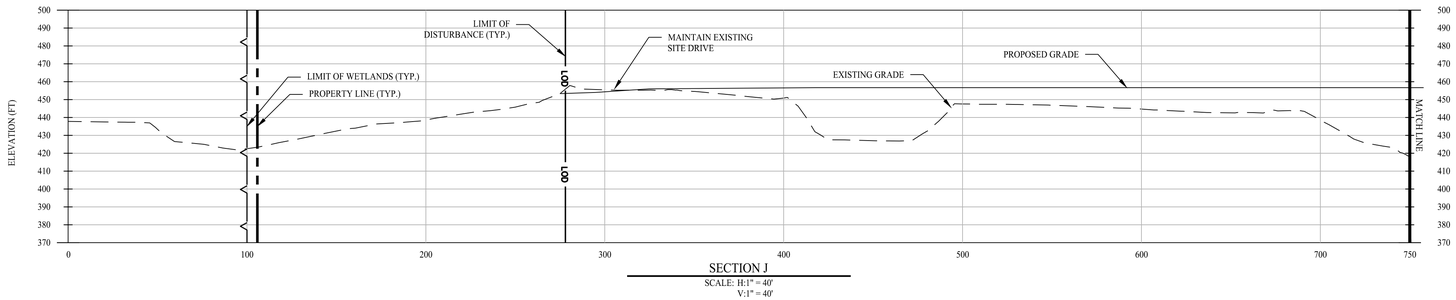
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

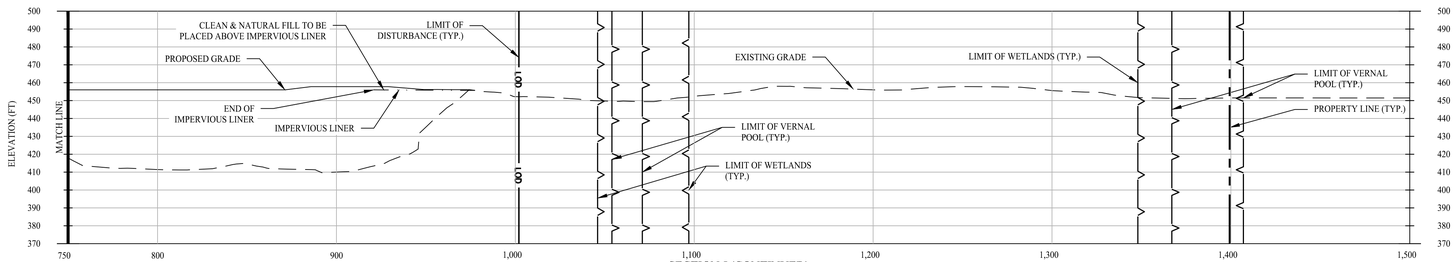
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SITE CROSS SECTIONS	2.83

Oct 17, 2023 – 5:07pm chris
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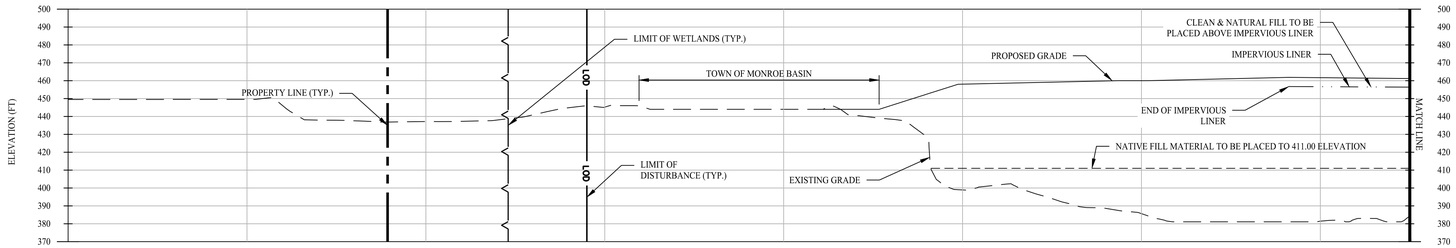
SECTION J

SCALE: H:1" = 40'
V:1" = 40'



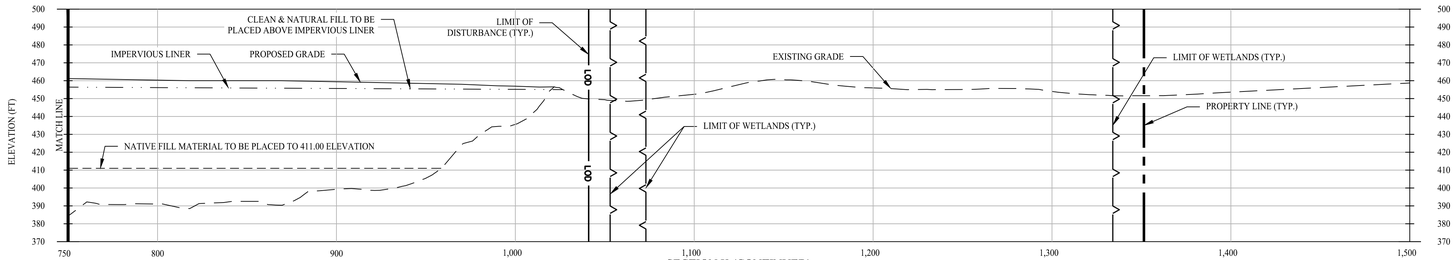
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SCALE: H:1" = 40'
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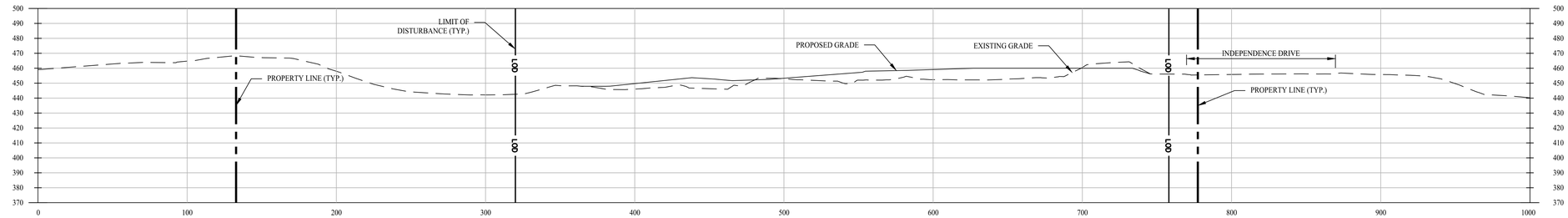
SECTION K

SCALE: H:1" = 40'
V:1" = 40'



SECTION K (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION L

SCALE: H:1" = 40'
V:1" = 40'

Rev. #: Date Description

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Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	AS SHOWN

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

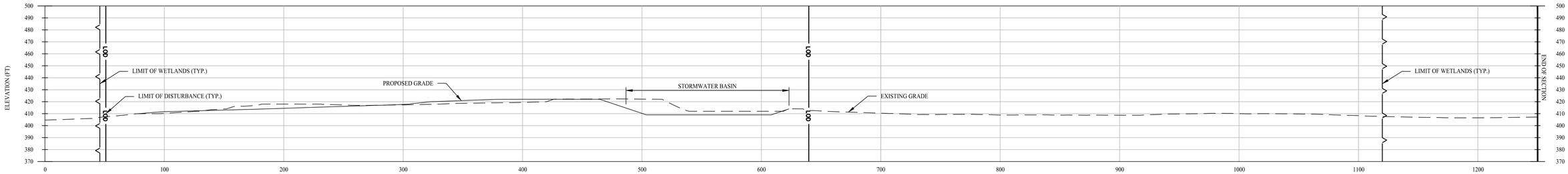
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SITE CROSS SECTIONS

Sheet #:

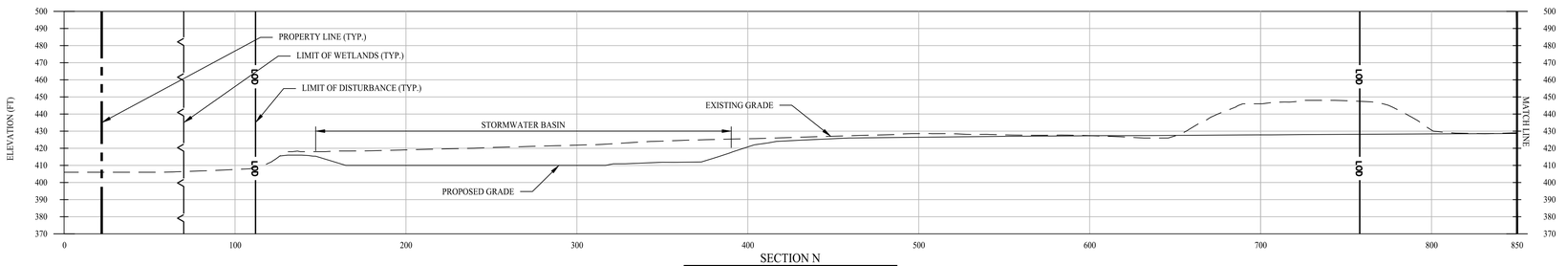
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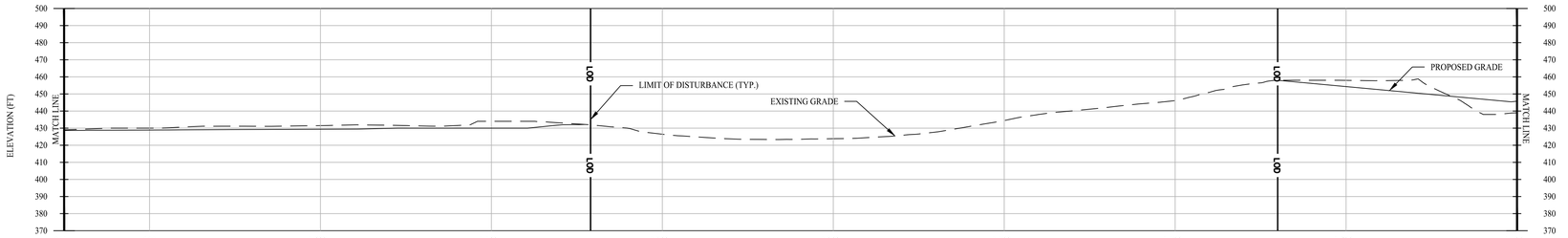
SECTION M

SCALE: H:1" = 40'
V:1" = 40'



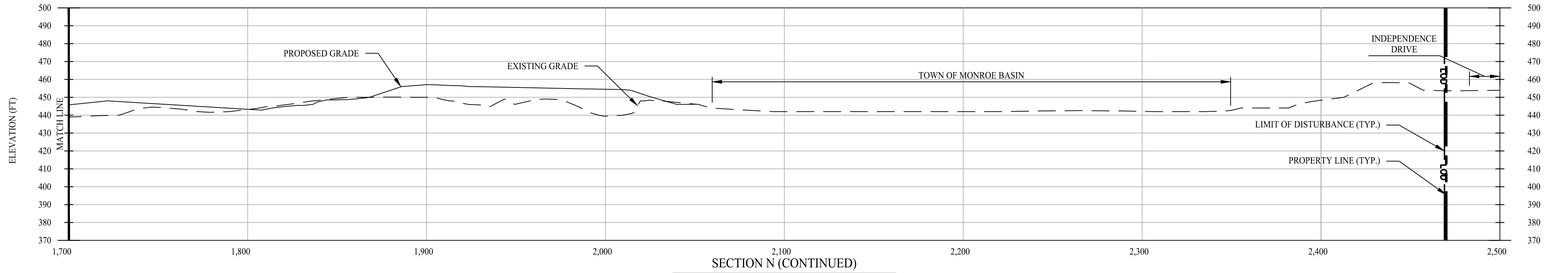
SECTION N

SCALE: H:1" = 40'
V:1" = 40'



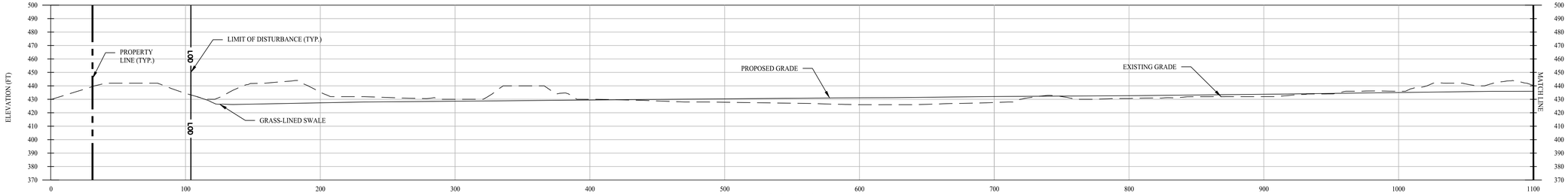
SECTION N (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION N (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION O

SCALE: H:1" = 40'
V:1" = 40'

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Scale:	AS SHOWN

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CT 25759

Project:

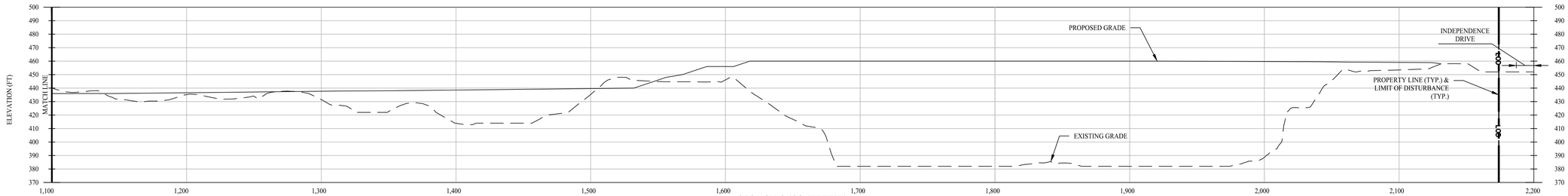
PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title: SITE CROSS SECTIONS

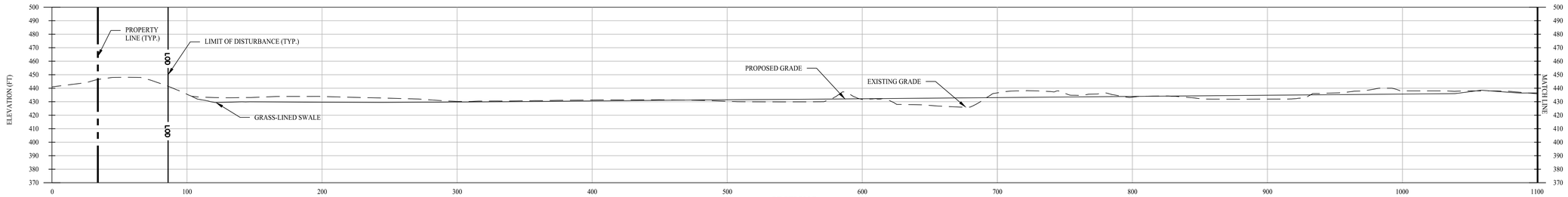
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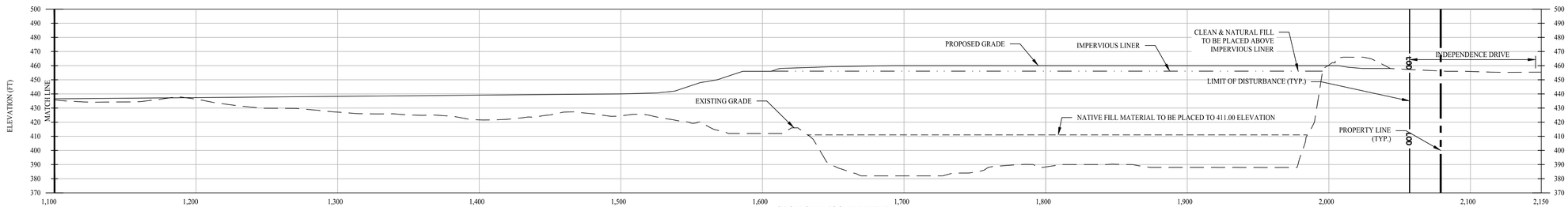
SECTION O (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



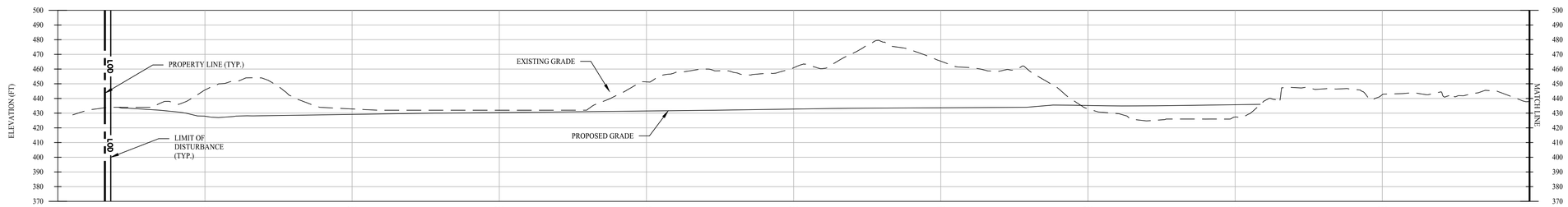
SECTION P

SCALE: H:1" = 40'
V:1" = 40'



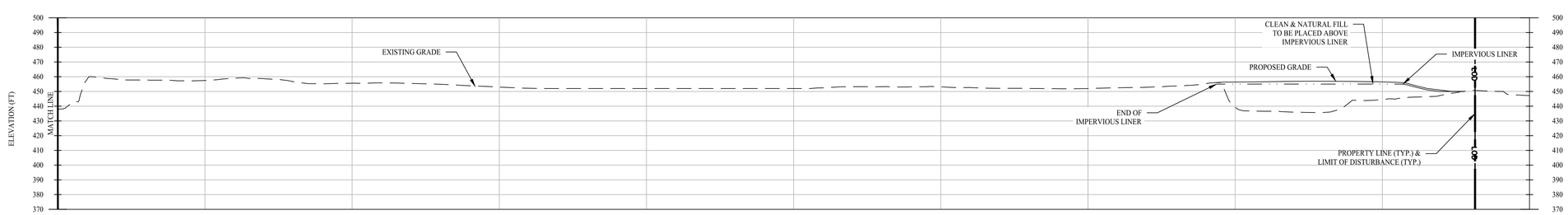
SECTION P (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'



SECTION Q

SCALE: H:1" = 40'
V:1" = 40'



SECTION Q (CONTINUED)

SCALE: H:1" = 40'
V:1" = 40'

Rev. #:	Date	Description

Graphic Scale:

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Checked By:	LL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	AS SHOWN

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CT 25759

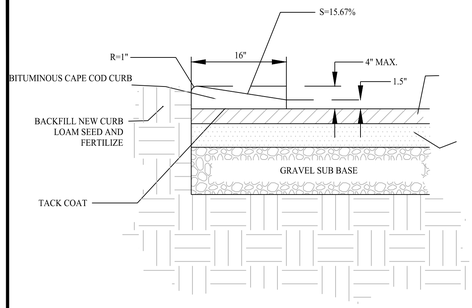
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

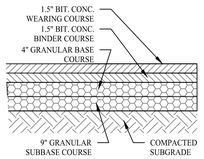
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SITE CROSS SECTIONS	2.86

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CAPE COD CURBING

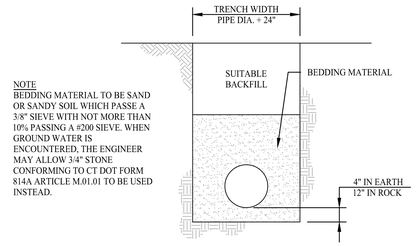
SCALE: NTS



HEAVY DUTY ASPHALT PAVING

PAVING DETAILS

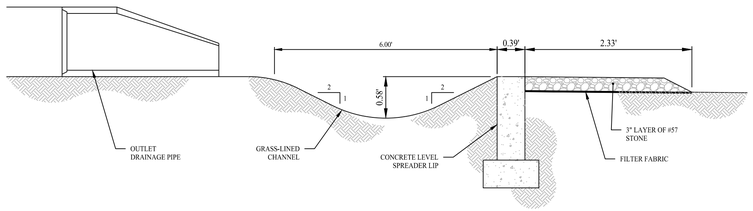
SCALE: NTS



NOTE
BEDDING MATERIAL TO BE SAND OR SANDY SOIL WHICH PASSE A 3/8" SIEVE WITH NOT MORE THAN 10% PASSING A #200 SIEVE. WHEN GROUND WATER IS ENCOUNTERED, THE ENGINEER MAY ALLOW 3/4" STONE CONFORMING TO CT DOT FORM 814A ARTICLE M.01.01 TO BE USED INSTEAD.

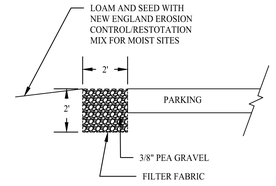
DRAINAGE PIPE TRENCH

SCALE: NTS



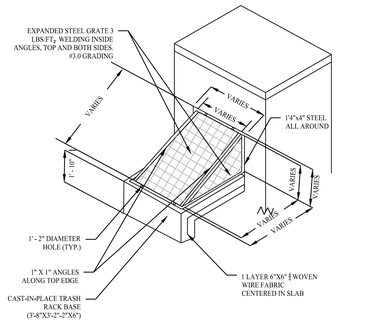
LEVEL SPREADER DETAIL

SCALE: NTS



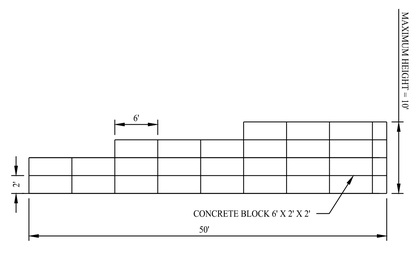
STONE FILTER STRIP DETAIL

SCALE: NTS

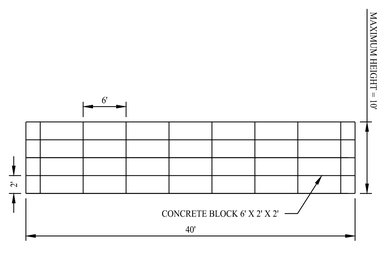


PRIMARY OUTLET TRASH RACK DETAIL

SCALE: NTS



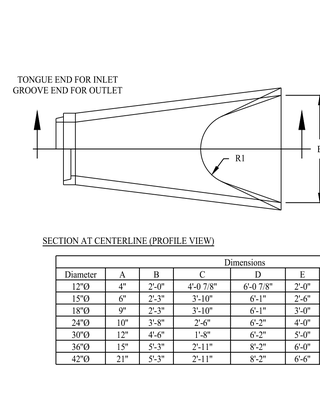
SIDE VIEW



REAR VIEW

MATERIAL STORAGE BIN DETAIL

SCALE: NTS



SECTION AT CENTERLINE (PROFILE VIEW)

Dimensions								
Diameter	A	B	C	D	E	F	R1	W
12"Ø	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	3 : 1	9"	2 9/16"
15"Ø	6"	2'-3"	3'-10"	6'-1"	2'-6"	3 : 1	11"	2 11/16"
18"Ø	9"	2'-3"	3'-10"	6'-1"	3'-0"	3 : 1	12"	2 13/16"
24"Ø	10"	3'-8"	2'-6"	6'-2"	4'-0"	3 : 1	14"	5 21/32"
30"Ø	12"	4'-6"	1'-8"	6'-2"	5'-0"	3 : 1	15"	4 17/32"
36"Ø	15"	5'-3"	2'-11"	8'-2"	6'-0"	3 : 1	20"	4 17/32"
42"Ø	21"	5'-3"	2'-11"	8'-2"	6'-6"	3 : 1	22"	4 13/32"

NOTES:

1. PRODUCED TO ASTM SPECIFICATIONS.

2. THIS DRAWING IS NOT INTENDED TO SHOW REINFORCEMENT DESIGN. EITHER AS TO PLACEMENT OR STEEL AREA. ACTUAL PROJECT SPECIFICATIONS OR CURRENT ASTM WILL GOVERN.

3. CONSULT HYDRO CONDUIT CORP. LOCAL REPRESENTATIVE FOR FURTHER DETAILS NOT LISTED ON THIS DRAWING.

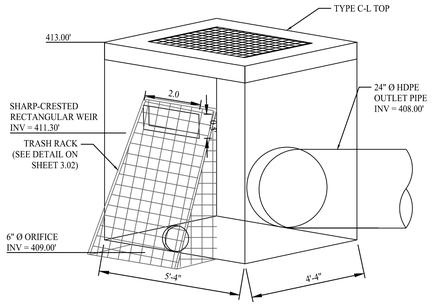
TULSA PIPE
3200 NORTH 129TH EAST AVENUE
TULSA, OKLAHOMA 74116
P.O. BOX 581524
TULSA, OKLAHOMA 74158-1524
(918) 438-0230

CR 170
35
ISSUED 12/93

FLARED END SECTION DETAILS

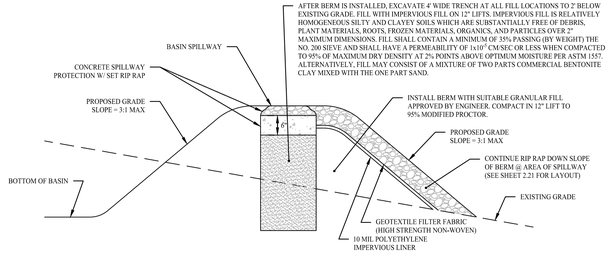
(WITH PRECAST STD, BASE AND CUSTOMER SPECIFIED OPENINGS)
FLAT TOP ECCENTRIC (CONCENTRIC ALSO AVAILABLE)

SCALE: NTS



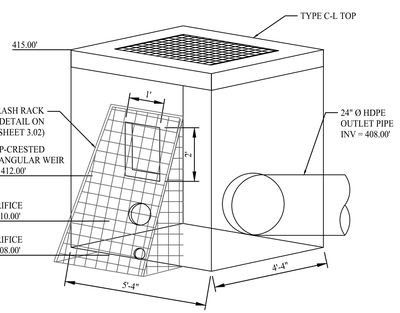
OUTLET STRUCTURE (OCS-1c)

SCALE: NTS



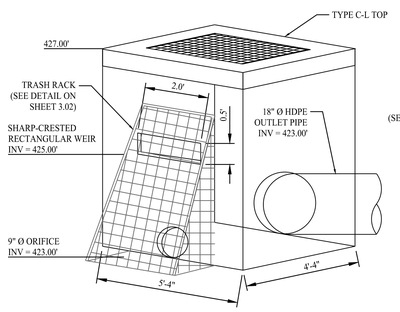
TYPICAL SPILLWAY IN FILL SECTION

SCALE: NTS



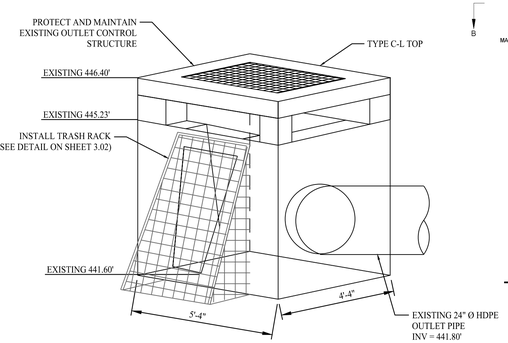
OUTLET STRUCTURE (OCS-1d)

SCALE: NTS



OUTLET STRUCTURE (OCS-3)

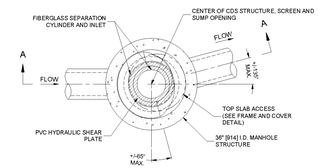
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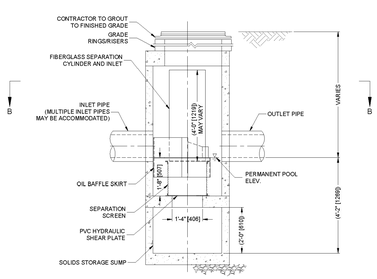
OUTLET STRUCTURE (OCS-1b)

(OCS IN EXISTING TOWN OF MONROE DETENTION BASIN ADJACENT TO INDEPENDENCE DRIVE)

SCALE: NTS



PLAN VIEW B-B
N.T.S.



ELEVATION A-A
N.T.S.



FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

CDS1515-3-C DESIGN NOTES
THE STANDARD CDS1515-3-C CONFIGURATION IS SHOWN. ALTERNATE CONFIGURATIONS ARE AVAILABLE AND ARE LISTED BELOW. SOME CONFIGURATIONS MAY BE COMBINED TO SUIT SITE REQUIREMENTS.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID			
WATER QUALITY FLOW RATE (CFS OR L/s)			*
PEAK FLOW RATE (CFS OR L/s)			*
RETURN PERIOD OF PEAK FLOW (YRS)			*
SCREEN APERTURE (2400 OR 4700)			*
PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	*	*	*
INLET PIPE 2	*	*	*
OUTLET PIPE	*	*	*
RIM ELEVATION			*
ANTI-FLOTATION BALLAST	WIDTH		HEIGHT
	*		*
NOTES/SPECIAL REQUIREMENTS:			
* PER ENGINEER OF RECORD			

GENERAL NOTES
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
3. CDS WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4. STRUCTURE SHALL MEET AASHTO H320 LOAD RATING, ASSUMING EARTH COVER OF 0' - 2', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
5. IF REQUIRED, PVC HYDRAULIC SHEAR PLATE IS PLACED ON SHELF AT BOTTOM OF SCREEN CYLINDER. REMOVE AND REPLACE AS NECESSARY DURING MAINTENANCE CLEANING.
6. CDS STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.

INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE CDS MANHOLE STRUCTURE.
C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
D. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET AND OUTLET PIPE(S). MATCH PIPE INVERTS WITH ELEVATIONS SHOWN. ALL PIPE CONNECTIONS TO BE WATER TIGHT.
E. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO ASSURE UNIT IS WATER TIGHT, HOLDING WATER TO FLOWLINE (INVERT MINIMUM. IT IS SUGGESTED THAT ALL JOINTS BELOW PIPE INVERTS ARE GROUTED.

CDS1515-3-C HYDRODYNAMIC SEPARATOR DETAIL

SCALE: NTS

Rev. #:	Date	Description

SOLLI ENGINEERING
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Drawn By:	CJP
Checked By:	LAM
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	NTS

Kevin Solli, P.E.
CT 25759

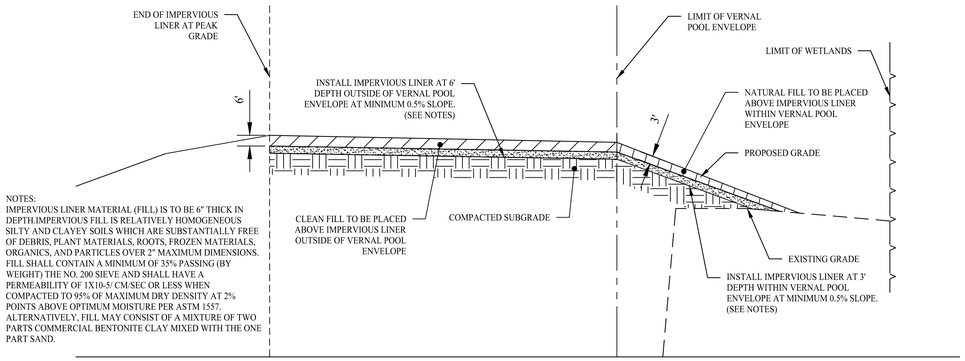
Project:

PROPOSED SITE RESTORATION

64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
DETAIL SHEET	3.01

Oct 17, 2023 – 5:08pm chris
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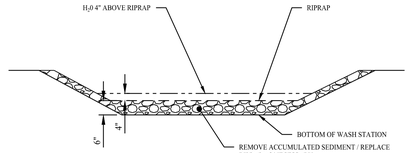


NOTES:
IMPERVIOUS LINER MATERIAL (FILL) IS TO BE 6" THICK IN DEPTH.IMPERVIOUS FILL IS RELATIVELY HOMOGENEOUS SILTY AND CLAYEY SOILS WHICH ARE SUBSTANTIALLY FREE OF DEBRIS, PLANT MATERIALS, ROOTS, FROZEN MATERIALS, ORGANICS, AND PARTICLES OVER 2" MAXIMUM DIMENSIONS. FILL SHALL CONTAIN A MINIMUM OF 35% PASSING (BY WEIGHT) THE NO. 200 SIEVE AND SHALL HAVE A PERMEABILITY OF 1X10-5/ CM/SEC OR LESS WHEN COMPACTED TO 95% OF MAXIMUM DRY DENSITY AT 2% POINTS ABOVE OPTIMUM MOISTURE PER ASTM 1557. ALTERNATIVELY, FILL MAY CONSIST OF A MIXTURE OF TWO PARTS COMMERCIAL BENTONITE CLAY MIXED WITH THE ONE PART SAND.

UPPER ELEVATION PAD IMPERVIOUS LINER DETAIL

SCALE: NTS

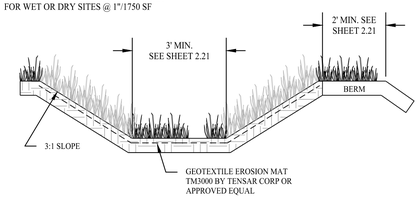
NOTES:
1. SEDIMENTATION TO BE SCRAPED OUT A MINIMUM OF EVERY 30 DAYS.
2. SEDIMENT LADEN WATER TO BE PUMPED/DRAINED TO THE SEDIMENTATION BASIN TO THE NORTH OF THE PROPOSED WHEEL WASH STATION.
3. WATER TO BE REPLENISHED AS NEEDED USING HOSE BIB, WHOSE LOCATION IS SHOWN ON THE SOIL EROSION AND SEDIMENT CONTROL PLANS.
4. TRUCKS TO BE WASHED DOWN ON AN AS-NEEDED BASIS PRIOR TO EXITING THE SITE, SPECIFICALLY AFTER HEAVY RAINFALL EVENTS WHERE MUD,DIRT AND/OR DUST ARE PRESENT ON TRUCKS EXITING THE SITE.
5. ENGINEER TO INSPECT THE SYSTEM AND PROVIDE RECOMMENDATIONS TO OPERATOR AS A PART OF THE SOIL EROSION AND SEDIMENT CONTROL INSPECTIONS.



WHEEL WASH STATION DETAIL

SCALE: NTS

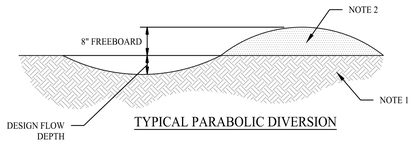
SEED SWALE WITH
NEW ENGLAND WETLAND PLANTS, INC.
EROSION CONTROL/RESTORATION MIX
FOR WET OR DRY SITES @ 1"/1750 SF



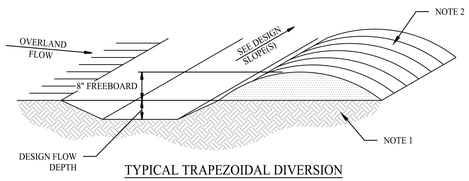
PERMANENT GRASS DIVERSION SWALE

SCALE: NTS

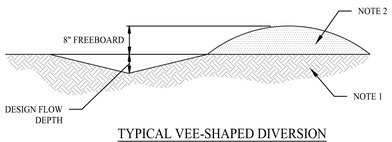
ENGINEER TO PROVIDE, IN THE 02370 SPECIFICATION, LENGTHS, SLOPES, DEPTHS, AND PROTECTION TYPES FOR ALL DIMENSIONS SHOWN ON THE SITE MAPS (AS STIPULATED IN THE GENERAL PERMIT, AGENCY REQUIREMENTS, OR STANDARD ENGINEERING PRACTICES).



TYPICAL PARABOLIC DIVERSION



TYPICAL TRAPEZOIDAL DIVERSION



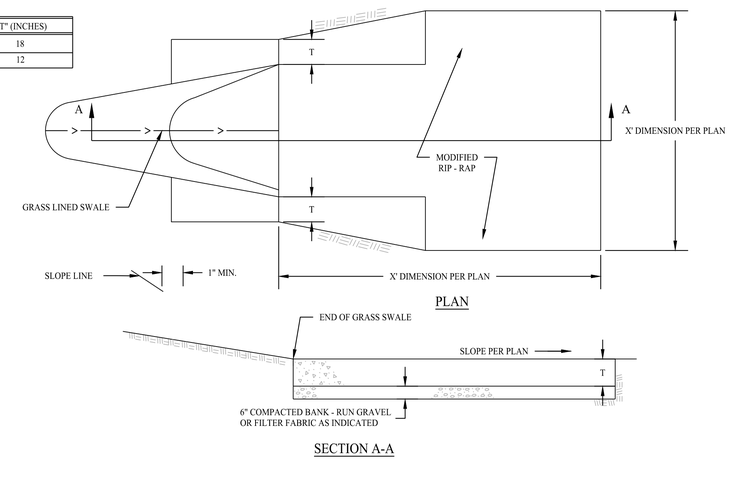
TYPICAL VEE-SHAPED DIVERSION

NOTES:
1. REMOVE ANY EXISTING VEGETATION AND SCARIFY OR BENCH ADJACENT SOILS PRIOR TO PLACING BERM.
2. BERM MATERIALS MUST BE ADEQUATELY COMPACTED AND STABILIZED.
3. REFER TO E&S PHASE I & II FOR TEMPORARY AND/OR FINAL STABILIZATION MEASURES.
4. BERM SHALL NOT BE CONSTRUCTED OF TOPSOIL.

TEMPORARY DIVERSION BERM DETAIL

SCALE: NTS

RIPRAP TYPE	"T" (INCHES)
INTERMEDIATE	18
MODIFIED	12



RIP-RAP AT SWALE END SECTION DETAIL

SCALE: NTS

Rev. #:	Date	Description

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Kevin Solli, P.E.
CT 25759

Project:

PROPOSED SITE RESTORATION

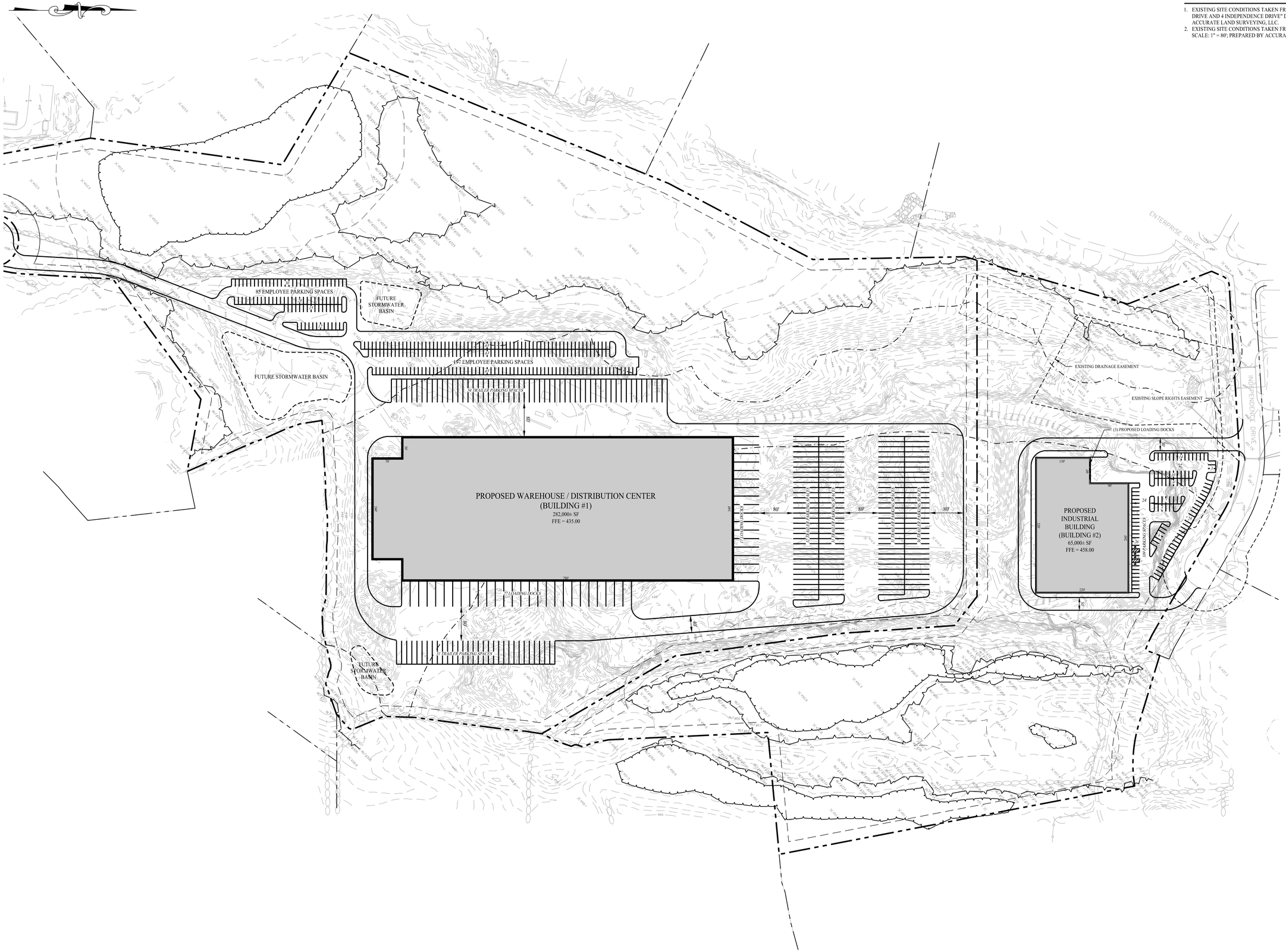
64 CAMBRIDGE DRIVE & 4 INDEPENDENCE DRIVE
MONROE, CONNECTICUT

Sheet Title:	Sheet #:
DETAIL SHEET	3.02

Oct 17, 2023 - 5:08pm chris
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GENERAL NOTES

1. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "PROPERTY SURVEY OF 64 CAMBRIDGE DRIVE AND 4 INDEPENDENCE DRIVE" DATED: 2/25/20; REVISED 03/17/22; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.
2. EXISTING SITE CONDITIONS TAKEN FROM A PLAN ENTITLED "LOT LINE REVISION" DATED: 9/28/21; SCALE: 1" = 80'; PREPARED BY ACCURATE LAND SURVEYING, LLC.



Rev. #: Date Description

Graphic Scale: 100 0 100 200

SOLLI ENGINEERING
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Drawn By:	CJP
Checked By:	MSL
Approved By:	KMS
Project #:	1903601
Plan Date:	10/18/23
Scale:	1" = 80'

Kevin Solli, P.E.
CT 25759

Project:

PROPOSED DEVELOPMENT

64 CAMBRIDGE DR. & 4 INDEPENDENCE DR.
MONROE, CONNECTICUT

Sheet Title: POTENTIAL DEVELOPMENT PLAN

Sheet #: PDP

Oct 17, 2023 – 5:25pm chris
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