MILLENNIUM ENGINEERING, INC.

Land Surveyors and Civil Engineers

MEI

STORMWATER MANAGEMENT REPORT

FOR THE

SITE PLAN

AT

163 ELM STREET
SALISBURY, MA

PREPARED FOR:

F & D REALTY LLC
1 MELVIN ST, SUITE C
WAKEFIELD, MA 01880

COMMONWEALTH OF MASSACHUSETTS
JAMES T. MELVIN
CIVIL
No. 52965
REGISTERED PROFESSIONAL ENGINEER

2-7-23

DATE: JUNE 21, 2022
REVISED: JANUARY 4, 2023
REVISED: FEBRUARY 7, 2023

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1.0 INTRODUCTION

1.1 Project Description

F & D Realty LLC proposes to construct two buildings with associated gravel storage areas. Approximately 796 feet of paved driveway, a public water & sewer distribution network, and a stormwater management system will be constructed to support the development. Private utilities including gas, electric, telephone, and cable will also support the development. Access to the site will continue to be provided via Elm Street.

1.2 Existing Site Characteristics

The subject parcel is described as Tax Map 9, Lot No. 31 on the Town of Salisbury, MA Assessor's Map and is bordered by Elm Street to the north. The property is located in the C and C-3 Commercial Zoning Districts. Elevations within the project site range from 52.00' along Elm Street to 8.00' in the wetlands at the rear of the site. These elevations are based upon 1988 NAVD.

The existing parcel is mostly hard packed gravel and is used for storage of materials and vehicles. Up until around 2007, the site was mostly undeveloped woodland with a single-family dwelling at the front of the property. Development of the parcel began with the removal of the dwelling and continued with clearing of a large portion of the site. The remainder of the site is undeveloped woodland. Stormwater runoff patterns generally flow from north to south across the property, feeding the bordering vegetated wetlands. See the accompanying plan for a more detailed description of the existing site conditions and topography.

The lot consists of several soil groups: Windsor loamy sand, 255A (Hydrologic Soil Group A); Deerfield loamy fine sand, 256A (Hydrologic Soil Group A); Hinckley and Windsor soils, 257E (Hydrologic Soil Group A); Ipswich and Westbrook mucky peats, 712A (Hydrologic Soil Group A/D); and Windsor-Rock outcrop complex, 721D (Hydrologic Soil Group A). See Appendix H for the NRCS soil map. In addition, soil evaluations were performed onsite to assist in the design of the stormwater treatment facilities. 21 test pits were performed in March, May and July 2022. Although the entire site is generally mapped as primarily "A" soils, as indicated in the soil evaluations there is a clear break in the soil composition about 2/3rds of the way into the site from sandy soils to silty loam soils. Thus, the rear of the site is modeled as a "C" soil in the HydroCAD calculations.

1.3 Proposed Site Features

The proposed development consists of 2 proposed buildings along nearly 800 linear feet of 24' wide paved driveway. Driveway profiles throughout the development are 1.0%. Access into the development is from Elm Street.

The development will include the installation of public and private utilities. The development will tie into the existing water distribution system and the existing wastewater collection system to provide service to the two buildings. Natural gas, electrical, telephone and cable service will be provided.

The storm water management system for the proposed development will consist of a typical pipe and catch basin/manhole drainage network within the proposed roadway. The two building sites will be designed to grade towards the roadway and connect to the drainage network.

Underground infiltration systems are proposed to infiltrate the runoff from the drainage network and gravel areas at the front of the site. A Contech treatment device is proposed to treat the stormwater before it discharges to the infiltration systems.

2.0 WATERSHED ANALYSIS AND METHODOLOGY

The stormwater runoff management system was analyzed using the storm events of the 2-year, 10-year and 100-year frequency. The analysis was performed using HydroCAD, version 10.00. Using USDA NRCS TR-20 and TR-55 methods of estimating runoff, the program uses the measured characteristics of the site and computes runoff produced by simulated rainfall events. The results are then used to design runoff control structures.

Existing drainage area boundaries were developed using an onsite topographic survey performed by Millennium Engineering, Inc. Proposed site development boundaries were developed from proposed grades and ground cover designed to minimize site storm water management structure requirements.

Hydrologic soil groups and curve numbers were estimated for existing and proposed developed conditions using available NRCS Soil Maps, current vegetation, and terrain.

3.0 DRAINAGE ANALYSIS

The purpose of the drainage analysis is two-fold. The first is to analyze and quantify the pre-development runoff flows through the site. The second purpose is to evaluate the impact of the proposed development on drainage patterns and flows, both within and outside the site, and to design a stormwater management system to adequately convey post-development runoff.

The design of the stormwater management system has the following goals:

1.) Minimize or eliminate erosion and sedimentation during construction as well as after development.

2.) To ensure that post-development flows do not have an adverse affect on downstream drainage structures and landowners.

3.) To design a stormwater and treatment system which will carry the surface runoff and satisfy goals one and two.

To determine the hydrological effect of the proposed development on the watershed, the existing conditions must first be analyzed.

4.0 WATERSHED DESCRIPTION: EXISTING CONDITIONS

Depending on the soil classification, type of ground cover present and the direction of the flow of runoff, the existing site is divided into watershed areas. Watershed area 100 consists of the rear half of the site and it flows towards the marsh. Area 200S consists of the front of the site and it feeds the isolated wetland. See the attached plans (Watersheds and HydroCad Data, sheet 1 of 2) for the watershed area boundaries and the pre-development time of concentration flow paths.

4.1 WATERSHED ANALYSIS: EXISTING CONDITIONS

The existing conditions were modeled using the tabular hydrograph method with a Type III synthetic storm distribution for the 2, 10 and 100-year storm recurrence intervals. Runoff hydrographs were produced to estimate existing peak discharge.

Flows for the three storm simulations are as follows:

Existing Peak Runoff Rates (c.f.s.)

Subcatchment	Size	2 Yr	10 Yr	100 Yr
	(Acres)	Storm	Storm	Storm
100	7.91	1.18	4.4	10.8
200	3.76	0.0	0.0	0.2
		2 Yr	**10 Yr**	**100 Yr**
Marsh		1.18	4.4	10.8
Isolated Wetland		0.0	0.0	0.2

The pre-development drainage calculations can be found in Appendix C.

5.0 WATERSHED DESCRIPTION: POST-DEVELOPMENT CONDITIONS

To determine the post development runoff, new watersheds, runoff curve numbers and times of concentration were generated reflecting the changes in the topography and surface cover. The post-development watersheds are shown on the attached plans (Watersheds and HydroCad Data, sheet 2 of 2). Watershed areas 1S-11S consist of the proposed site driveway, paved parking areas, buildings and gravel areas and it connects to the proposed drainage system which discharges into underground infiltration system #1. Areas 12S - 14S feed the proposed underground infiltration system #2. Area 100 consists of the remainder of the rear half of the site and it flows towards the marsh.

5.1 WATERSHED ANALYSIS: POST-DEVELOPMENT CONDITIONS

The proposed developed conditions were modeled using the tabular hydrograph method with a Type III synthetic storm distribution for the 2, 10 and 100-year storm recurrence intervals. Runoff hydrographs were produced to estimate the post-development peak discharge.

Flows for the three storm simulations are as follows:

Post-Developed Peak Runoff Rates (c.f.s.)

Subcatchment	**Size**	**2 Yr**	**10 Yr**	**100 Yr**
	(Acres)	**Storm**	**Storm**	**Storm**
1S	0.12	0.0	0.1	0.3
2S	0.06	0.1	0.2	0.4
3S	0.43	0.2	0.6	1.3
3.1S	0.15	0.4	0.6	0.9
4S	0.14	0.0	0.1	0.3
5S	0.35	0.9	1.4	2.1
6S	0.15	0.1	0.3	0.6
7S	0.71	1.2	2.2	3.6
8S	0.13	0.4	0.6	0.8
9S	0.33	0.9	1.4	2.1
10S	0.32	0.5	0.9	1.5
11S	0.88	1.5	2.7	4.4
12S	0.45	1.0	1.6	2.5
13S	0.59	1.2	2.1	3.3
14S	1.26	3.6	5.3	7.8
100	5.60	0.6	2.8	7.3
		2 Yr	**10 Yr**	**100 Yr**
Marsh		0.6	2.8	10.6

The post-development drainage calculations can be found in Appendix D.

6.0 STORMWATER STANDARDS CALCULATIONS

The Stormwater Management Plan developed for this project incorporates water quantity and quality controls that will protect surface and groundwater resources and adjacent properties from potential impacts due to increased impervious areas on the site. The following provides a brief discussion on how the proposed project will meet the ten established performance standards of the DEP Stormwater Management Policy.

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

No proposed site stormwater conveyance systems will discharge untreated stormwater directly to wetlands or surrounding areas. Stormwater runoff from the proposed driveway and gravel areas will discharge into the proposed infiltration basin and constructed wetland.

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

Stormwater runoff peak discharge rates from the proposed development are less than existing conditions for the 2-yr, 10-yr, and 100-yr 24-hour Type III storm events.

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

Required Recharge volume, Rv (A soil) = F * impervious area
= 0.60 in * 162,860 s.f.
= 8,143 c.f.

Total Recharge required = 8,143 c.f.
Total Recharge provided = 25,555 c.f.

Drawdown Calculations

Underground Infiltration System #1

$$\text{Drawdown Time} = \frac{Rv}{(K)\ (\text{Bottom Area})}$$

Rv=Storage Volume=1,111 c.f.

K=Saturated Hydraulic Conductivity=8.27 in./hr
Bottom Area=830 s.f.

$$\text{Drawdown Time} = \frac{1{,}111 \text{ c.f.}}{(8.27 \text{ in/hr})(1\text{ft}/12\text{in})(830 \text{ s.f.})}$$

Drawdown Time = 1.9 hours

Underground Infiltration System #2

$$\text{Drawdown Time} = \frac{\text{Rv}}{(\text{K})\ (\text{Bottom Area})}$$

Rv=Storage Volume=5,692 c.f.
K=Saturated Hydraulic Conductivity=8.27 in./hr
Bottom Area=4,886 s.f.

$$\text{Drawdown Time} = \frac{5{,}692 \text{ c.f.}}{(8.27 \text{ in/hr})(1\text{ft}/12\text{in})(4{,}886 \text{ s.f.})}$$

Drawdown Time = 1.7 hours

Underground Infiltration System #3

$$\text{Drawdown Time} = \frac{\text{Rv}}{(\text{K})\ (\text{Bottom Area})}$$

Rv=Storage Volume=19,298 c.f.
K=Saturated Hydraulic Conductivity=8.27 in./hr
Bottom Area=2,645 s.f.

$$\text{Drawdown Time} = \frac{19{,}298 \text{ c.f.}}{(8.27 \text{ in/hr})(1\text{ft}/12\text{in})(2{,}645 \text{ s.f.})}$$

Drawdown Time = 10.6 hours

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

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

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

The Massachusetts DEP requires water quality calculations based on 1.0 inch of runoff for the total impervious area associated with the proposed development. The following calculation identifies the water quality volume required.

Total Impervious Area = 145,820 s.f.
145,820 s.f. x 1.0" / 12 (to convert to ft) = 12,151 c.f. of runoff to be treated for water quality.

The proposed development's drainage system must meet the MA Office of Coastal Zone management (CZM)/MA Department of Environmental Protection (DEP) Stormwater Management policy standard of removing 80% of the average annual load of Total Suspended Solids (TSS). The stormwater management system for this development will include the use of a Contech CDS unit for treatment prior to discharge into the drainage system. The following demonstrates that the proposed storm water management system for the development satisfies the requirement for treatment of 80% of total Suspended Solids:

See attached TSS removal charts (Appendix F)

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

This project does not qualify as a land use with higher potential pollutant loads.

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

314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

This project does not fall within a critical area.

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

The proposed development is not considered a redevelopment project and does not meet the requirements of definition for this standard.

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

The proposed development design includes erosion and sediment controls to minimize the potential for sedimentation in down gradient resource areas. Reference is made to the project plans for additional information.

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

An O&M plan has been developed and is included in this report.

10. All illicit discharges to the stormwater management system are prohibited.

No illicit discharges exist on the site.

7.0 CONCLUSIONS

The results of this report indicate the proposed stormwater management system for the proposed development is capable of storing and treating the runoff for the 2-year, 10-year and 100-year storm events.

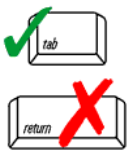
The peak flow rates in this analysis have been conservatively estimated for both the pre- and post-development conditions. Based on the results of the analyses described herein, the proposed development will not increase the runoff rate leaving the site. The proposed storm water management facilities shown on the Site Plan will produce no adverse storm water runoff impacts under the storms analyzed.

8.0 APPENDIX A – STORMWATER REPORT CHECKLIST

Checklist for Stormwater Report

A. Introduction

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



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

The Stormwater Report must include:

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

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

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

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

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

B. Stormwater Checklist and Certification

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

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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature

COMMONWEALTH OF MASSACHUSETTS
JAMES T.
MELVIN
CIVIL
No. 52965
REGISTERED
PROFESSIONAL ENGINEER

2-7-23

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist (continued)

Checklist for Stormwater Report

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

☐ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☐ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☒ Grass Channel

☐ Green Roof

☒ Other (describe): Underground Infiltration Structures

Standard 1: No New Untreated Discharges

☒ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☒ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist (continued)

Standard 2: Peak Rate Attenuation

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

Standard 3: Recharge

- ☒ Soil Analysis provided.
- ☒ Required Recharge Volume calculation provided.
- ☐ Required Recharge volume reduced through use of the LID site Design Credits.
- ☒ Sizing the infiltration, BMPs is based on the following method: Check the method used.

  ☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

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

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

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

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

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☒ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

  ☐ is within the Zone II or Interim Wellhead Protection Area

  ☐ is near or to other critical areas

  ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)

  ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☒ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist (continued)

Standard 4: Water Quality (continued)

☒ The BMP is sized (and calculations provided) based on:

- ☒ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☒ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

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

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist (continued)

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

☐ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☐ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☐ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

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

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

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist (continued)

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

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☒ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☒ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

9.0 APPENDIX B – LONG-TERM POLLUTION PREVENTION PLAN AND OPERATION & MAINTENANCE PLAN

LONG-TERM POLLUTION PREVENTION PLAN

AND

OPERATION & MAINTENANCE PLAN

For

F & D REALTY LLC
1 MELVIN STREET SUITE C
WAKEFIELD, MA 01880

PROPOSED SITE IMPROVEMENTS AT 163 ELM STREET

PREPARED BY:

MILLENNIUM ENGINEERING, INC.
62 ELM STREET
SALISBURY, MA 01952
(978) 463–8980

JANUARY 4, 2023
FEBRUARY 7, 2023

This long-term Stormwater Management System Operations and Maintenance (O&M) Plan, filed with the Town of Salisbury, shall be implemented at 163 Elm Street to ensure that the stormwater management system functions as designed. The Owner holds 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 a Stormwater Management O&M Plan identifying the key components of the stormwater system and a log for tracking inspections and 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, and prohibitions on the use of pesticides.

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 ongoing responsibility is the Owner, its successors and assigns. Adequate maintenance is defined in this document as good working condition.

Contact information is provided below:

Responsibility for Operations and Maintenance During Construction
Mark Cardillo
1 Melvin Street Suite C
Wakefield, MA 01880
(617) 719-2238

EROSION AND SEDIMENT CONTROL BMPs

Minimize Disturbed Area and Protect Natural Features and Soil

Topsoil

Topsoil stripped from the immediate construction area can be temporarily stockpiled on site providing that the perimeter of the stockpiles is properly staked with silt fence at the toe of slope. The stockpiles shall be in areas that will not interfere with construction and at least 15 feet away from areas of concentrated flows or pavement. The area shall be inspected weekly for erosion and immediately after storm events. Areas on or around the stockpile that have eroded shall be stabilized immediately with erosion controls.

Stabilize Soils

Temporary Stabilization

- All vegetated areas which do not exhibit a minimum of 85% vegetative growth by Oct. 15th, or which are disturbed after Oct. 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The placement of erosion control blankets or mulch and netting shall not occur over accumulated snow or on frozen ground and shall be completed in advance of thaw or spring melt events.
- All ditches or swales which do not exhibit a minimum of 85% vegetative growth by Oct. 15th, or which are disturbed after Oct. 15th, shall be stabilized with stone or erosion control blankets appropriate for the design flow conditions.
- After November 15th, incomplete road surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel.

Protect Slopes

Geotextile erosion control blankets shall be used to provide stabilization for slopes exceeding 3:1. Prepare soil before installing erosion control blanket, including any necessary application of lime, fertilizer, and seed. Begin at the top of the slope by anchoring the blanket in a 6" deep x 6" wide trench with approximately 12" extended beyond the upslope portion of the trench. Anchor the blanket with a row of staples/stakes approximately 12" apart in the bottom of the trench. Backfill and compact the trench after stapling. Apply seed to compacted soil and fold remaining 12" portion of back over seed and compacted soil. Secure over compacted soil with a row of staples/stakes spaced approximately 12" apart across the width of the blanket. Roll erosion control blanket either down or horizontally across the slope. Blanket will unroll with appropriate side against the soil surface. All blankets must be securely fastened to soil surface by placing staples/stakes in appropriate locations as shown in the staple pattern guide. When using the dot system, staples/stakes should be placed through each of the colored dots corresponding to the appropriate staple pattern. The edges of parallel blankets must be stapled with approximately 2"-5" overlap. Consecutive blankets spliced down the slope must be placed end over end (shingle style) with an approximate 3" overlap. Staple through overlapped area, approximately 12" apart across entire blanket's width. In loose soil conditions, the use of staple or stake lengths greater than 6" may be necessary to properly anchor the blanket.

Establish Perimeter Controls and Sediment Barriers

Silt fence shall be installed along the limit of work. The silt fence shall be installed before construction begins. Wooden posts shall be doubled and coupled at filter cloth seams. Filter cloth shall be fastened securely to support netting with ties spaced every 24" at top, midsection, and bottom. When two sections of filter cloth adjoin each other, they shall be overlapped by 6 inches, folded and stapled. Woodchips shall be installed at downslope side of silt fence and shall remain after silt fence is removed. Silt fence shall be removed upon completion of the project and stabilization of all soil.

Maintenance:
1. Silt fence shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any repairs that are required shall be made immediately.
2. If the fabric on the silt fence shall decompose or become ineffective during the expected life of the fence, the fabric shall be replaced promptly.
3. Sediment deposits shall be inspected after every storm event. The deposits shall be removed when they reach approximately one-half the height of the barrier.
4. Sediment deposits that are removed or left in place after the fabric has been removed shall be graded to conform with the existing topography and vegetated.

Establish Stabilized Construction Entrance

A stabilized construction entrance shall be installed before construction begins on the site. The stone anti-tracking pad shall remain in place until the subgrade of pavement is installed.

1. Stone shall be 4-6" stone, reclaimed stone, or recycled concrete equivalent.
2. The length of the stabilized entrance shall not be less than 50'.
3. The thickness of the stone for the stabilized entrance shall not be less than 12".
4. Geotextile filter cloth shall be placed over the entire area prior to placing the stone.
5. All surface water that is flowing to or diverted toward the construction entrance shall be piped beneath the entrance. If piping is impractical, a berm with 5:1 slopes that can be crossed by vehicles may be substituted for the pipe.
6. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top-dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, washed, or tracked onto public rights-of-way must be removed promptly.
7. Wheels shall be cleaned to remove mud prior to entrance onto public rights-of way. When washing is required, it shall be done on an area stabilized with stone which drains into an approved sediment trapping device.

Catch Basin Inlet Protection

Inlet protection devices intercept and/or filter sediment before it can be transported from a site into the storm drain system and discharged into a lake, river, stream, wetland, or other waterbody. These devices also keep sediment from filling or clogging storm drain pipes, ditches, and downgradient sediment traps or ponds. A siltsack or approved equal shall be used for catch basin inlet protection. It should be inspected weekly. When the restraint cord is no longer visible, siltsack is full and shall be emptied.

POST-CONSTRUCTION BMPs

Snow and Snow Melt Management

Proper management of snow and snow melt, snow removal and storage, use of deicing compounds, and other practices can minimize major runoff and pollutant loading impacts. Snow will be stored in the areas shown on the site plan. Snow is not to be plowed or piled within the wetlands, wetland buffer, or constructed wetland. Use of alternative deicing compounds, such as calcium chloride and calcium magnesium acetate, will be investigated for use. Professional services will be used for snow management.

Catch Basins

Catch basins are incorporated in the proposed development's stormwater management plan. The sump provides for settlement of suspended solids and a hood is provided to remove floatables and trapped hydrocarbons. It is not anticipated that the proposed paved areas will become an area of high sediment loading. The sump should be inspected and cleaned at least four times per year; the more frequent the cleaning, the less likely sediment will be resuspended and subsequently discharged. Catch basin sediments and debris shall be disposed of at an approved DEP landfill. The Owner shall be responsible for the catch basin cleaning operations.

CDS System

A CDS2015-5 and 1515-3 is incorporated into the site design for treatment for the proposed Drainage system. At a minimum, the unit shall be inspected twice per year (spring and fall). The CDS unit should be vacuum cleaned when the level of sediment has reached 75% of capacity in the isolated sump. Sediments and debris shall be disposed of at an approved DEP landfill. The Owner shall be responsible for the CDS cleaning operations.

Sediment Forebay

A sediment forebay is included in the stormwater management plan as pretreatment for the constructed wetland. The forebay shall be inspected two times per year by a landscaping contractor hired by the Owner. Sediments removed during cleaning shall be disposed of at an approved DEP landfill.

Underground Infiltration System

Infiltration chambers are incorporated into the site design for infiltration. The infiltration systems shall be inspected after every major storm event in the first 4 months after construction to ensure proper function. Inspection ports shall be utilized for access and assessment. After the four-month period, the systems shall be inspected a minimum of twice per year. Any grit or sediment found within the chambers impacting infiltration shall be removed by manual or mechanical methods, such as a vacuum truck. The owner will be responsible for proper maintenance of the infiltration systems.

Peastone Diaphragm

A stone diaphragm is proposed along the exterior fence of the dog play areas. The stone diaphragm shall be inspected twice per year (spring and fall). Any sediment and debris should be removed manually before the stone is adversely impacted. The oner will be responsible for proper maintenance of the stone trenches.

Storage Area

Inspect the gravel regularly, especially after major storm events. Notation of any erosion, rills, and areas of sedimentation should be made and repaired immediately. The surface shall be continually monitored during all extended dry conditions to address potential dust conditions. Water application or the spreading of calcium chloride shall take place, as needed, to alleviate dust conditions impacting abutting properties and the environment.

<u>FINAL STABILIZATION</u>

<u>Permanent Seeding</u>

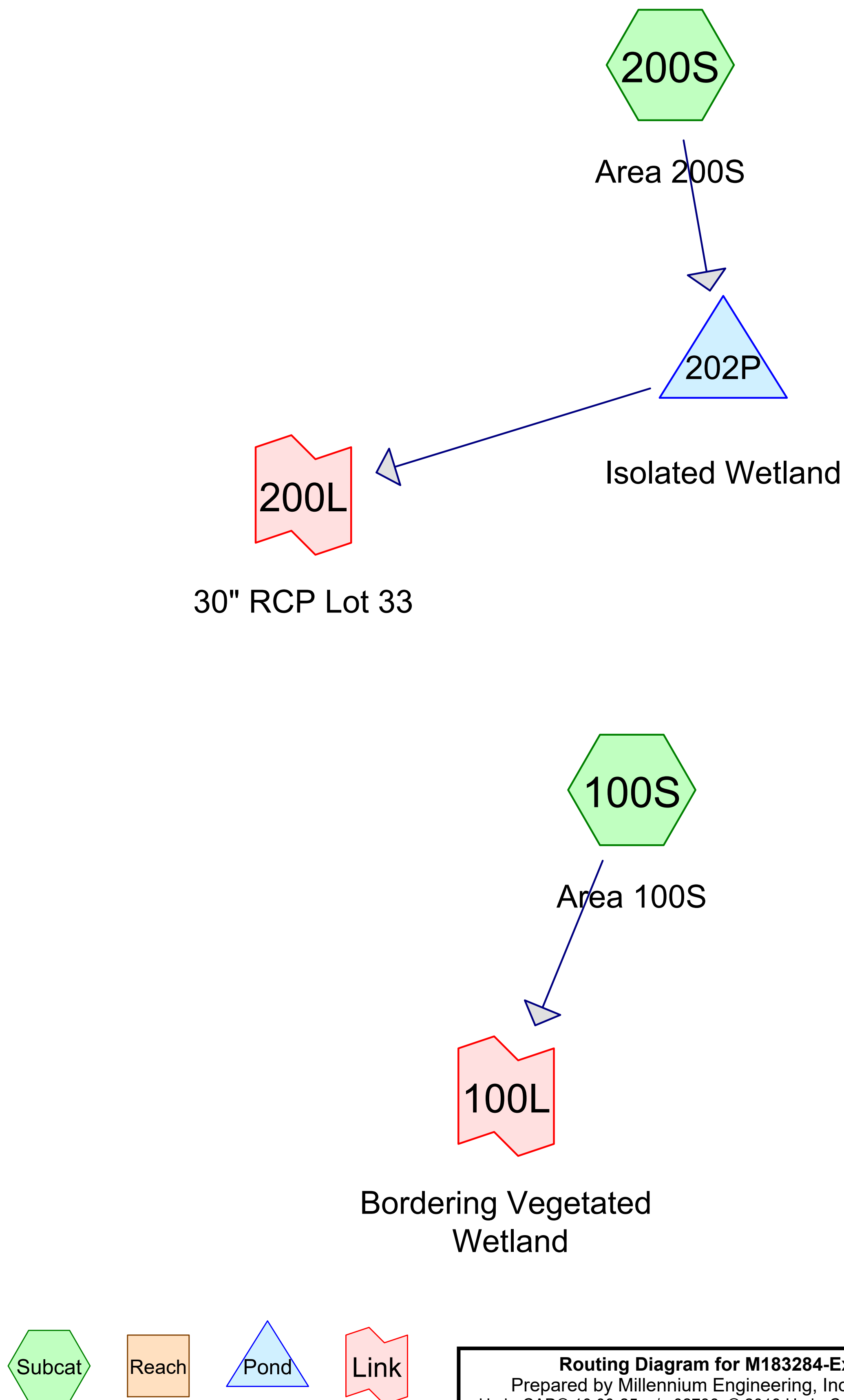
Loam and hydroseed any disturbed surfaces after the final design grades have been achieved. A minimum of 6" of loam shall be installed. Seed mix shall be MA State Slope Mixture (50% creeping red fescue, 30% Kentucky 31 tall fescue, 10% annual ryegrass, 5% red top, 5% ladino clover) and MA State Plot Mixture (50% creeping red fescue, 25% 85/80 Kentucky bluegrass, 10% annual ryegrass, 10% red top, 5% ladino clover).

Construction debris, trash and temporary BMPs (including silt fences, material storage areas, and inlet protection) will also be removed and any areas disturbed during removal will be seeded immediately.

INSPECTION & MAINTENANCE LOG

Activity	*Date*	*Inspected By*	*Findings*
Deep Sump Catch Basin (4x per year)			
CDS Cleaning (2x per year)			
Infiltration Chambers Inspection (2x per year)			
Peastone Diaphragm Cleaning (2x per year min.)			
Rip-rap Outlets & Emergency Spillway Protection (2x per year)			
Roof Drain Cleanouts (2x per year)			
Vegetation and Landscaping (2x per year)			

10.0 APPENDIX C – PRE-DEVELOPMENT DRAINAGE CALCULATIONS



Routing Diagram for M183284-Existing 1-25-23
Prepared by Millennium Engineering, Inc., Printed 2/8/2023
HydroCAD® 10.00-25 s/n 02736 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
26,000	39	>75% Grass cover, Good, HSG A (200S)
55,000	96	Gravel surface, HSG A (100S)
2,650	98	Paved roads w/curbs & sewers, HSG A (200S)
3,075	98	Roofs, HSG A (200S)
256,743	30	Woods, Good, HSG A (100S, 200S)
165,059	70	Woods, Good, HSG C (100S)
508,527	**51**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
343,468	HSG A	100S, 200S
0	HSG B	
165,059	HSG C	100S
0	HSG D	
0	Other	
508,527		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
26,000	0	0	0	0	26,000	>75% Grass cover, Good
55,000	0	0	0	0	55,000	Gravel surface
2,650	0	0	0	0	2,650	Paved roads w/curbs & sewers
3,075	0	0	0	0	3,075	Roofs
256,743	0	165,059	0	0	421,802	Woods, Good
343,468	**0**	**165,059**	**0**	**0**	**508,527**	**TOTAL AREA**

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 100S: Area 100S Runoff Area=344,527 sf 0.00% Impervious Runoff Depth>0.37"
Flow Length=720' Tc=32.9 min CN=60 Runoff=1.16 cfs 10,483 cf

Subcatchment 200S: Area 200S Runoff Area=164,000 sf 3.49% Impervious Runoff Depth=0.00"
Flow Length=450' Slope=0.0050 '/' Tc=40.7 min CN=34 Runoff=0.00 cfs 0 cf

Pond 202P: Isolated Wetland Peak Elev=47.00' Storage=0 cf Inflow=0.00 cfs 0 cf
Outflow=0.00 cfs 0 cf

Link 100L: Bordering Vegetated Wetland Inflow=1.16 cfs 10,483 cf
Primary=1.16 cfs 10,483 cf

Link 200L: 30" RCP Lot 33 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 508,527 sf Runoff Volume = 10,483 cf Average Runoff Depth = 0.25"
98.87% Pervious = 502,802 sf 1.13% Impervious = 5,725 sf

Summary for Subcatchment 100S: Area 100S

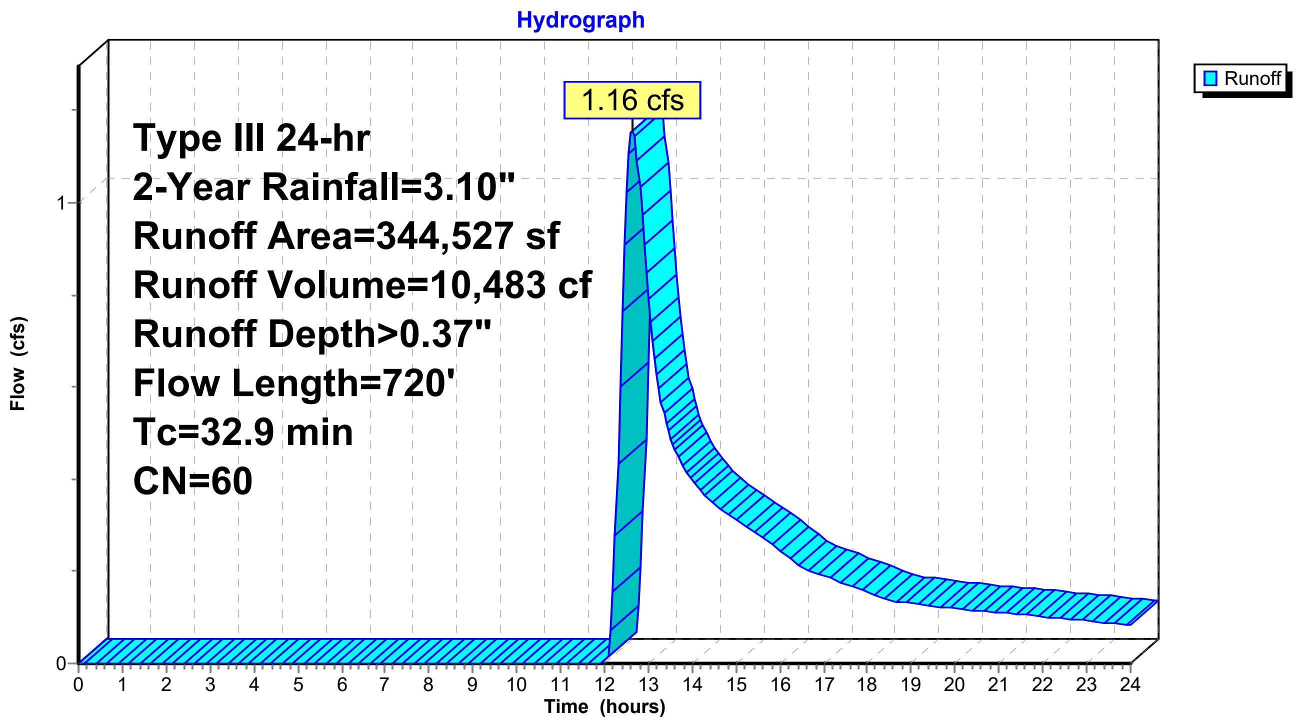
Runoff = 1.16 cfs @ 12.63 hrs, Volume= 10,483 cf, Depth> 0.37"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
124,468	30	Woods, Good, HSG A
165,059	70	Woods, Good, HSG C
55,000	96	Gravel surface, HSG A
344,527	60	Weighted Average
344,527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.3	196	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	474	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	720	Total			

Subcatchment 100S: Area 100S



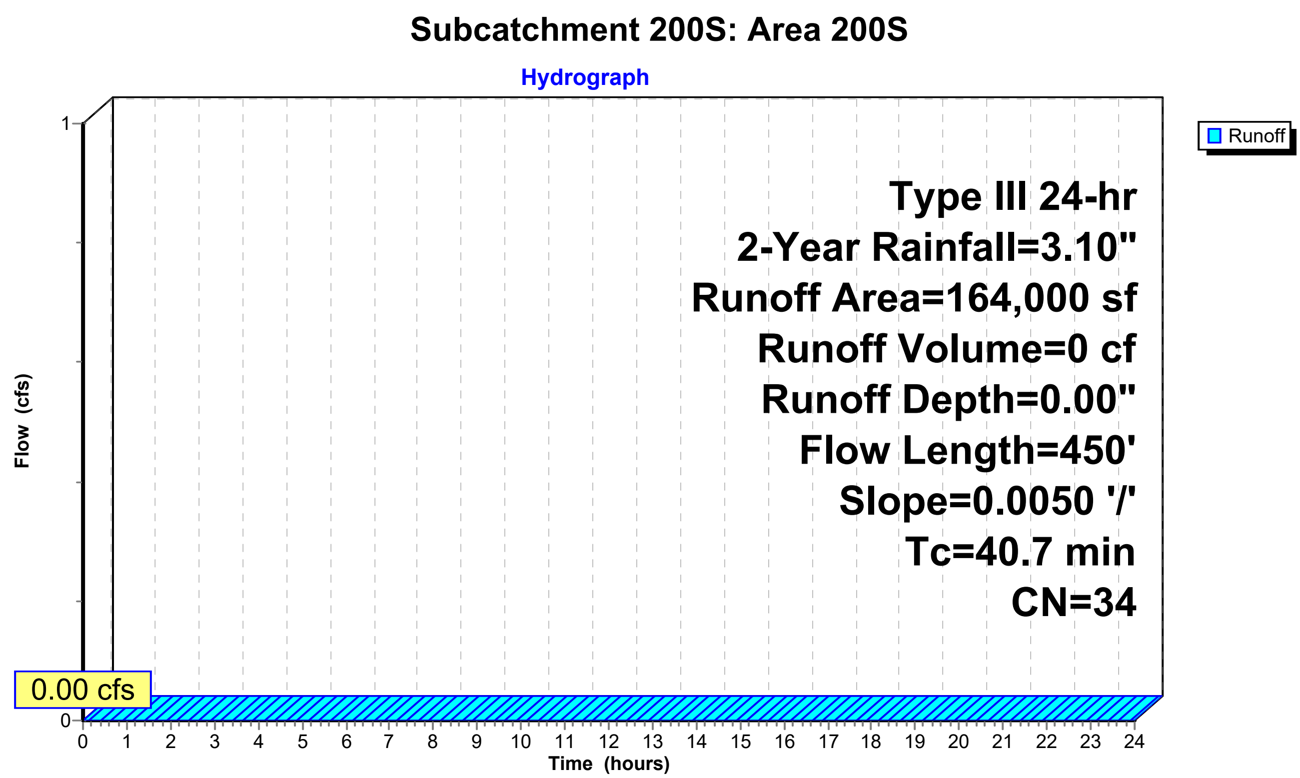
Summary for Subcatchment 200S: Area 200S

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
3,075	98	Roofs, HSG A
2,650	98	Paved roads w/curbs & sewers, HSG A
26,000	39	>75% Grass cover, Good, HSG A
132,275	30	Woods, Good, HSG A
164,000	34	Weighted Average
158,275		96.51% Pervious Area
5,725		3.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
18.9	400	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
40.7	450	Total			



Summary for Pond 202P: Isolated Wetland

Inflow Area = 164,000 sf, 3.49% Impervious, Inflow Depth = 0.00" for 2-Year event
Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 47.00' @ 0.00 hrs Surf.Area= 2,500 sf Storage= 0 cf
Flood Elev= 48.00' Surf.Area= 3,300 sf Storage= 2,900 cf

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

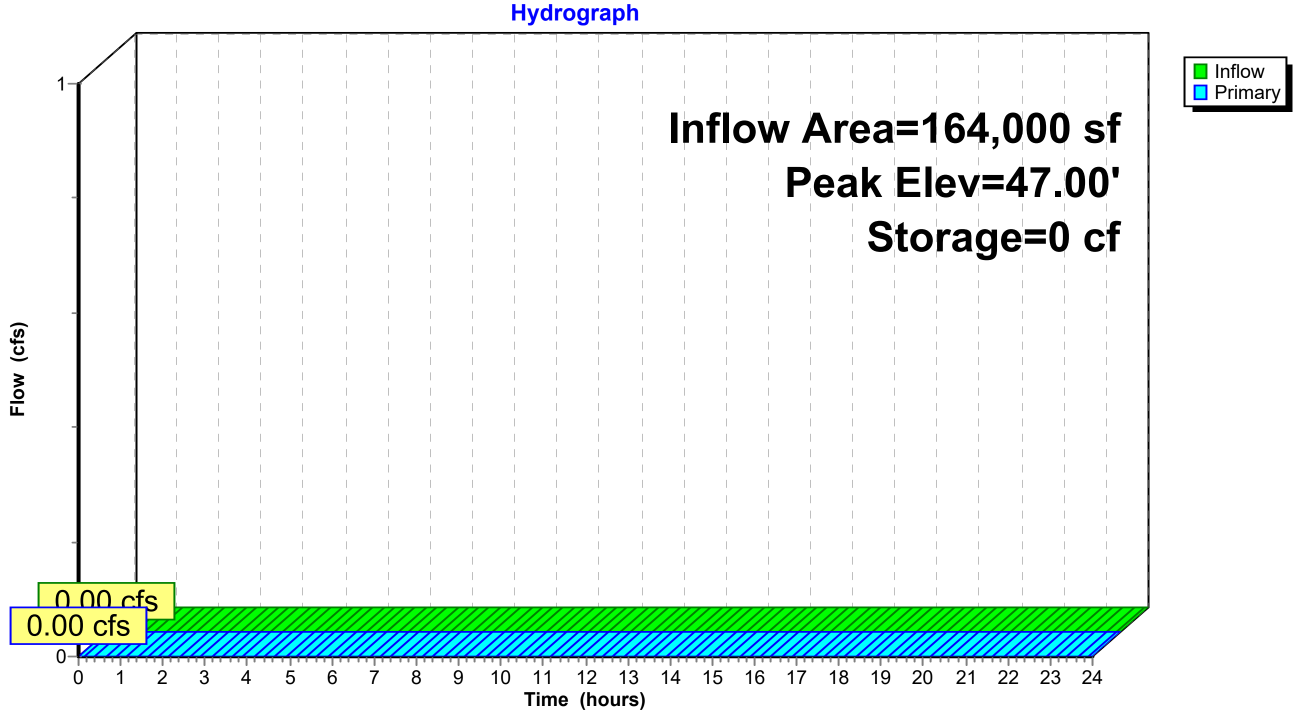
Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	2,900 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	2,500	0	0
48.00	3,300	2,900	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**9.0' long x 15.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.00' (Free Discharge)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 202P: Isolated Wetland



Stage-Area-Storage for Pond 202P: Isolated Wetland

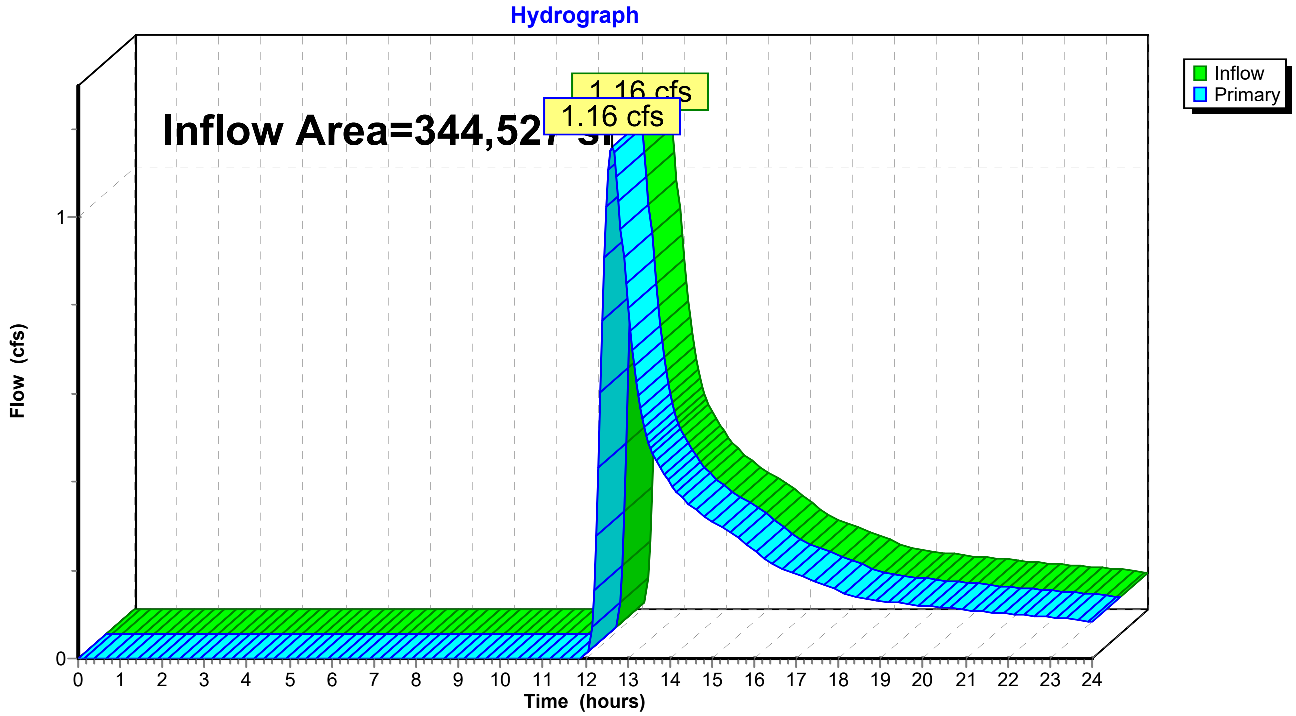
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.00	2,500	0	47.53	2,924	1,437
47.01	2,508	25	47.54	2,932	1,467
47.02	2,516	50	47.55	2,940	1,496
47.03	2,524	75	47.56	2,948	1,525
47.04	2,532	101	47.57	2,956	1,555
47.05	2,540	126	47.58	2,964	1,585
47.06	2,548	151	47.59	2,972	1,614
47.07	2,556	177	47.60	2,980	1,644
47.08	2,564	203	47.61	2,988	1,674
47.09	2,572	228	47.62	2,996	1,704
47.10	2,580	254	47.63	3,004	1,734
47.11	2,588	280	47.64	3,012	1,764
47.12	2,596	306	47.65	3,020	1,794
47.13	2,604	332	47.66	3,028	1,824
47.14	2,612	358	47.67	3,036	1,855
47.15	2,620	384	47.68	3,044	1,885
47.16	2,628	410	47.69	3,052	1,915
47.17	2,636	437	47.70	3,060	1,946
47.18	2,644	463	47.71	3,068	1,977
47.19	2,652	489	47.72	3,076	2,007
47.20	2,660	516	47.73	3,084	2,038
47.21	2,668	543	47.74	3,092	2,069
47.22	2,676	569	47.75	3,100	2,100
47.23	2,684	596	47.76	3,108	2,131
47.24	2,692	623	47.77	3,116	2,162
47.25	2,700	650	47.78	3,124	2,193
47.26	2,708	677	47.79	3,132	2,225
47.27	2,716	704	47.80	3,140	2,256
47.28	2,724	731	47.81	3,148	2,287
47.29	2,732	759	47.82	3,156	2,319
47.30	2,740	786	47.83	3,164	2,351
47.31	2,748	813	47.84	3,172	2,382
47.32	2,756	841	47.85	3,180	2,414
47.33	2,764	869	47.86	3,188	2,446
47.34	2,772	896	47.87	3,196	2,478
47.35	2,780	924	47.88	3,204	2,510
47.36	2,788	952	47.89	3,212	2,542
47.37	2,796	980	47.90	3,220	2,574
47.38	2,804	1,008	47.91	3,228	2,606
47.39	2,812	1,036	47.92	3,236	2,639
47.40	2,820	1,064	47.93	3,244	2,671
47.41	2,828	1,092	47.94	3,252	2,703
47.42	2,836	1,121	47.95	3,260	2,736
47.43	2,844	1,149	47.96	3,268	2,769
47.44	2,852	1,177	47.97	3,276	2,801
47.45	2,860	1,206	47.98	3,284	2,834
47.46	2,868	1,235	47.99	3,292	2,867
47.47	2,876	1,263	48.00	**3,300**	**2,900**
47.48	2,884	1,292			
47.49	2,892	1,321			
47.50	2,900	1,350			
47.51	2,908	1,379			
47.52	2,916	1,408			

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,527 sf,	0.00% Impervious, Inflow Depth > 0.37"	for 2-Year event
Inflow =	1.16 cfs @ 12.63 hrs, Volume=	10,483 cf	
Primary =	1.16 cfs @ 12.63 hrs, Volume=	10,483 cf, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 100L: Bordering Vegetated Wetland

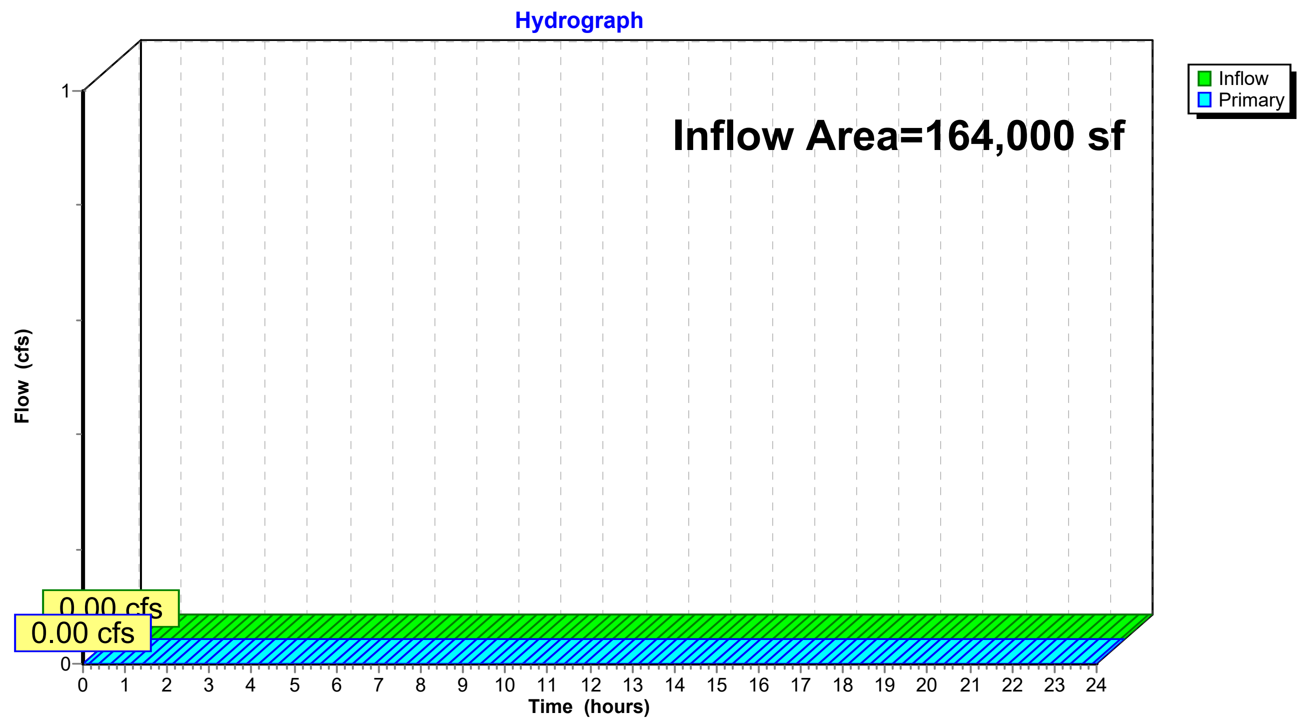


Summary for Link 200L: 30" RCP Lot 33

Inflow Area =	164,000 sf,	3.49% Impervious,	Inflow Depth = 0.00"	for 2-Year event
Inflow =	0.00 cfs @	0.00 hrs, Volume=	0 cf	
Primary =	0.00 cfs @	0.00 hrs, Volume=	0 cf, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 200L: 30" RCP Lot 33



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 100S: Area 100S Runoff Area=344,527 sf 0.00% Impervious Runoff Depth>1.01"
Flow Length=720' Tc=32.9 min CN=60 Runoff=4.40 cfs 28,981 cf

Subcatchment 200S: Area 200S Runoff Area=164,000 sf 3.49% Impervious Runoff Depth>0.02"
Flow Length=450' Slope=0.0050 '/' Tc=40.7 min CN=34 Runoff=0.01 cfs 241 cf

Pond 202P: Isolated Wetland Peak Elev=47.09' Storage=240 cf Inflow=0.01 cfs 241 cf
Outflow=0.00 cfs 0 cf

Link 100L: Bordering Vegetated Wetland Inflow=4.40 cfs 28,981 cf
Primary=4.40 cfs 28,981 cf

Link 200L: 30" RCP Lot 33 Inflow=0.00 cfs 0 cf
Primary=0.00 cfs 0 cf

Total Runoff Area = 508,527 sf Runoff Volume = 29,221 cf Average Runoff Depth = 0.69"
98.87% Pervious = 502,802 sf 1.13% Impervious = 5,725 sf

Summary for Subcatchment 100S: Area 100S

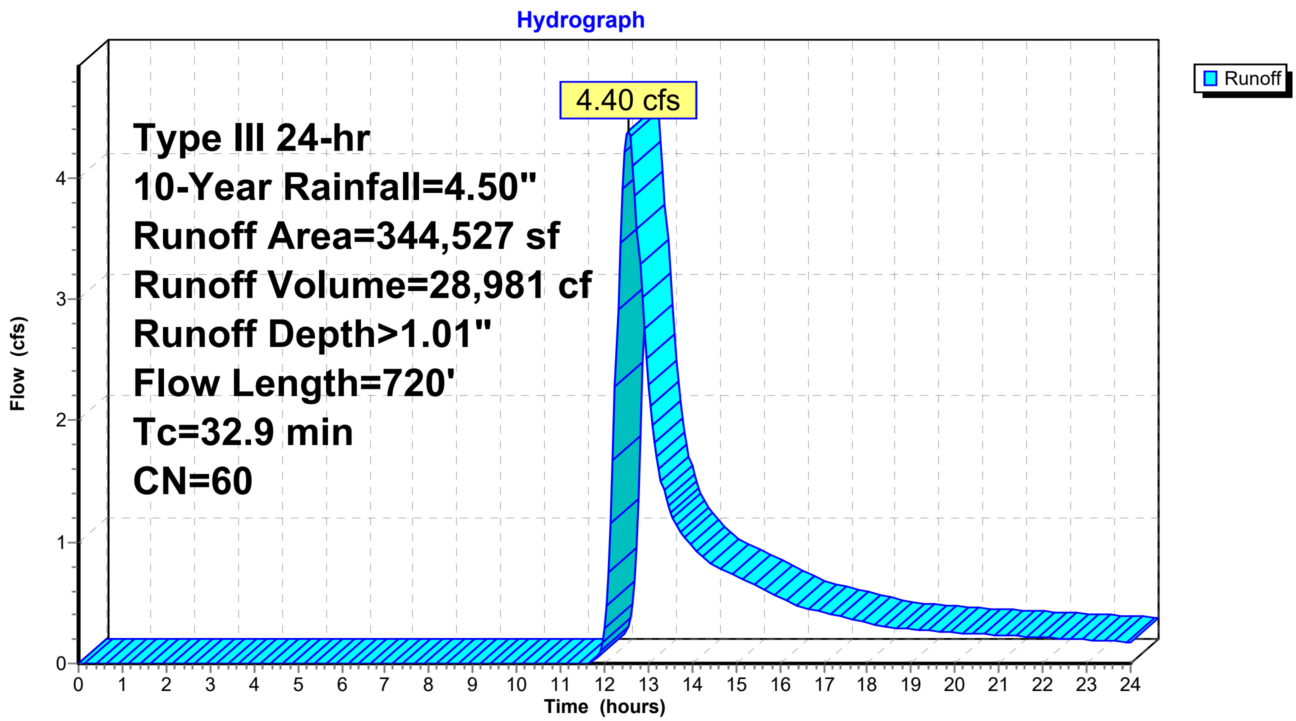
Runoff = 4.40 cfs @ 12.54 hrs, Volume= 28,981 cf, Depth> 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
124,468	30	Woods, Good, HSG A
165,059	70	Woods, Good, HSG C
55,000	96	Gravel surface, HSG A
344,527	60	Weighted Average
344,527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.3	196	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	474	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	720	Total			

Subcatchment 100S: Area 100S



Summary for Subcatchment 200S: Area 200S

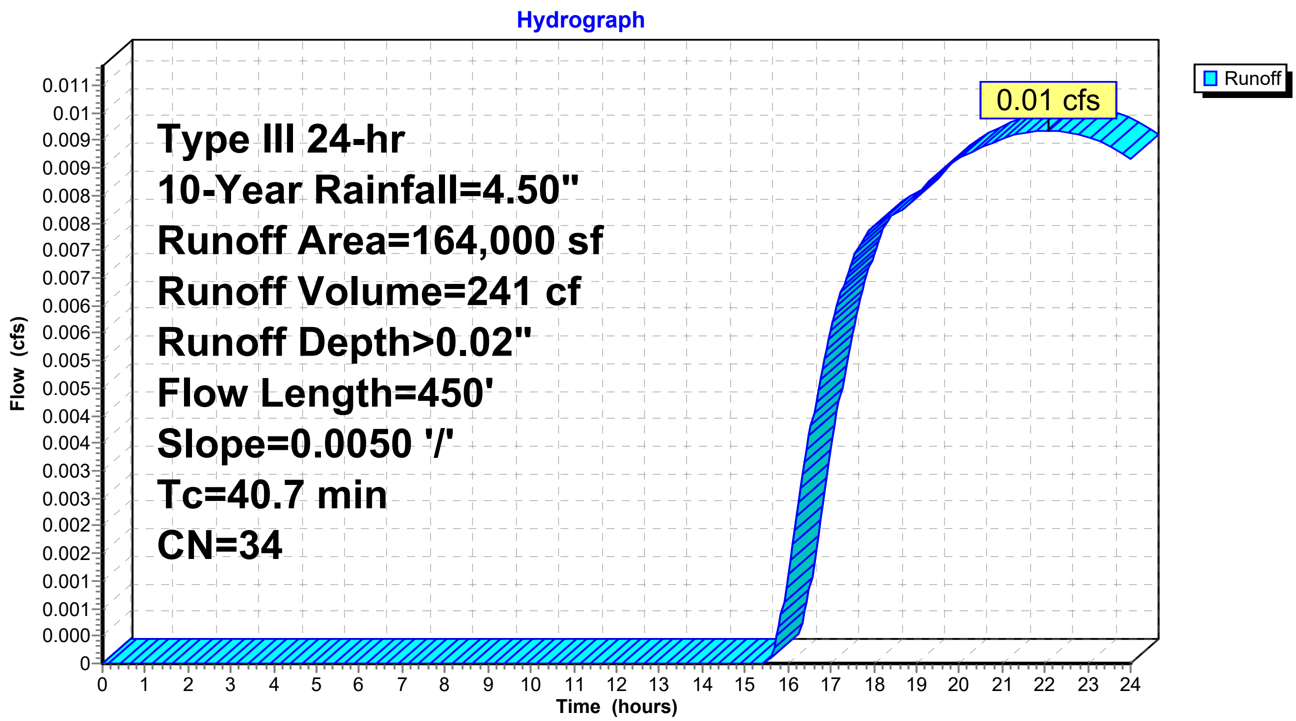
Runoff = 0.01 cfs @ 22.09 hrs, Volume= 241 cf, Depth> 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,075	98	Roofs, HSG A
2,650	98	Paved roads w/curbs & sewers, HSG A
26,000	39	>75% Grass cover, Good, HSG A
132,275	30	Woods, Good, HSG A
164,000	34	Weighted Average
158,275		96.51% Pervious Area
5,725		3.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
18.9	400	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
40.7	450	Total			

Subcatchment 200S: Area 200S



Summary for Pond 202P: Isolated Wetland

Inflow Area = 164,000 sf, 3.49% Impervious, Inflow Depth > 0.02" for 10-Year event
Inflow = 0.01 cfs @ 22.09 hrs, Volume= 241 cf
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 47.09' @ 24.00 hrs Surf.Area= 2,576 sf Storage= 240 cf
Flood Elev= 48.00' Surf.Area= 3,300 sf Storage= 2,900 cf

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

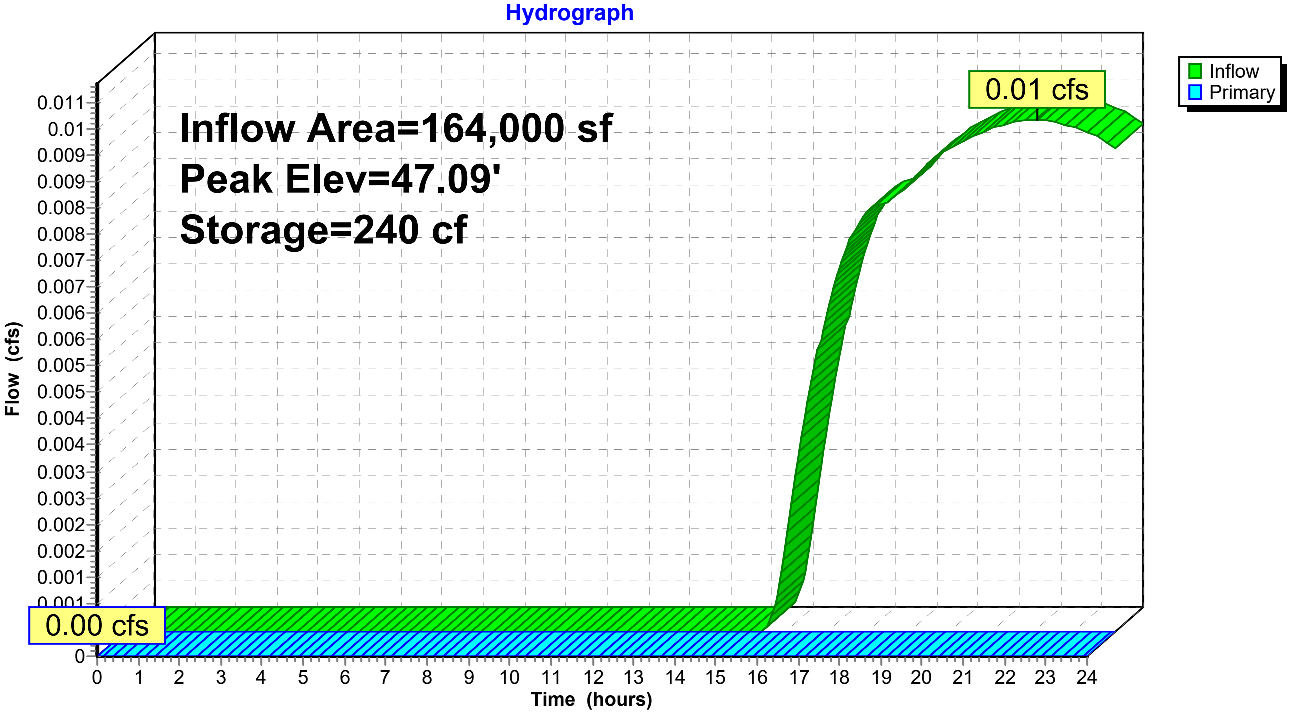
Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	2,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	2,500	0	0
48.00	3,300	2,900	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**9.0' long x 15.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=47.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 202P: Isolated Wetland



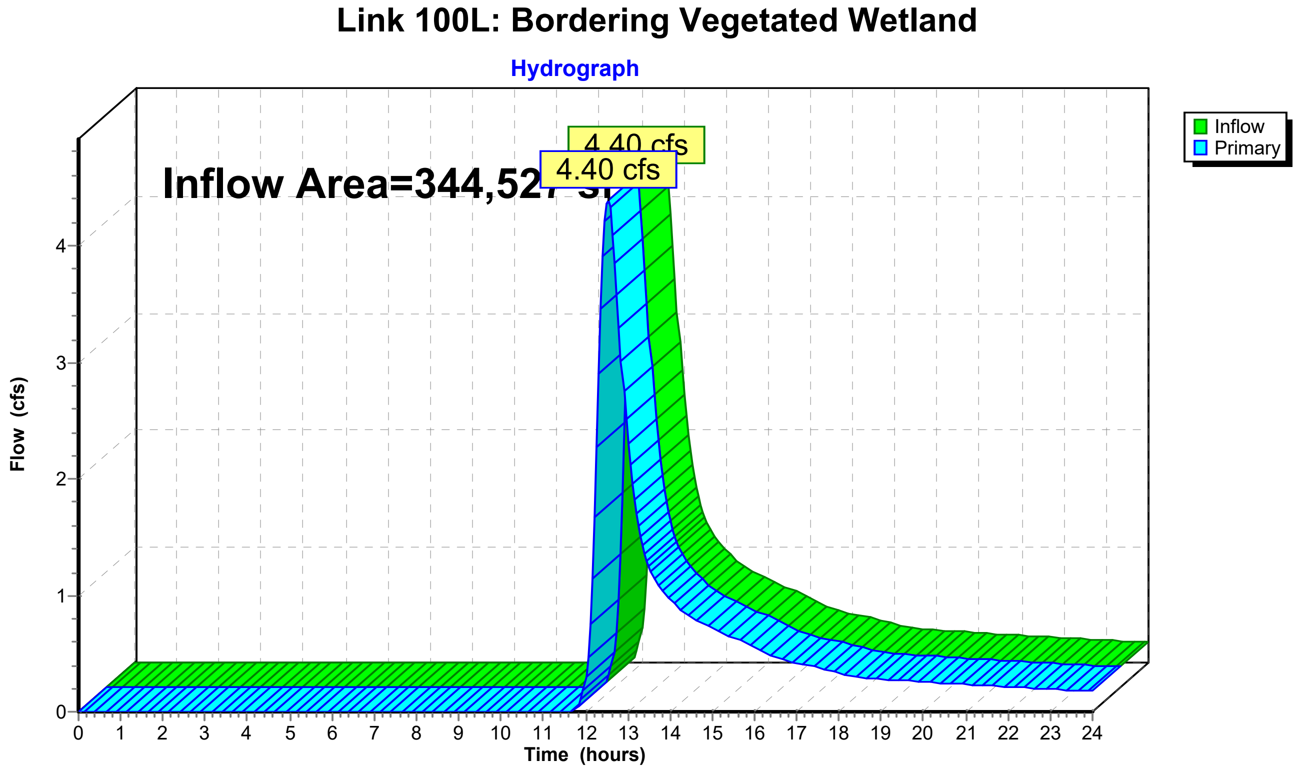
Stage-Area-Storage for Pond 202P: Isolated Wetland

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.00	2,500	0	47.53	2,924	1,437
47.01	2,508	25	47.54	2,932	1,467
47.02	2,516	50	47.55	2,940	1,496
47.03	2,524	75	47.56	2,948	1,525
47.04	2,532	101	47.57	2,956	1,555
47.05	2,540	126	47.58	2,964	1,585
47.06	2,548	151	47.59	2,972	1,614
47.07	2,556	177	47.60	2,980	1,644
47.08	2,564	203	47.61	2,988	1,674
47.09	2,572	228	47.62	2,996	1,704
47.10	2,580	254	47.63	3,004	1,734
47.11	2,588	280	47.64	3,012	1,764
47.12	2,596	306	47.65	3,020	1,794
47.13	2,604	332	47.66	3,028	1,824
47.14	2,612	358	47.67	3,036	1,855
47.15	2,620	384	47.68	3,044	1,885
47.16	2,628	410	47.69	3,052	1,915
47.17	2,636	437	47.70	3,060	1,946
47.18	2,644	463	47.71	3,068	1,977
47.19	2,652	489	47.72	3,076	2,007
47.20	2,660	516	47.73	3,084	2,038
47.21	2,668	543	47.74	3,092	2,069
47.22	2,676	569	47.75	3,100	2,100
47.23	2,684	596	47.76	3,108	2,131
47.24	2,692	623	47.77	3,116	2,162
47.25	2,700	650	47.78	3,124	2,193
47.26	2,708	677	47.79	3,132	2,225
47.27	2,716	704	47.80	3,140	2,256
47.28	2,724	731	47.81	3,148	2,287
47.29	2,732	759	47.82	3,156	2,319
47.30	2,740	786	47.83	3,164	2,351
47.31	2,748	813	47.84	3,172	2,382
47.32	2,756	841	47.85	3,180	2,414
47.33	2,764	869	47.86	3,188	2,446
47.34	2,772	896	47.87	3,196	2,478
47.35	2,780	924	47.88	3,204	2,510
47.36	2,788	952	47.89	3,212	2,542
47.37	2,796	980	47.90	3,220	2,574
47.38	2,804	1,008	47.91	3,228	2,606
47.39	2,812	1,036	47.92	3,236	2,639
47.40	2,820	1,064	47.93	3,244	2,671
47.41	2,828	1,092	47.94	3,252	2,703
47.42	2,836	1,121	47.95	3,260	2,736
47.43	2,844	1,149	47.96	3,268	2,769
47.44	2,852	1,177	47.97	3,276	2,801
47.45	2,860	1,206	47.98	3,284	2,834
47.46	2,868	1,235	47.99	3,292	2,867
47.47	2,876	1,263	48.00	**3,300**	**2,900**
47.48	2,884	1,292			
47.49	2,892	1,321			
47.50	2,900	1,350			
47.51	2,908	1,379			
47.52	2,916	1,408			

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,527 sf,	0.00% Impervious,	Inflow Depth > 1.01"	for 10-Year event	
Inflow =	4.40 cfs @	12.54 hrs,	Volume=	28,981 cf	
Primary =	4.40 cfs @	12.54 hrs,	Volume=	28,981 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

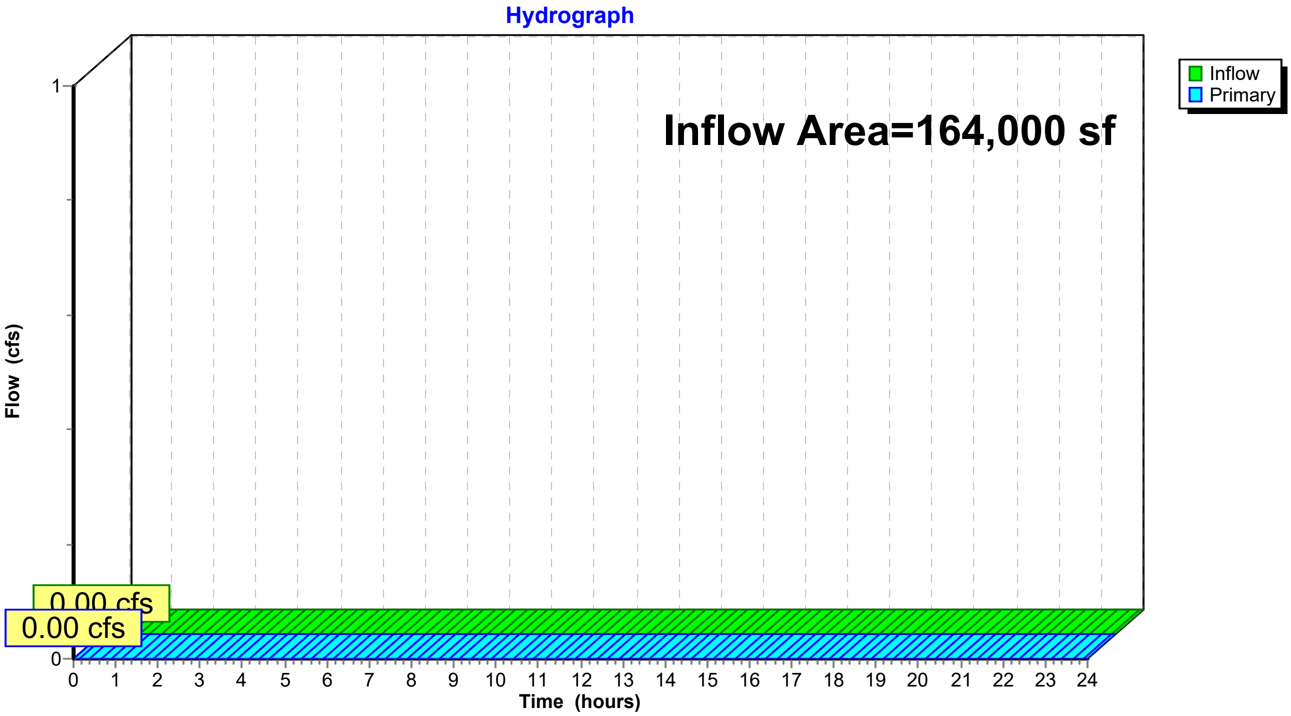


Summary for Link 200L: 30" RCP Lot 33

Inflow Area =	164,000 sf,	3.49% Impervious,	Inflow Depth = 0.00"	for 10-Year event	
Inflow =	0.00 cfs @	0.00 hrs,	Volume=	0 cf	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 200L: 30" RCP Lot 33



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 100S: Area 100S Runoff Area=344,527 sf 0.00% Impervious Runoff Depth>2.24"
Flow Length=720' Tc=32.9 min CN=60 Runoff=10.83 cfs 64,224 cf

Subcatchment 200S: Area 200S Runoff Area=164,000 sf 3.49% Impervious Runoff Depth>0.30"
Flow Length=450' Slope=0.0050 '/' Tc=40.7 min CN=34 Runoff=0.19 cfs 4,145 cf

Pond 202P: Isolated Wetland Peak Elev=48.03' Storage=2,900 cf Inflow=0.19 cfs 4,145 cf
Outflow=0.10 cfs 1,247 cf

Link 100L: Bordering Vegetated Wetland Inflow=10.83 cfs 64,224 cf
Primary=10.83 cfs 64,224 cf

Link 200L: 30" RCP Lot 33 Inflow=0.10 cfs 1,247 cf
Primary=0.10 cfs 1,247 cf

Total Runoff Area = 508,527 sf Runoff Volume = 68,368 cf Average Runoff Depth = 1.61"
98.87% Pervious = 502,802 sf 1.13% Impervious = 5,725 sf

Summary for Subcatchment 100S: Area 100S

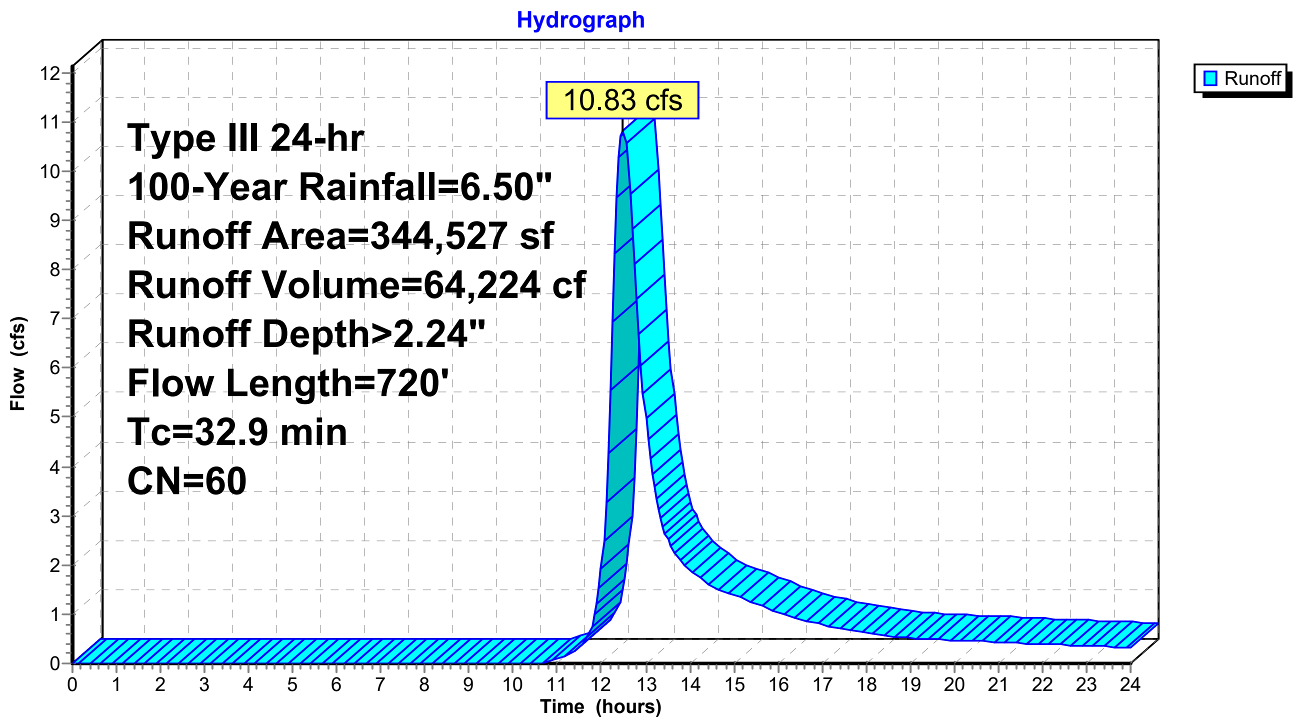
Runoff = 10.83 cfs @ 12.49 hrs, Volume= 64,224 cf, Depth> 2.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
124,468	30	Woods, Good, HSG A
165,059	70	Woods, Good, HSG C
55,000	96	Gravel surface, HSG A
344,527	60	Weighted Average
344,527		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.3	196	0.0150	0.61		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
5.8	474	0.0750	1.37		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
32.9	720	Total			

Subcatchment 100S: Area 100S



Summary for Subcatchment 200S: Area 200S

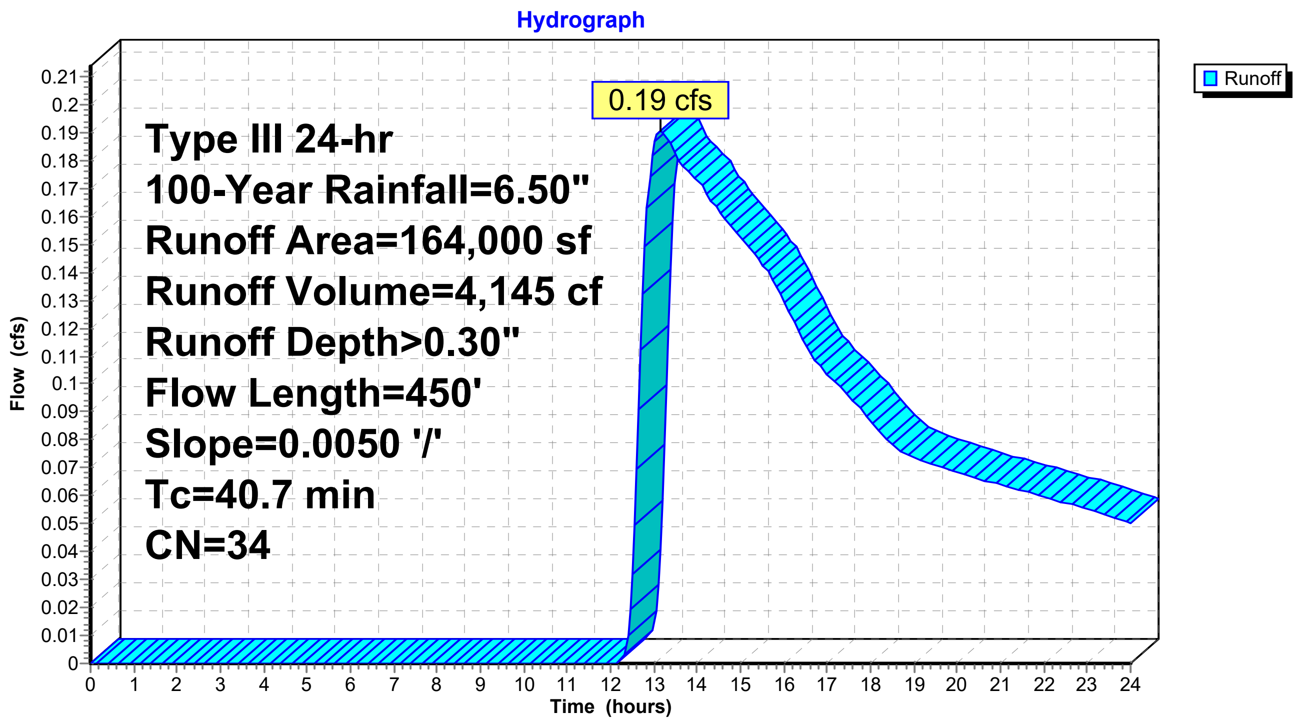
Runoff = 0.19 cfs @ 13.14 hrs, Volume= 4,145 cf, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,075	98	Roofs, HSG A
2,650	98	Paved roads w/curbs & sewers, HSG A
26,000	39	>75% Grass cover, Good, HSG A
132,275	30	Woods, Good, HSG A
164,000	34	Weighted Average
158,275		96.51% Pervious Area
5,725		3.49% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.8	50	0.0050	0.04		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
18.9	400	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
40.7	450	Total			

Subcatchment 200S: Area 200S



Summary for Pond 202P: Isolated Wetland

Inflow Area =	164,000 sf,	3.49% Impervious,	Inflow Depth > 0.30"	for 100-Year event
Inflow =	0.19 cfs @	13.14 hrs, Volume=	4,145 cf	
Outflow =	0.10 cfs @	18.60 hrs, Volume=	1,247 cf,	Atten= 47%, Lag= 327.8 min
Primary =	0.10 cfs @	18.60 hrs, Volume=	1,247 cf	

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 48.03' @ 18.60 hrs Surf.Area= 3,300 sf Storage= 2,900 cf
Flood Elev= 48.00' Surf.Area= 3,300 sf Storage= 2,900 cf

Plug-Flow detention time= 449.7 min calculated for 1,244 cf (30% of inflow)
Center-of-Mass det. time= 249.9 min (1,265.9 - 1,016.0)

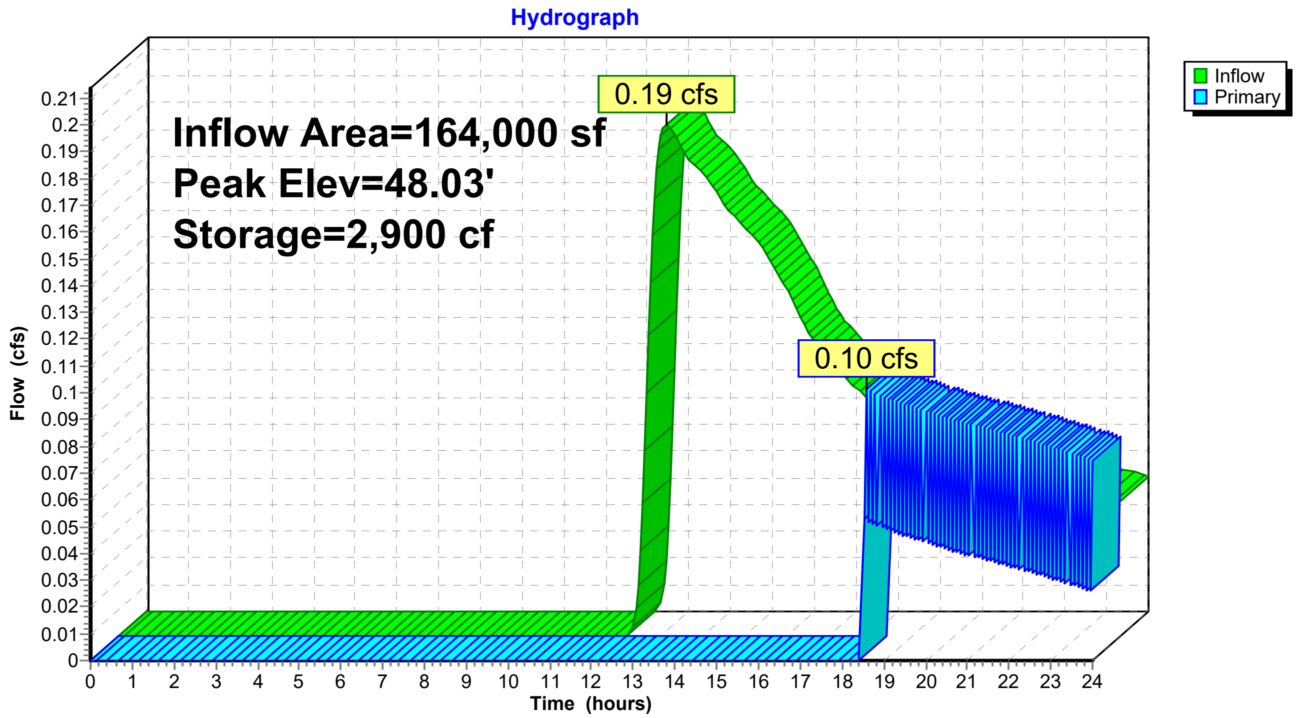
Volume	Invert	Avail.Storage	Storage Description
#1	47.00'	2,900 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
47.00	2,500	0	0
48.00	3,300	2,900	2,900

Device	Routing	Invert	Outlet Devices
#1	Primary	48.00'	**9.0' long x 15.0' 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) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.10 cfs @ 18.60 hrs HW=48.03' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.10 cfs @ 0.43 fps)

Pond 202P: Isolated Wetland



Stage-Area-Storage for Pond 202P: Isolated Wetland

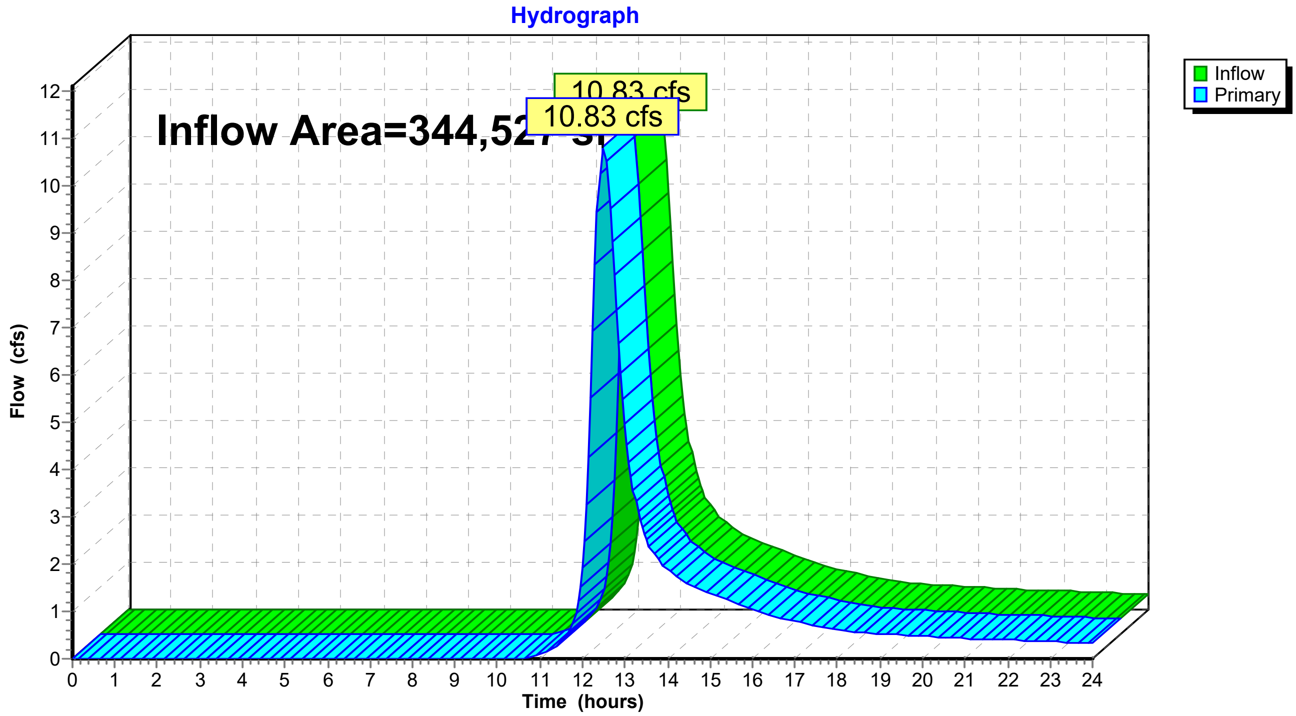
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.00	2,500	0	47.53	2,924	1,437
47.01	2,508	25	47.54	2,932	1,467
47.02	2,516	50	47.55	2,940	1,496
47.03	2,524	75	47.56	2,948	1,525
47.04	2,532	101	47.57	2,956	1,555
47.05	2,540	126	47.58	2,964	1,585
47.06	2,548	151	47.59	2,972	1,614
47.07	2,556	177	47.60	2,980	1,644
47.08	2,564	203	47.61	2,988	1,674
47.09	2,572	228	47.62	2,996	1,704
47.10	2,580	254	47.63	3,004	1,734
47.11	2,588	280	47.64	3,012	1,764
47.12	2,596	306	47.65	3,020	1,794
47.13	2,604	332	47.66	3,028	1,824
47.14	2,612	358	47.67	3,036	1,855
47.15	2,620	384	47.68	3,044	1,885
47.16	2,628	410	47.69	3,052	1,915
47.17	2,636	437	47.70	3,060	1,946
47.18	2,644	463	47.71	3,068	1,977
47.19	2,652	489	47.72	3,076	2,007
47.20	2,660	516	47.73	3,084	2,038
47.21	2,668	543	47.74	3,092	2,069
47.22	2,676	569	47.75	3,100	2,100
47.23	2,684	596	47.76	3,108	2,131
47.24	2,692	623	47.77	3,116	2,162
47.25	2,700	650	47.78	3,124	2,193
47.26	2,708	677	47.79	3,132	2,225
47.27	2,716	704	47.80	3,140	2,256
47.28	2,724	731	47.81	3,148	2,287
47.29	2,732	759	47.82	3,156	2,319
47.30	2,740	786	47.83	3,164	2,351
47.31	2,748	813	47.84	3,172	2,382
47.32	2,756	841	47.85	3,180	2,414
47.33	2,764	869	47.86	3,188	2,446
47.34	2,772	896	47.87	3,196	2,478
47.35	2,780	924	47.88	3,204	2,510
47.36	2,788	952	47.89	3,212	2,542
47.37	2,796	980	47.90	3,220	2,574
47.38	2,804	1,008	47.91	3,228	2,606
47.39	2,812	1,036	47.92	3,236	2,639
47.40	2,820	1,064	47.93	3,244	2,671
47.41	2,828	1,092	47.94	3,252	2,703
47.42	2,836	1,121	47.95	3,260	2,736
47.43	2,844	1,149	47.96	3,268	2,769
47.44	2,852	1,177	47.97	3,276	2,801
47.45	2,860	1,206	47.98	3,284	2,834
47.46	2,868	1,235	47.99	3,292	2,867
47.47	2,876	1,263	48.00	**3,300**	**2,900**
47.48	2,884	1,292	48.01	3,300	2,900
47.49	2,892	1,321	48.02	3,300	2,900
47.50	2,900	1,350	48.03	3,300	2,900
47.51	2,908	1,379			
47.52	2,916	1,408			

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,527 sf,	0.00% Impervious,	Inflow Depth > 2.24"	for 100-Year event
Inflow =	10.83 cfs @	12.49 hrs, Volume=	64,224 cf	
Primary =	10.83 cfs @	12.49 hrs, Volume=	64,224 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

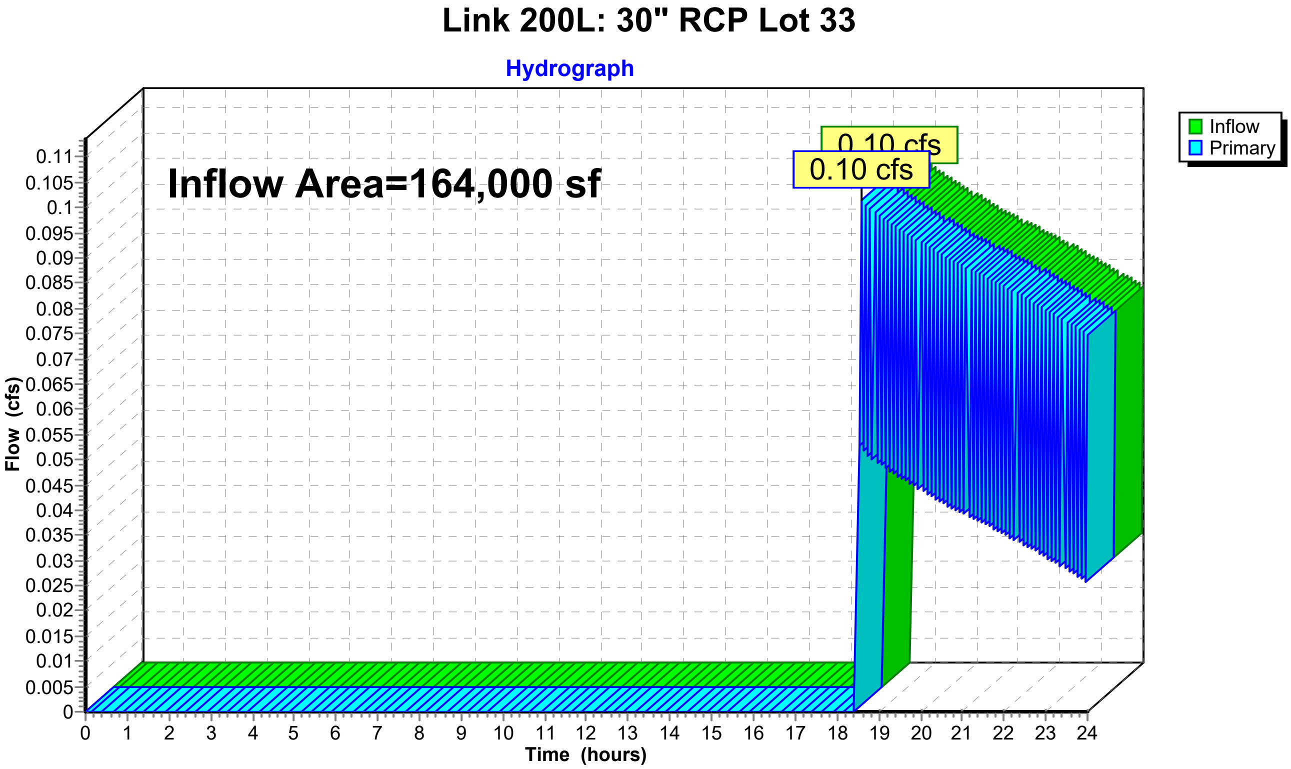
Link 100L: Bordering Vegetated Wetland



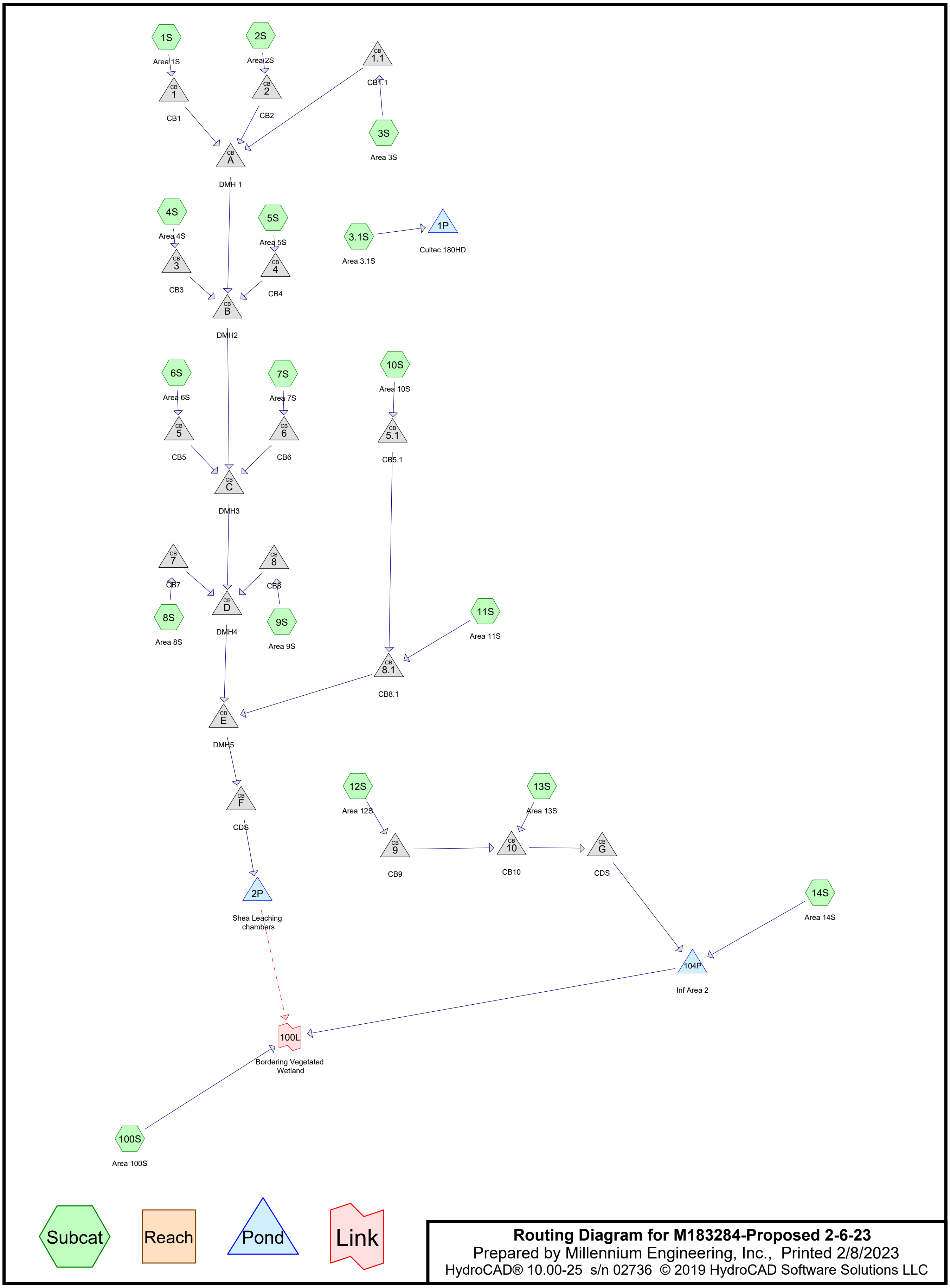
Summary for Link 200L: 30" RCP Lot 33

Inflow Area = 164,000 sf, 3.49% Impervious, Inflow Depth > 0.09" for 100-Year event
Inflow = 0.10 cfs @ 18.60 hrs, Volume= 1,247 cf
Primary = 0.10 cfs @ 18.60 hrs, Volume= 1,247 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



11.0 APPENDIX D – POST-DEVELOPMENT DRAINAGE CALCULATIONS



Routing Diagram for M183284-Proposed 2-6-23
Prepared by Millennium Engineering, Inc., Printed 2/8/2023
HydroCAD® 10.00-25 s/n 02736 © 2019 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
35,135	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 9S, 10S, 11S, 12S)
32,069	30	Brush, Good, HSG A (100S)
139,145	96	Gravel surface, HSG A (7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 100S)
61,675	98	Paved parking, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S)
17,040	98	Roofs, HSG A (3.1S, 9S, 11S)
57,990	30	Woods, Good, HSG A (7S, 10S, 11S, 13S, 100S)
165,060	70	Woods, Good, HSG C (100S)
508,114	**72**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
343,054	HSG A	1S, 2S, 3.1S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S, 12S, 13S, 14S, 100S
0	HSG B	
165,060	HSG C	100S
0	HSG D	
0	Other	
508,114		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover	Sub Num
35,135	0	0	0	0	35,135	>75% Grass cover, Good	
32,069	0	0	0	0	32,069	Brush, Good	
139,145	0	0	0	0	139,145	Gravel surface	
61,675	0	0	0	0	61,675	Paved parking	
17,040	0	0	0	0	17,040	Roofs	
57,990	0	165,060	0	0	223,050	Woods, Good	
343,054	**0**	**165,060**	**0**	**0**	**508,114**	**TOTAL AREA**	

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Area 1S Runoff Area=5,035 sf 31.38% Impervious Runoff Depth>0.31"
Tc=6.0 min CN=58 Runoff=0.02 cfs 128 cf

Subcatchment 2S: Area 2S Runoff Area=2,730 sf 83.15% Impervious Runoff Depth>1.91"
Tc=6.0 min CN=88 Runoff=0.14 cfs 434 cf

Subcatchment 3.1S: Area 3.1S Runoff Area=6,480 sf 100.00% Impervious Runoff Depth>2.87"
Tc=6.0 min CN=98 Runoff=0.44 cfs 1,548 cf

Subcatchment 3S: Area 3S Runoff Area=18,585 sf 43.69% Impervious Runoff Depth>0.55"
Tc=6.0 min CN=65 Runoff=0.21 cfs 854 cf

Subcatchment 4S: Area 4S Runoff Area=6,150 sf 33.33% Impervious Runoff Depth>0.34"
Tc=6.0 min CN=59 Runoff=0.03 cfs 173 cf

Subcatchment 5S: Area 5S Runoff Area=15,230 sf 87.72% Impervious Runoff Depth>2.16"
Tc=6.0 min CN=91 Runoff=0.86 cfs 2,745 cf

Subcatchment 6S: Area 6S Runoff Area=6,675 sf 50.86% Impervious Runoff Depth>0.72"
Tc=6.0 min CN=69 Runoff=0.11 cfs 402 cf

Subcatchment 7S: Area 7S Runoff Area=30,740 sf 21.05% Impervious Runoff Depth>1.53"
Tc=6.0 min CN=83 Runoff=1.24 cfs 3,909 cf

Subcatchment 8S: Area 8S Runoff Area=5,625 sf 44.44% Impervious Runoff Depth>2.76"
Tc=6.0 min CN=97 Runoff=0.37 cfs 1,292 cf

Subcatchment 9S: Area 9S Runoff Area=14,465 sf 70.83% Impervious Runoff Depth>2.65"
Tc=6.0 min CN=96 Runoff=0.94 cfs 3,193 cf

Subcatchment 10S: Area 10S Runoff Area=13,830 sf 63.16% Impervious Runoff Depth>1.32"
Tc=6.0 min CN=80 Runoff=0.48 cfs 1,526 cf

Subcatchment 11S: Area 11S Runoff Area=38,165 sf 33.83% Impervious Runoff Depth>1.46"
Tc=6.0 min CN=82 Runoff=1.46 cfs 4,633 cf

Subcatchment 12S: Area 12S Runoff Area=19,480 sf 3.08% Impervious Runoff Depth>1.91"
Tc=6.0 min CN=88 Runoff=0.98 cfs 3,094 cf

Subcatchment 13S: Area 13S Runoff Area=25,775 sf 0.00% Impervious Runoff Depth>1.83"
Tc=6.0 min CN=87 Runoff=1.24 cfs 3,920 cf

Subcatchment 14S: Area 14S Runoff Area=55,000 sf 0.00% Impervious Runoff Depth>2.65"
Tc=6.0 min CN=96 Runoff=3.58 cfs 12,140 cf

Subcatchment 100S: Area 100S Runoff Area=244,149 sf 0.00% Impervious Runoff Depth>0.30"
Flow Length=805' Tc=30.0 min CN=58 Runoff=0.62 cfs 6,160 cf

Pond 1: CB1 Peak Elev=47.53' Inflow=0.02 cfs 128 cf
12.0" Round Culvert n=0.013 L=16.0' S=0.0100 '/' Outflow=0.02 cfs 128 cf

Pond 1.1: CB1.1 Peak Elev=46.83' Inflow=0.21 cfs 854 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=0.21 cfs 854 cf

Pond 1P: Cultec 180HD Peak Elev=47.88' Storage=158 cf Inflow=0.44 cfs 1,548 cf
Outflow=0.20 cfs 1,551 cf

Pond 2: CB2 Peak Elev=47.66' Inflow=0.14 cfs 434 cf
12.0" Round Culvert n=0.013 L=9.0' S=0.0100 '/' Outflow=0.14 cfs 434 cf

Pond 2P: Shea Leaching chambers Peak Elev=41.02' Storage=4,854 cf Inflow=5.82 cfs 19,289 cf
Outflow=1.42 cfs 19,297 cf

Pond 3: CB3 Peak Elev=45.83' Inflow=0.03 cfs 173 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.03 cfs 173 cf

Pond 4: CB4 Peak Elev=46.29' Inflow=0.86 cfs 2,745 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=0.86 cfs 2,745 cf

Pond 5: CB5 Peak Elev=44.61' Inflow=0.11 cfs 402 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.11 cfs 402 cf

Pond 5.1: CB5.1 Peak Elev=44.85' Inflow=0.48 cfs 1,526 cf
12.0" Round Culvert n=0.013 L=224.0' S=0.0050 '/' Outflow=0.48 cfs 1,526 cf

Pond 6: CB6 Peak Elev=45.06' Inflow=1.24 cfs 3,909 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=1.24 cfs 3,909 cf

Pond 7: CB7 Peak Elev=45.21' Inflow=0.37 cfs 1,292 cf
12.0" Round Culvert n=0.013 L=19.0' S=0.0100 '/' Outflow=0.37 cfs 1,292 cf

Pond 8: CB8 Peak Elev=45.45' Inflow=0.94 cfs 3,193 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=0.94 cfs 3,193 cf

Pond 8.1: CB8.1 Peak Elev=44.09' Inflow=1.94 cfs 6,159 cf
12.0" Round Culvert n=0.013 L=118.0' S=0.0050 '/' Outflow=1.94 cfs 6,159 cf

Pond 9: CB9 Peak Elev=48.92' Inflow=0.98 cfs 3,094 cf
12.0" Round Culvert n=0.013 L=146.0' S=0.0068 '/' Outflow=0.98 cfs 3,094 cf

Pond 10: CB10 Peak Elev=48.22' Inflow=2.22 cfs 7,014 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=2.22 cfs 7,014 cf

Pond 104P: Inf Area 2 Peak Elev=47.83' Storage=4,316 cf Inflow=5.79 cfs 19,154 cf
Discarded=1.56 cfs 19,192 cf Primary=0.00 cfs 0 cf Outflow=1.56 cfs 19,192 cf

Pond A: DMH 1 Peak Elev=45.98' Inflow=0.36 cfs 1,416 cf
12.0" Round Culvert n=0.013 L=189.0' S=0.0050 '/' Outflow=0.36 cfs 1,416 cf

Pond B: DMH2 Peak Elev=45.30' Inflow=1.23 cfs 4,334 cf
12.0" Round Culvert n=0.013 L=184.0' S=0.0050 '/' Outflow=1.23 cfs 4,334 cf

Pond C: DMH3 Peak Elev=44.53' Inflow=2.57 cfs 8,646 cf
18.0" Round Culvert n=0.013 L=97.0' S=0.0051 '/' Outflow=2.57 cfs 8,646 cf

Pond D: DMH4 Peak Elev=44.10' Inflow=3.88 cfs 13,130 cf
18.0" Round Culvert n=0.013 L=165.0' S=0.0050 '/' Outflow=3.88 cfs 13,130 cf

Pond E: DMH5 Peak Elev=43.23' Inflow=5.82 cfs 19,289 cf
24.0" Round Culvert n=0.013 L=264.0' S=0.0050 '/' Outflow=5.82 cfs 19,289 cf

Pond F: CDS Peak Elev=41.80' Inflow=5.82 cfs 19,289 cf
24.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=5.82 cfs 19,289 cf

Pond G: CDS Peak Elev=47.87' Inflow=2.22 cfs 7,014 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=2.22 cfs 7,014 cf

Link 100L: Bordering Vegetated Wetland Inflow=0.62 cfs 6,160 cf
Primary=0.62 cfs 6,160 cf

Total Runoff Area = 508,114 sf Runoff Volume = 46,151 cf Average Runoff Depth = 1.09"
84.51% Pervious = 429,399 sf 15.49% Impervious = 78,715 sf

Summary for Subcatchment 1S: Area 1S

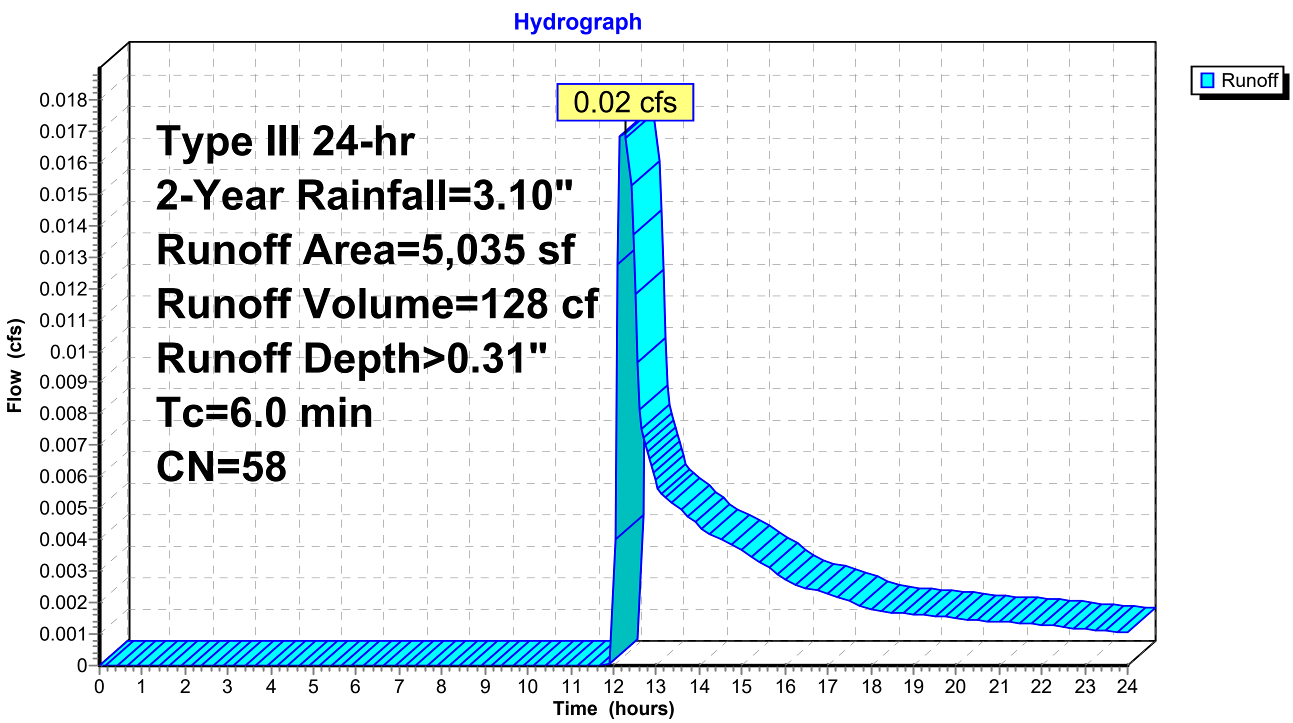
Runoff = 0.02 cfs @ 12.26 hrs, Volume= 128 cf, Depth> 0.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
1,580	98	Paved parking, HSG A
3,455	39	>75% Grass cover, Good, HSG A
5,035	58	Weighted Average
3,455		68.62% Pervious Area
1,580		31.38% Impervious Area

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

Subcatchment 1S: Area 1S



Summary for Subcatchment 2S: Area 2S

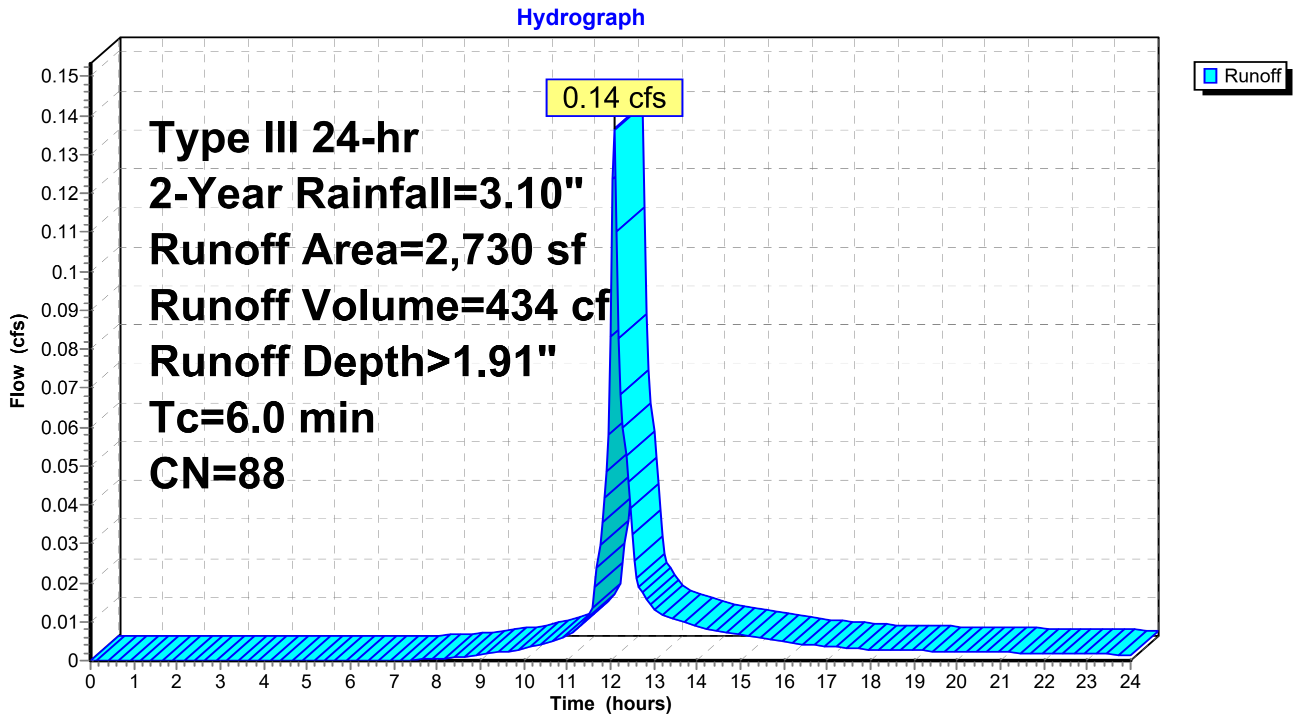
Runoff = 0.14 cfs @ 12.09 hrs, Volume= 434 cf, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,270	98	Paved parking, HSG A
460	39	>75% Grass cover, Good, HSG A
2,730	88	Weighted Average
460		16.85% Pervious Area
2,270		83.15% Impervious Area

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

Subcatchment 2S: Area 2S



Summary for Subcatchment 3.1S: Area 3.1S

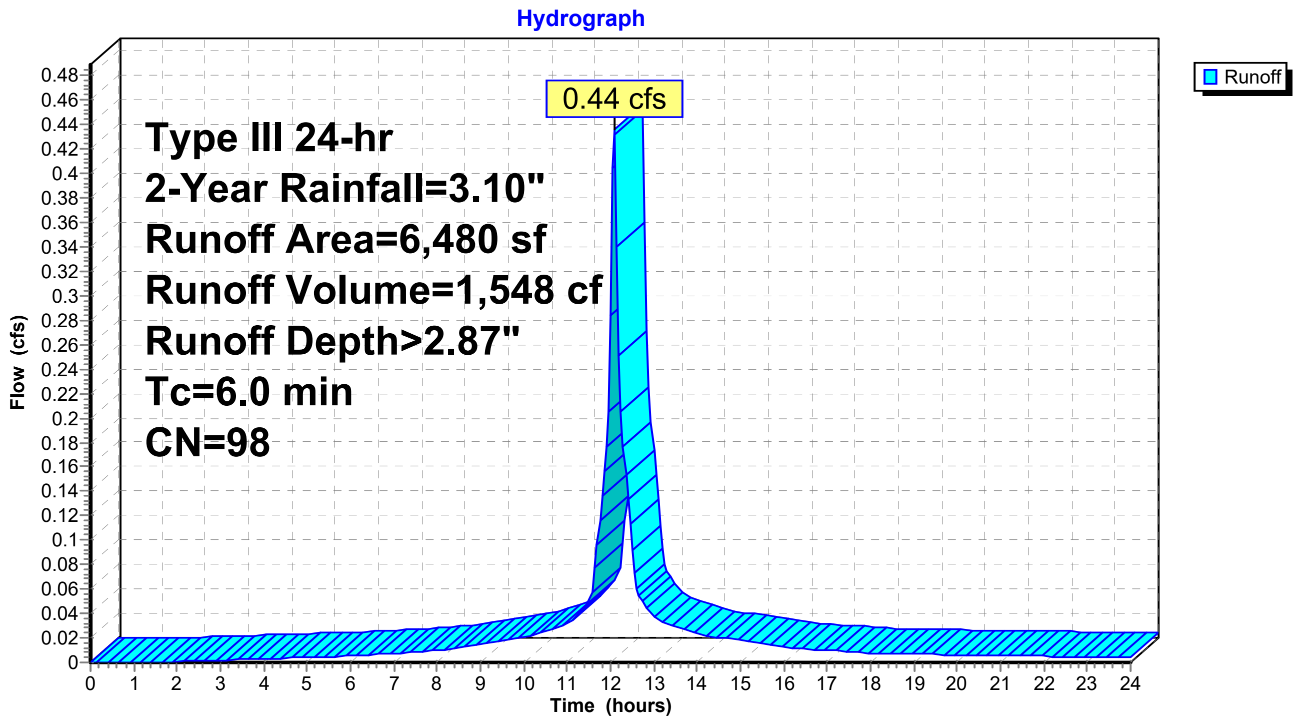
Runoff = 0.44 cfs @ 12.09 hrs, Volume= 1,548 cf, Depth> 2.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
6,480	98	Roofs, HSG A
6,480		100.00% Impervious Area

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

Subcatchment 3.1S: Area 3.1S



Summary for Subcatchment 3S: Area 3S

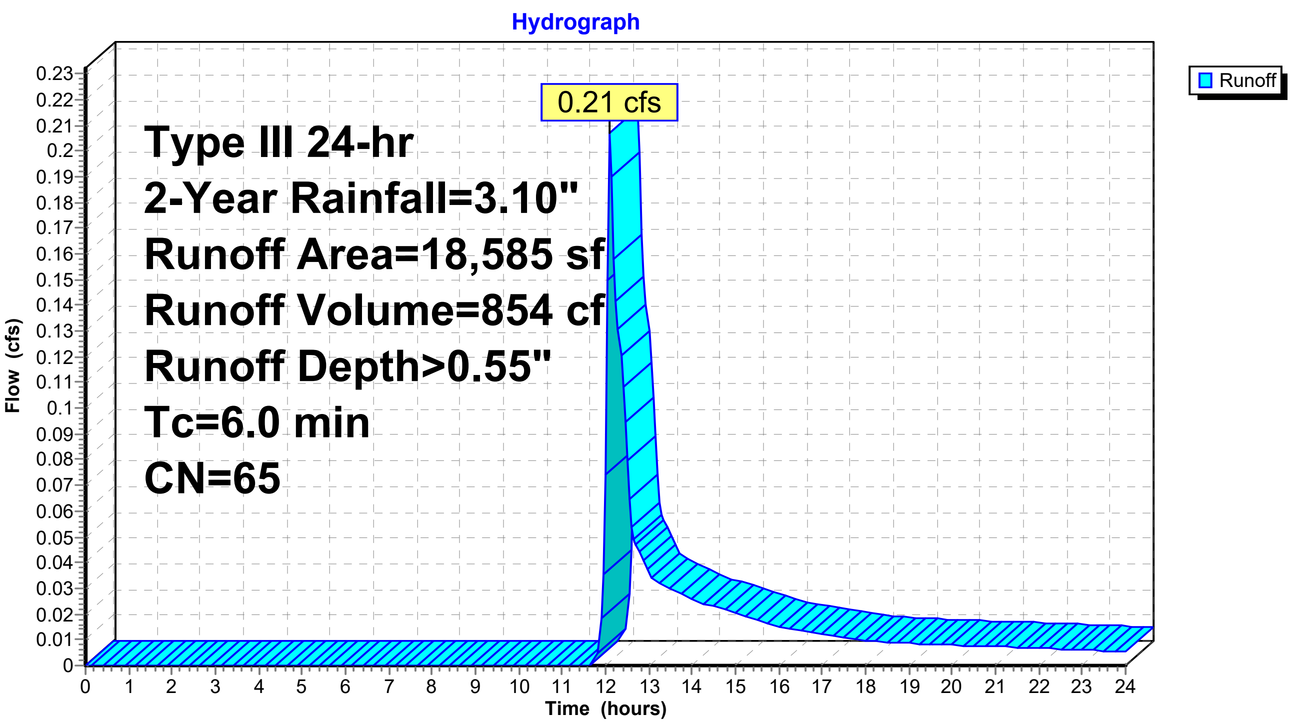
Runoff = 0.21 cfs @ 12.11 hrs, Volume= 854 cf, Depth> 0.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
8,120	98	Paved parking, HSG A
10,465	39	>75% Grass cover, Good, HSG A
18,585	65	Weighted Average
10,465		56.31% Pervious Area
8,120		43.69% Impervious Area

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

Subcatchment 3S: Area 3S



Summary for Subcatchment 4S: Area 4S

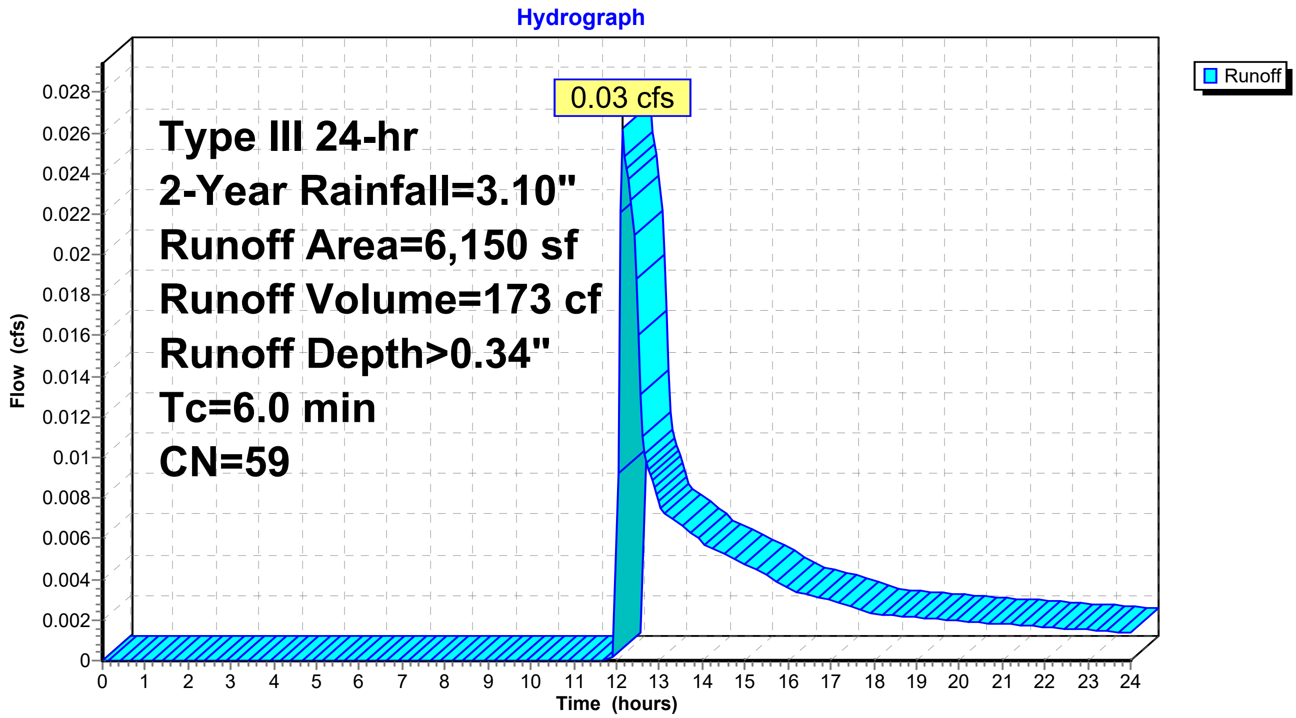
Runoff = 0.03 cfs @ 12.16 hrs, Volume= 173 cf, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,050	98	Paved parking, HSG A
4,100	39	>75% Grass cover, Good, HSG A
6,150	59	Weighted Average
4,100		66.67% Pervious Area
2,050		33.33% Impervious Area

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

Subcatchment 4S: Area 4S



Summary for Subcatchment 5S: Area 5S

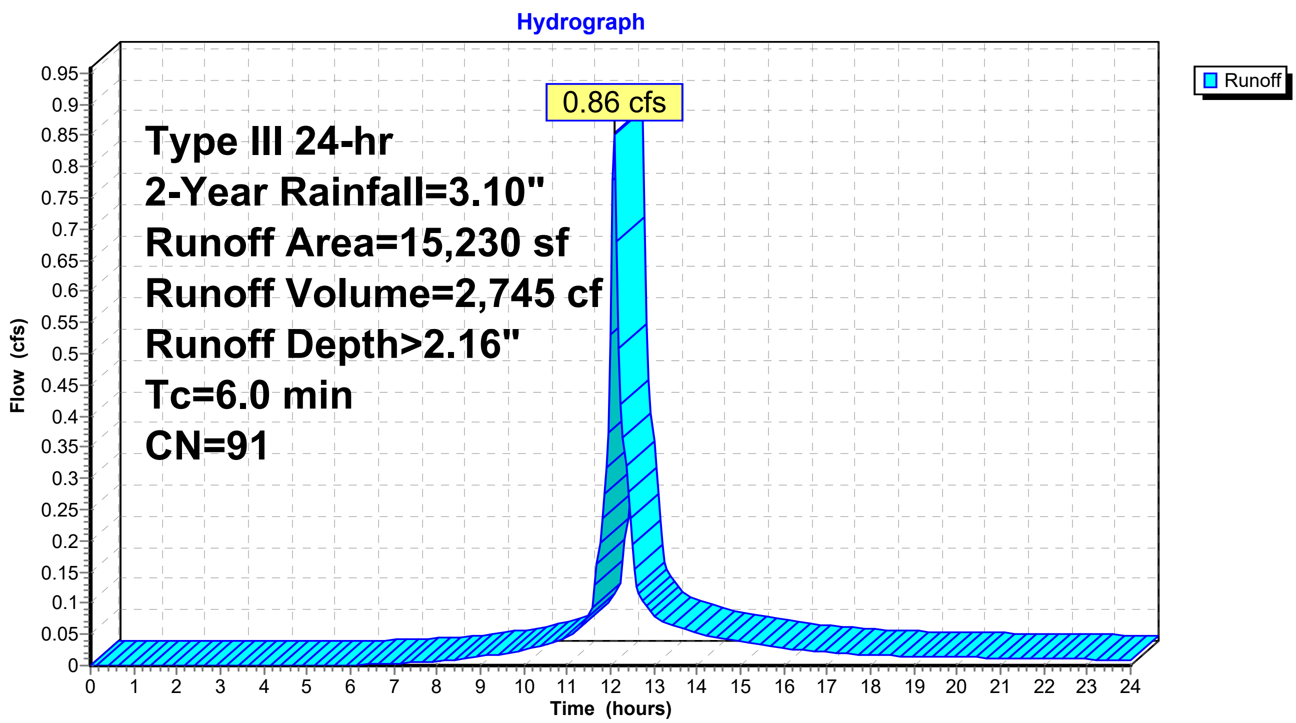
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 2,745 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
13,360	98	Paved parking, HSG A
1,870	39	>75% Grass cover, Good, HSG A
15,230	91	Weighted Average
1,870		12.28% Pervious Area
13,360		87.72% Impervious Area

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

Subcatchment 5S: Area 5S



Summary for Subcatchment 6S: Area 6S

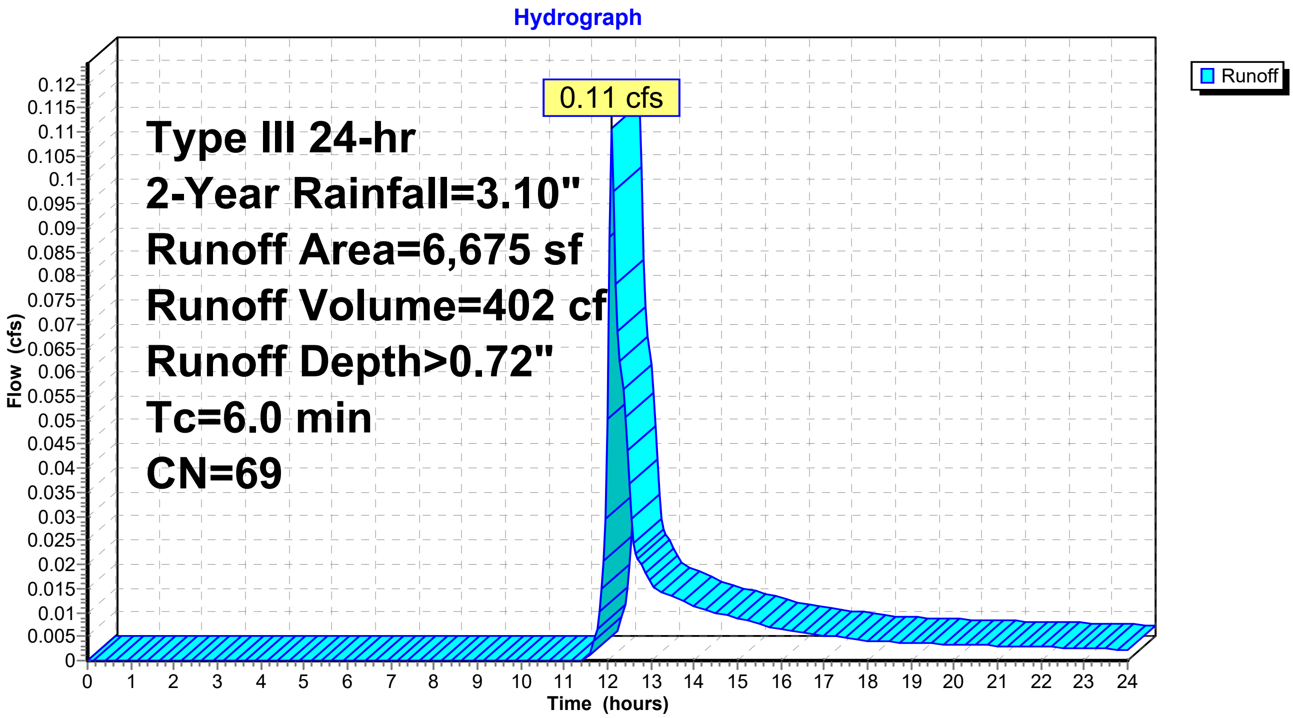
Runoff = 0.11 cfs @ 12.11 hrs, Volume= 402 cf, Depth> 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
3,395	98	Paved parking, HSG A
3,280	39	>75% Grass cover, Good, HSG A
6,675	69	Weighted Average
3,280		49.14% Pervious Area
3,395		50.86% Impervious Area

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

Subcatchment 6S: Area 6S



Summary for Subcatchment 7S: Area 7S

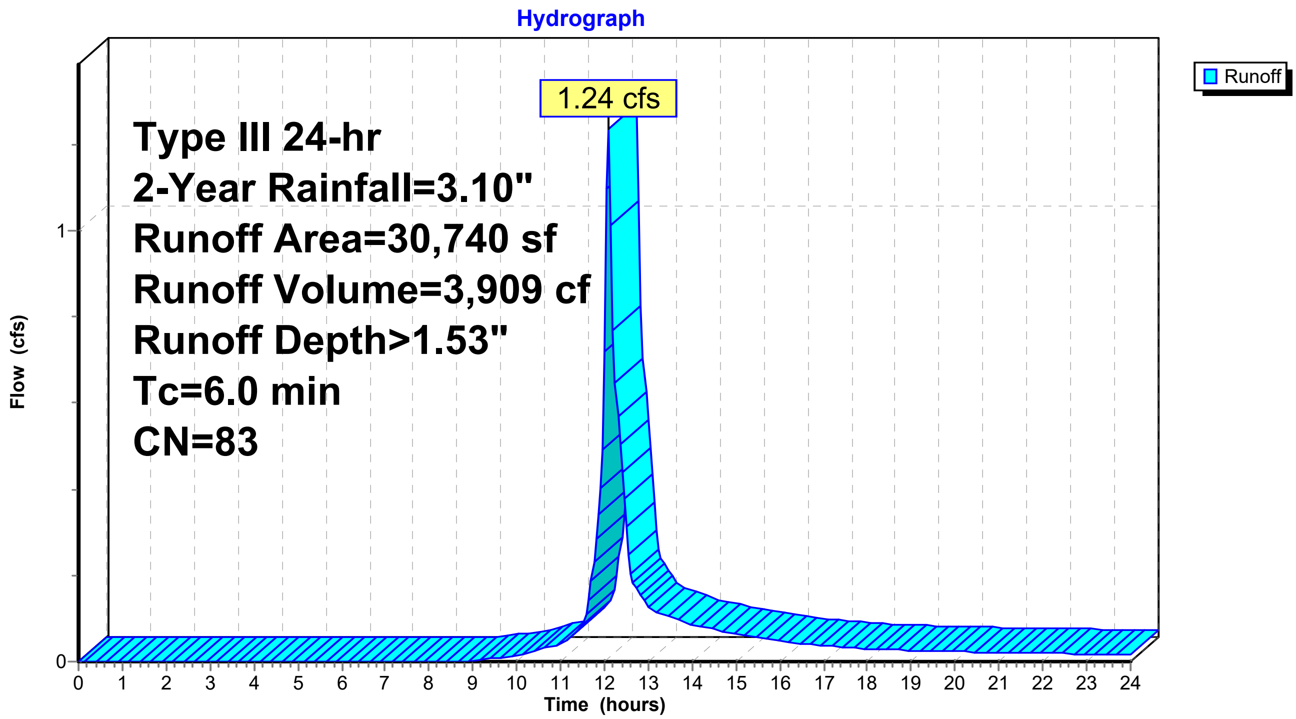
Runoff = 1.24 cfs @ 12.09 hrs, Volume= 3,909 cf, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
6,470	98	Paved parking, HSG A
17,620	96	Gravel surface, HSG A
4,150	39	>75% Grass cover, Good, HSG A
2,500	30	Woods, Good, HSG A
30,740	83	Weighted Average
24,270		78.95% Pervious Area
6,470		21.05% Impervious Area

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

Subcatchment 7S: Area 7S



Summary for Subcatchment 8S: Area 8S

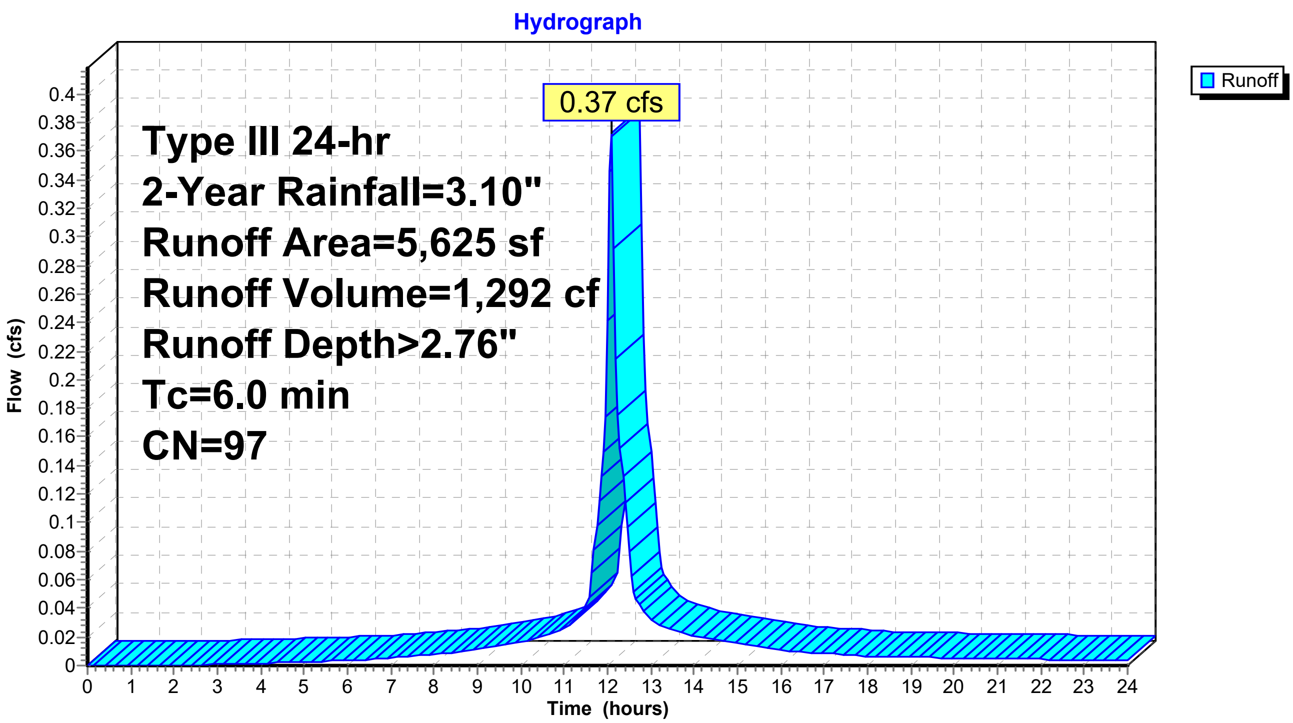
Runoff = 0.37 cfs @ 12.09 hrs, Volume= 1,292 cf, Depth> 2.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
2,500	98	Paved parking, HSG A
3,125	96	Gravel surface, HSG A
5,625	97	Weighted Average
3,125		55.56% Pervious Area
2,500		44.44% Impervious Area

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

Subcatchment 8S: Area 8S



Summary for Subcatchment 9S: Area 9S

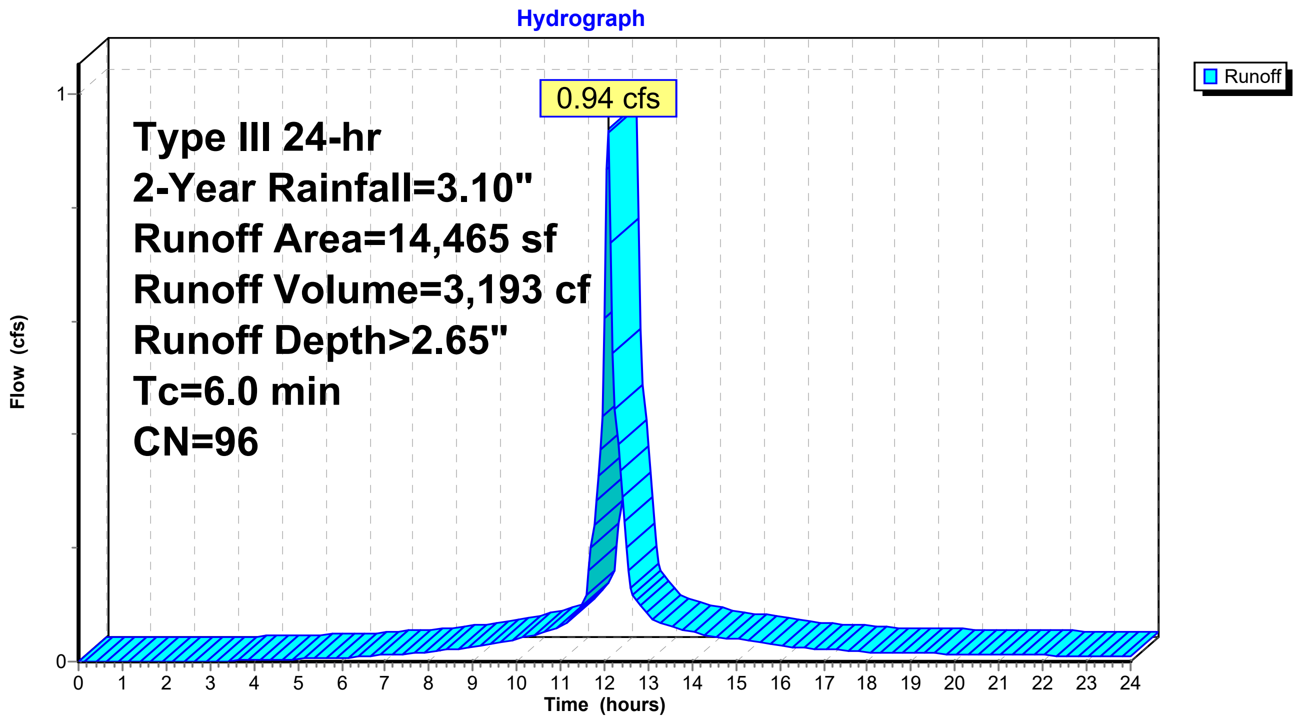
Runoff = 0.94 cfs @ 12.09 hrs, Volume= 3,193 cf, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
4,965	98	Paved parking, HSG A
3,820	96	Gravel surface, HSG A
400	39	>75% Grass cover, Good, HSG A
14,465	96	Weighted Average
4,220		29.17% Pervious Area
10,245		70.83% Impervious Area

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

Subcatchment 9S: Area 9S



Summary for Subcatchment 10S: Area 10S

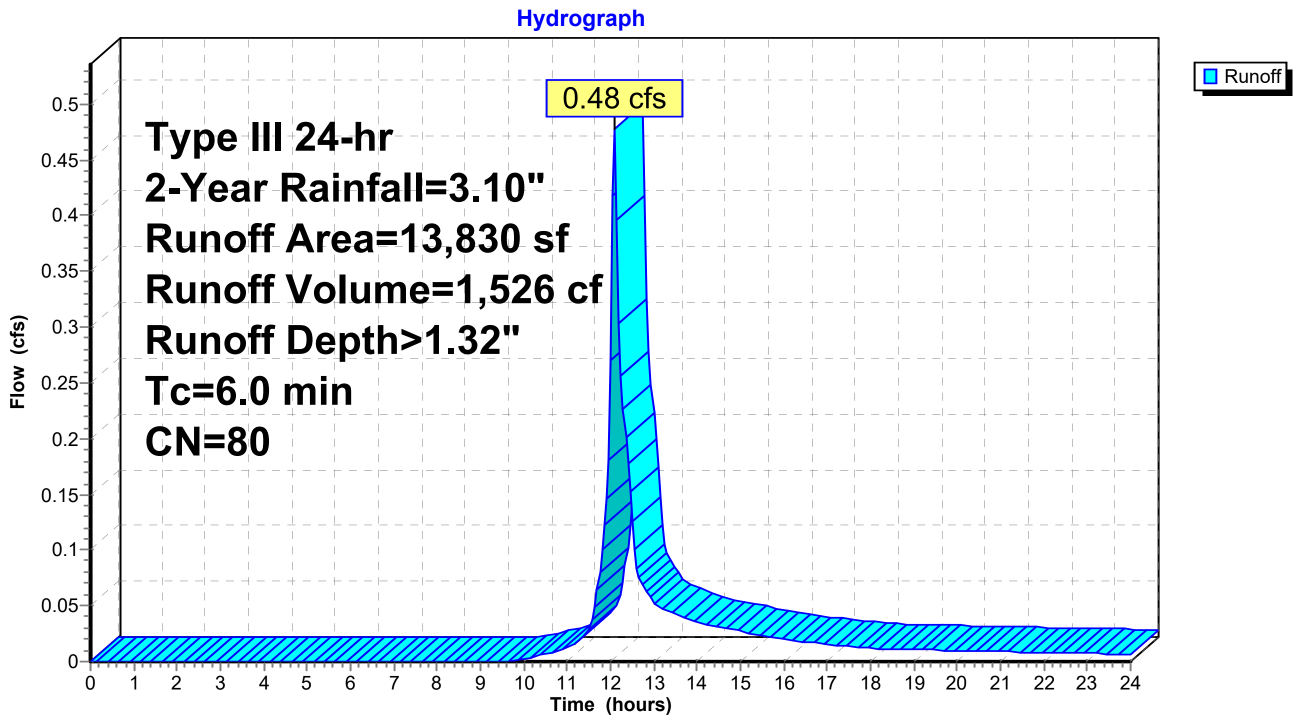
Runoff = 0.48 cfs @ 12.10 hrs, Volume= 1,526 cf, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
8,735	98	Paved parking, HSG A
1,325	96	Gravel surface, HSG A
870	39	>75% Grass cover, Good, HSG A
2,900	30	Woods, Good, HSG A
13,830	80	Weighted Average
5,095		36.84% Pervious Area
8,735		63.16% Impervious Area

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

Subcatchment 10S: Area 10S



Summary for Subcatchment 11S: Area 11S

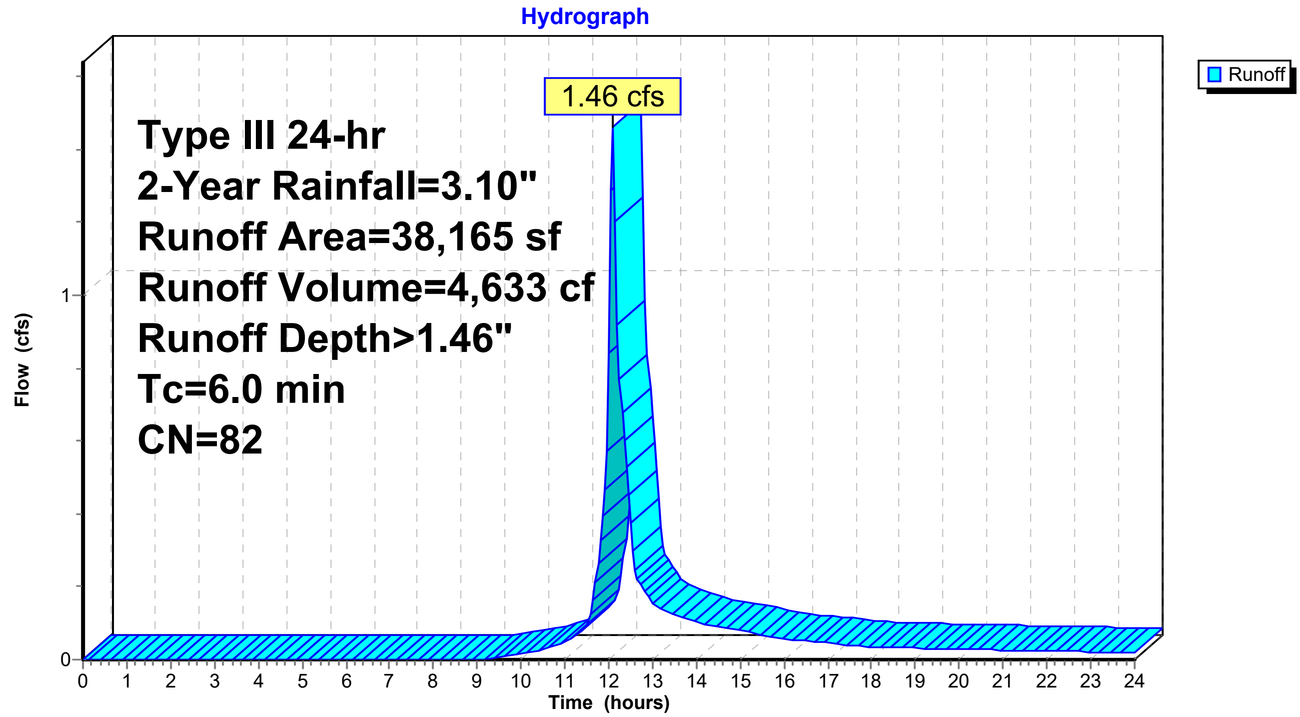
Runoff = 1.46 cfs @ 12.09 hrs, Volume= 4,633 cf, Depth> 1.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
7,630	98	Paved parking, HSG A
16,190	96	Gravel surface, HSG A
3,165	39	>75% Grass cover, Good, HSG A
5,900	30	Woods, Good, HSG A
38,165	82	Weighted Average
25,255		66.17% Pervious Area
12,910		33.83% Impervious Area

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

Subcatchment 11S: Area 11S



Summary for Subcatchment 12S: Area 12S

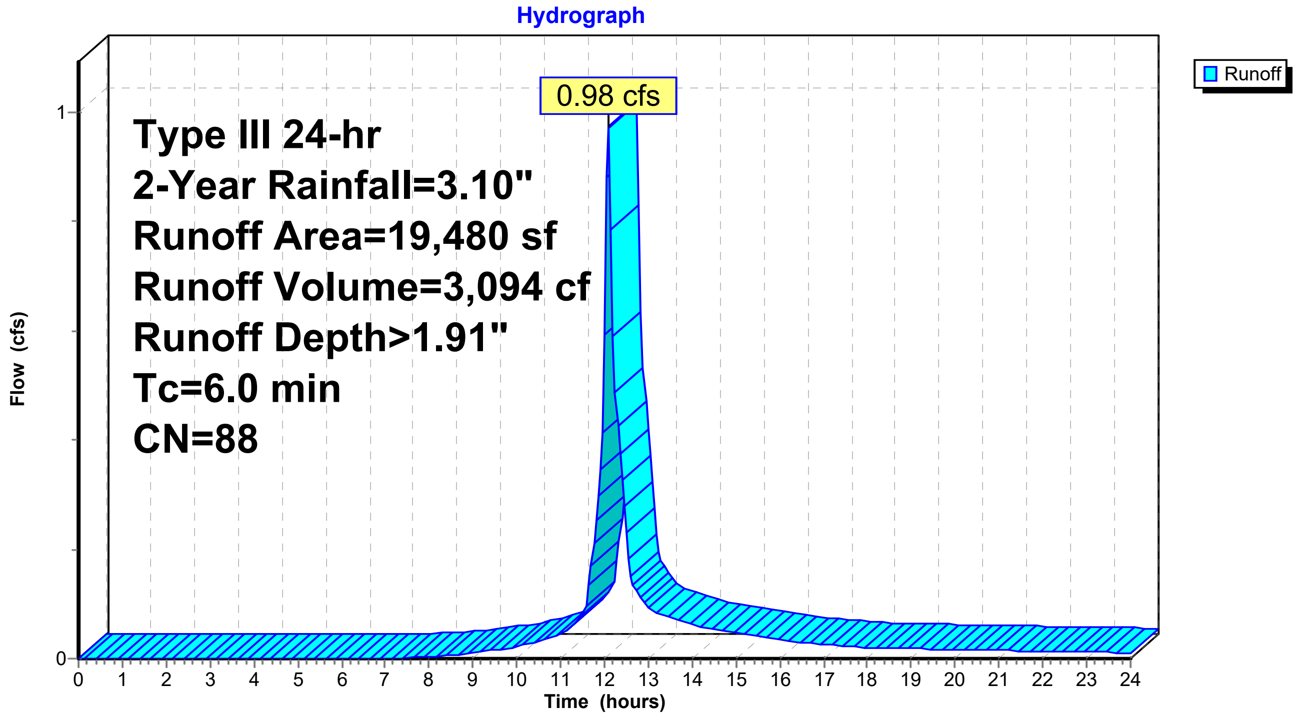
Runoff = 0.98 cfs @ 12.09 hrs, Volume= 3,094 cf, Depth> 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
15,960	96	Gravel surface, HSG A
2,920	39	>75% Grass cover, Good, HSG A
600	98	Paved parking, HSG A
19,480	88	Weighted Average
18,880		96.92% Pervious Area
600		3.08% Impervious Area

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

Subcatchment 12S: Area 12S



Summary for Subcatchment 13S: Area 13S

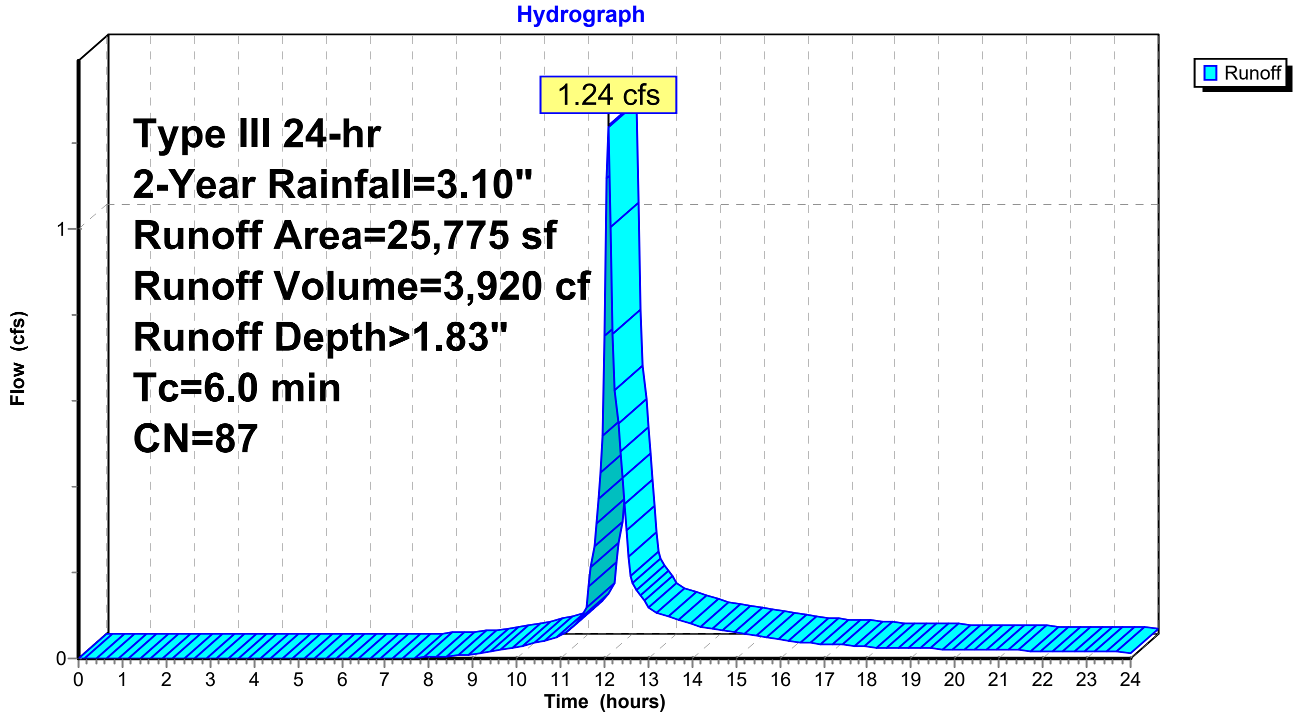
Runoff = 1.24 cfs @ 12.09 hrs, Volume= 3,920 cf, Depth> 1.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
22,400	96	Gravel surface, HSG A
3,375	30	Woods, Good, HSG A
25,775	87	Weighted Average
25,775		100.00% Pervious Area

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

Subcatchment 13S: Area 13S



Summary for Subcatchment 14S: Area 14S

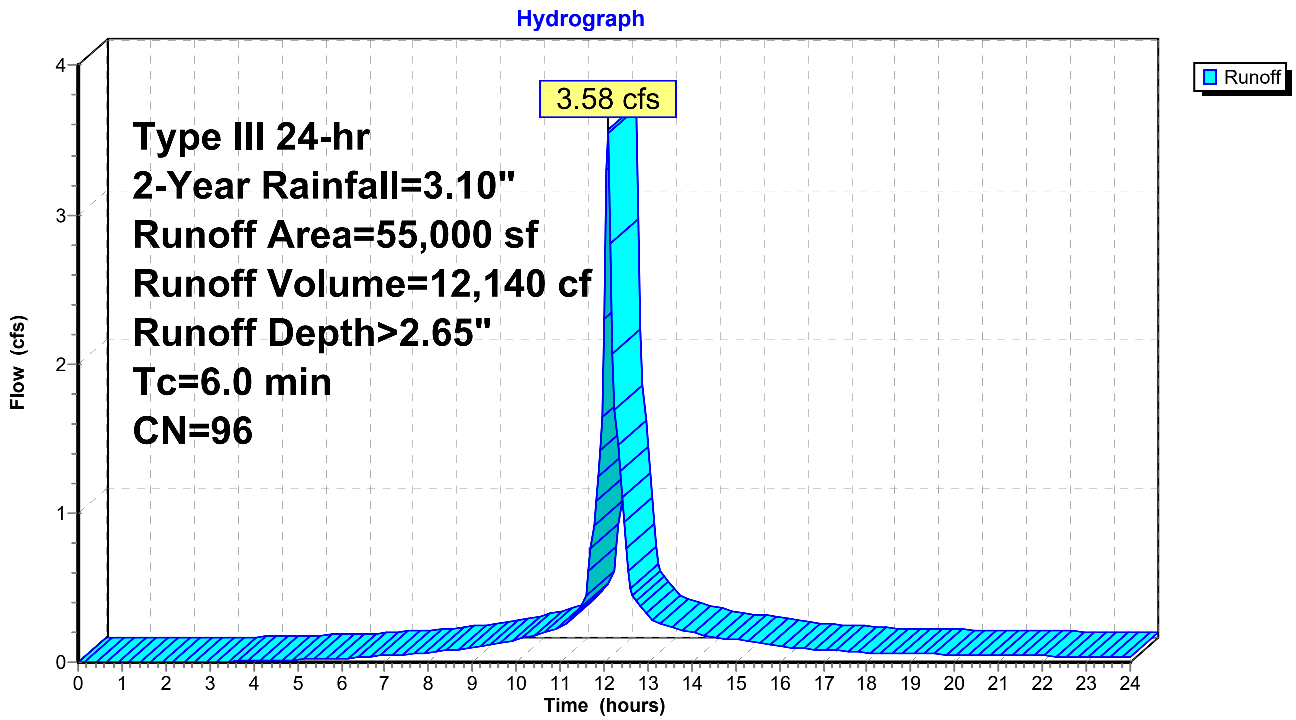
Runoff = 3.58 cfs @ 12.09 hrs, Volume= 12,140 cf, Depth> 2.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
55,000	96	Gravel surface, HSG A
55,000		100.00% Pervious Area

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

Subcatchment 14S: Area 14S



Summary for Subcatchment 100S: Area 100S

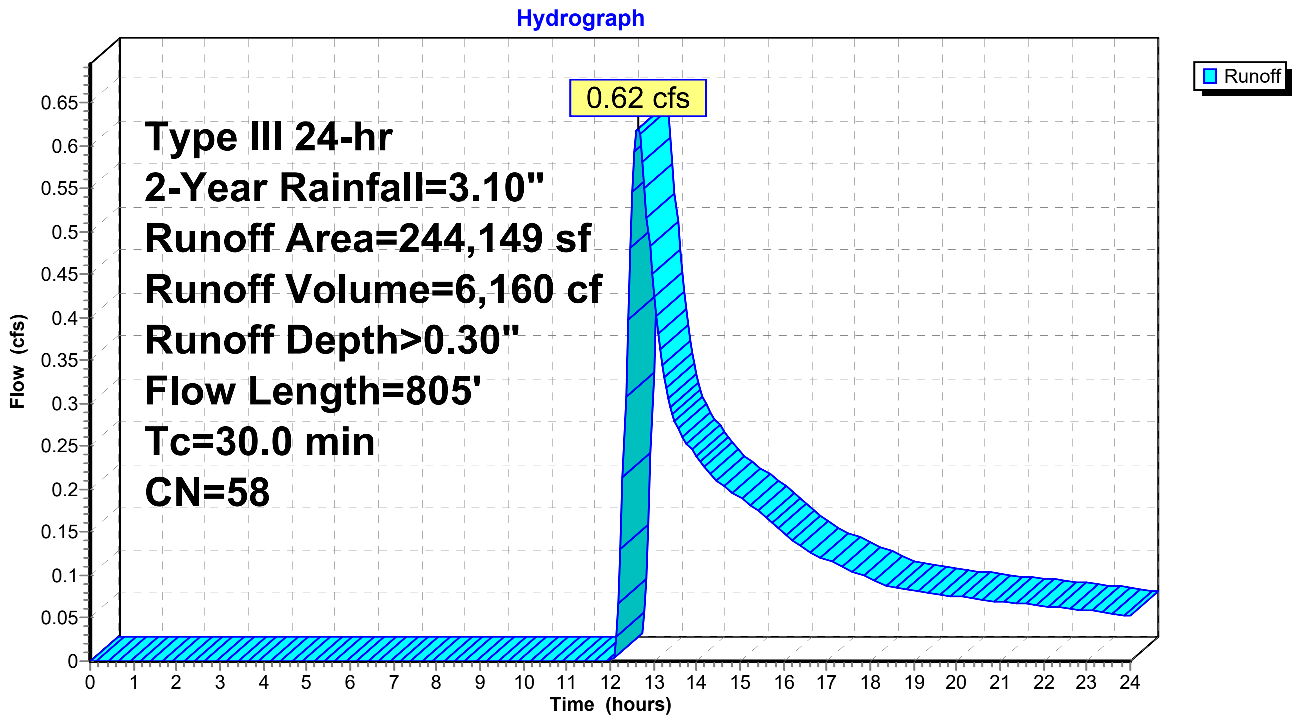
Runoff = 0.62 cfs @ 12.63 hrs, Volume= 6,160 cf, Depth> 0.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.10"

Area (sf)	CN	Description
3,705	96	Gravel surface, HSG A
32,069	30	Brush, Good, HSG A
43,315	30	Woods, Good, HSG A
165,060	70	Woods, Good, HSG C
244,149	58	Weighted Average
244,149		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	50	0.0080	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.2	291	0.0350	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	464	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.0	805	Total			

Subcatchment 100S: Area 100S



Summary for Pond 1: CB1

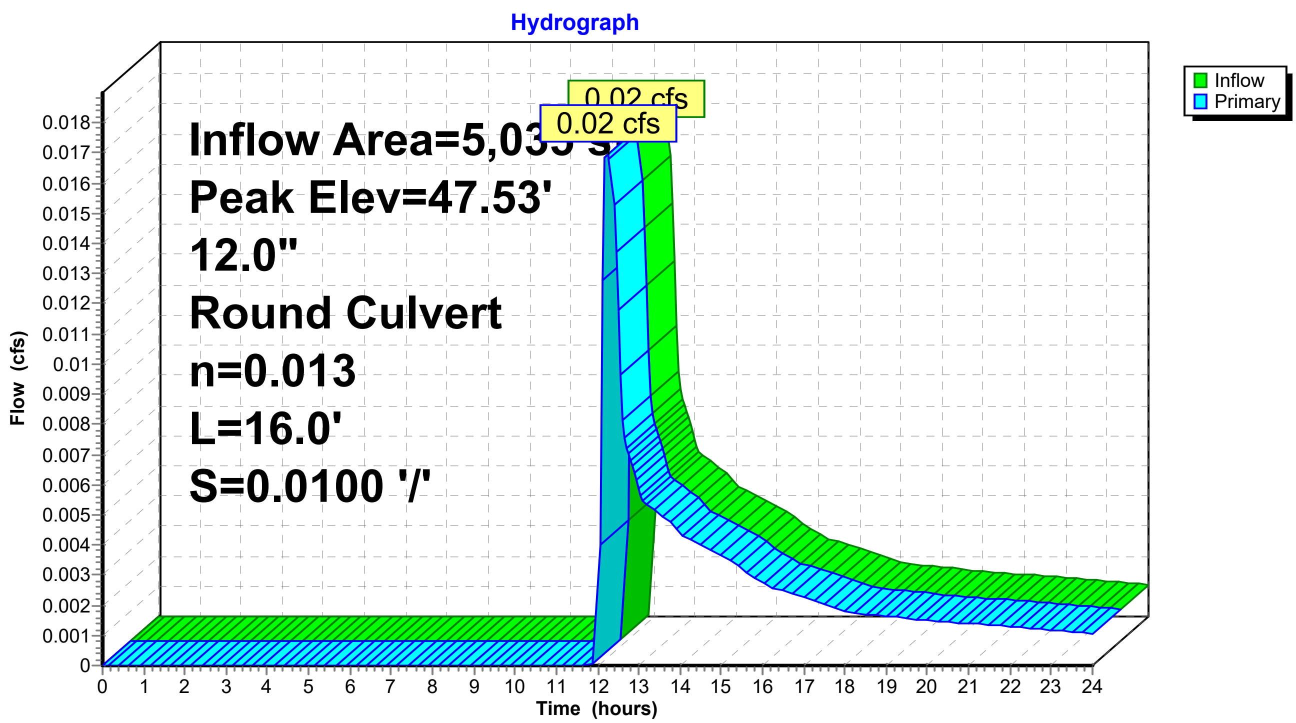
Inflow Area = 5,035 sf, 31.38% Impervious, Inflow Depth > 0.31" for 2-Year event
Inflow = 0.02 cfs @ 12.26 hrs, Volume= 128 cf
Outflow = 0.02 cfs @ 12.26 hrs, Volume= 128 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 12.26 hrs, Volume= 128 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.53' @ 12.26 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.02 cfs @ 12.26 hrs HW=47.53' TW=45.89' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.02 cfs @ 1.13 fps)

Pond 1: CB1



Stage-Area-Storage for Pond 1: CB1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0		
48.31	0		
48.36	0		
48.41	0		
48.46	0		
48.51	0		
48.56	0		
48.61	0		
48.66	0		
48.71	0		
48.76	0		
48.81	0		
48.86	0		
48.91	0		
48.96	0		
49.01	0		
49.06	0		
49.11	0		
49.16	0		
49.21	0		
49.26	0		
49.31	0		
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

Summary for Pond 1.1: CB1.1

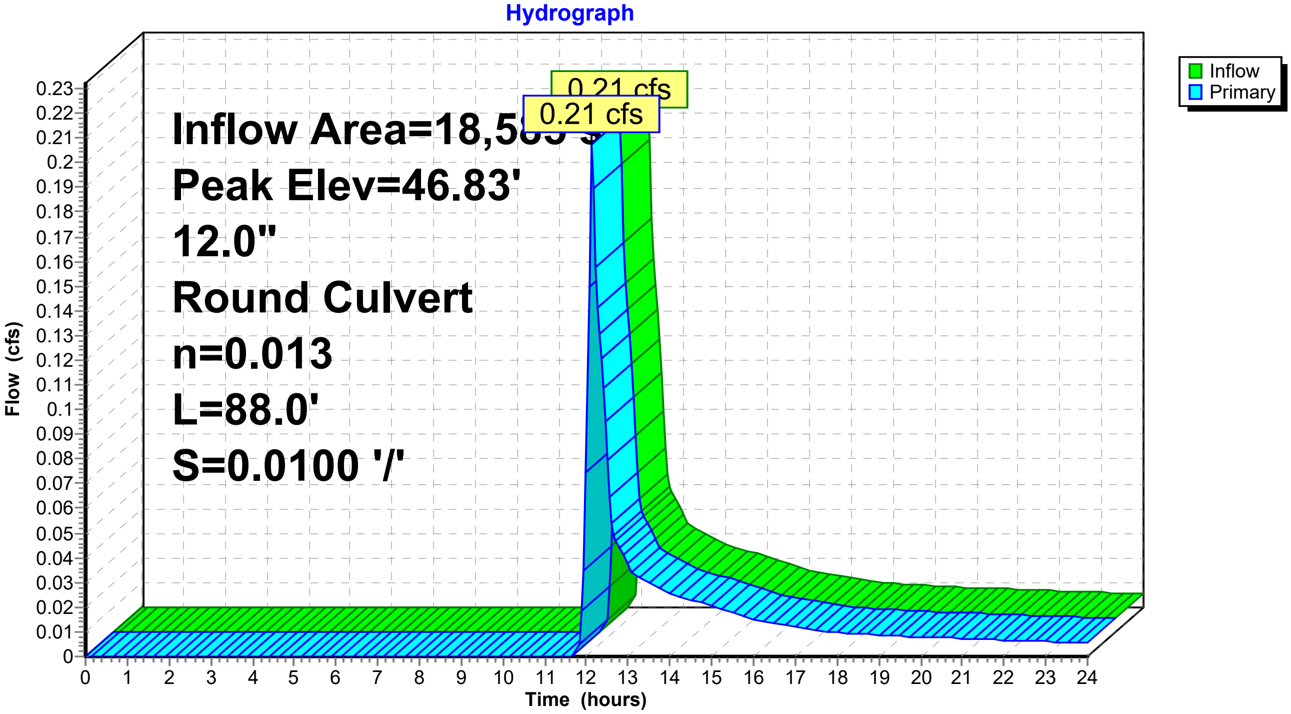
Inflow Area = 18,585 sf, 43.69% Impervious, Inflow Depth > 0.55" for 2-Year event
Inflow = 0.21 cfs @ 12.11 hrs, Volume= 854 cf
Outflow = 0.21 cfs @ 12.11 hrs, Volume= 854 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.21 cfs @ 12.11 hrs, Volume= 854 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.83' @ 12.12 hrs
Flood Elev= 49.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.60'	**12.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.60' / 45.72' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.20 cfs @ 12.11 hrs HW=46.82' TW=45.97' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.20 cfs @ 2.29 fps)

Pond 1.1: CB1.1



Stage-Area-Storage for Pond 1.1: CB1.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
46.60	**0**	49.25	0
46.65	0	49.30	0
46.70	0	49.35	0
46.75	0	49.40	0
46.80	0	49.45	0
46.85	0	49.50	0
46.90	0	49.55	0
46.95	0	49.60	0
47.00	0	49.65	0
47.05	0	49.70	0
47.10	0	49.75	0
47.15	0	49.80	0
47.20	0	49.85	0
47.25	0	49.90	0
47.30	0		
47.35	0		
47.40	0		
47.45	0		
47.50	0		
47.55	0		
47.60	0		
47.65	0		
47.70	0		
47.75	0		
47.80	0		
47.85	0		
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		

Summary for Pond 1P: Cultec 180HD

Inflow Area = 6,480 sf,100.00% Impervious, Inflow Depth > 2.87" for 2-Year event
Inflow = 0.44 cfs @ 12.09 hrs, Volume= 1,548 cf
Outflow = 0.20 cfs @ 12.27 hrs, Volume= 1,551 cf, Atten= 55%, Lag= 10.8 min
Discarded = 0.20 cfs @ 12.27 hrs, Volume= 1,551 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.88' @ 12.27 hrs Surf.Area= 830 sf Storage= 158 cf
Flood Elev= 49.44' Surf.Area= 830 sf Storage= 889 cf

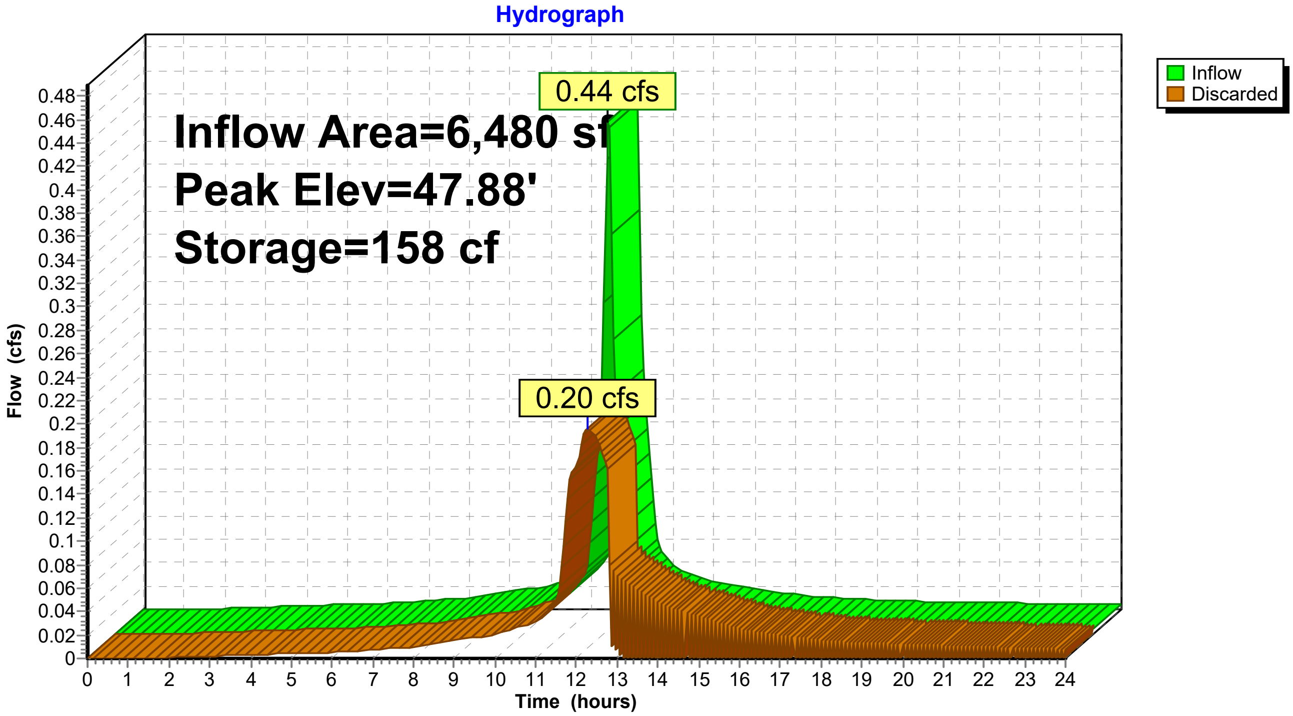
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 3.6 min (760.2 - 756.6)

Volume	Invert	Avail.Storage	Storage Description
#1	47.90'	354 cf	**Cultec C-100HD** x 25 Inside #2 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 5 rows
#2	47.40'	758 cf	**21.00'W x 39.50'L x 2.71'H Prismatoid** 2,248 cf Overall - 354 cf Embedded = 1,894 cf x 40.0% Voids
		1,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	47.40'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 45.40'

Discarded OutFlow Max=0.20 cfs @ 12.27 hrs HW=47.87' (Free Discharge)
└─**1=Exfiltration** (Controls 0.20 cfs)

Pond 1P: Cultec 180HD



Stage-Area-Storage for Pond 1P: Cultec 180HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.40	**830**	0
47.45	830	17
47.50	830	33
47.55	830	50
47.60	830	66
47.65	830	83
47.70	830	100
47.75	830	116
47.80	830	133
47.85	830	149
47.90	830	166
47.95	830	198
48.00	830	229
48.05	830	260
48.10	830	290
48.15	830	321
48.20	830	351
48.25	830	381
48.30	830	411
48.35	830	440
48.40	830	469
48.45	830	498
48.50	830	526
48.55	830	553
48.60	830	580
48.65	830	605
48.70	830	630
48.75	830	653
48.80	830	674
48.85	830	693
48.90	830	710
48.95	830	727
49.00	830	743
49.05	830	760
49.10	830	776
49.15	830	793
49.20	830	809
49.25	830	826
49.30	830	843
49.35	830	859
49.40	830	876
49.45	830	892
49.50	830	909
49.55	830	926
49.60	830	942
49.65	830	959
49.70	830	975
49.75	830	992
49.80	830	1,009
49.85	830	1,025
49.90	830	1,042
49.95	830	1,058
50.00	830	1,075
50.05	830	1,091
50.10	830	**1,108**

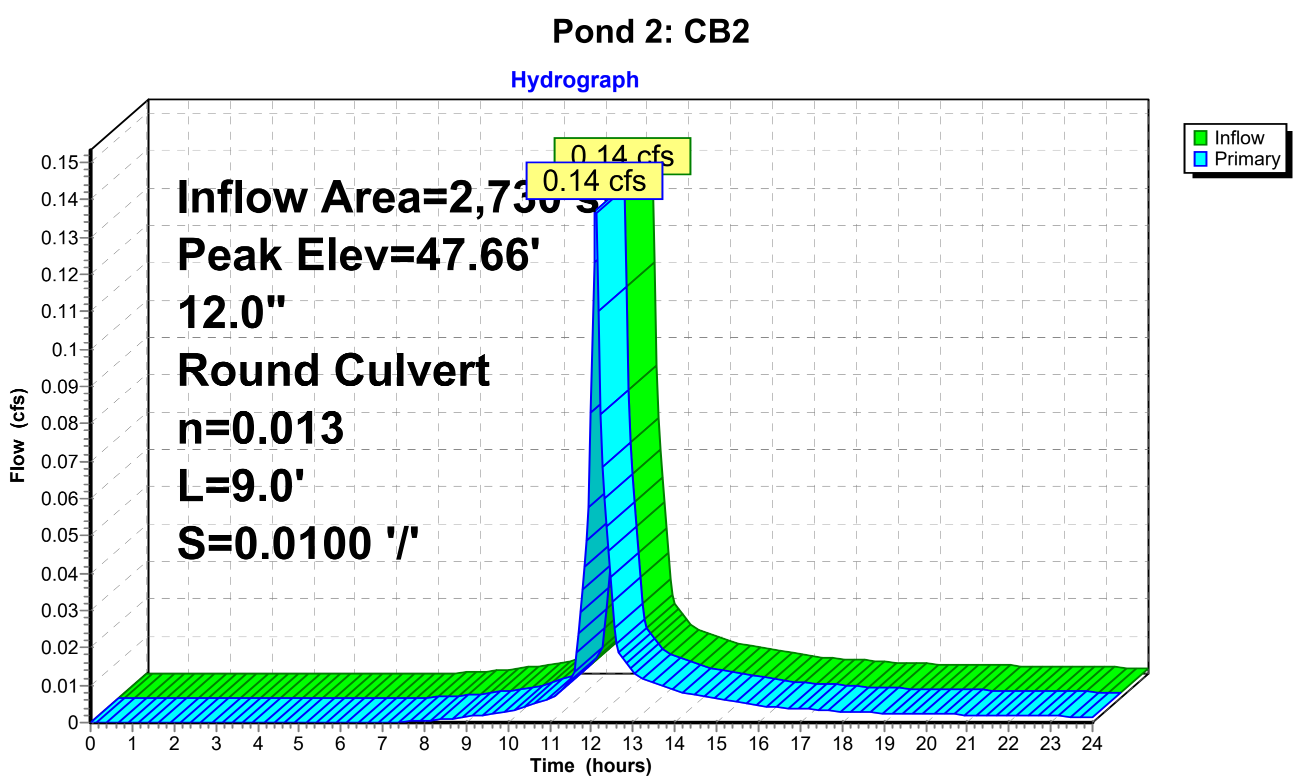
Summary for Pond 2: CB2

Inflow Area =	2,730 sf, 83.15% Impervious,	Inflow Depth > 1.91"	for 2-Year event
Inflow =	0.14 cfs @ 12.09 hrs, Volume=	434 cf	
Outflow =	0.14 cfs @ 12.09 hrs, Volume=	434 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.14 cfs @ 12.09 hrs, Volume=	434 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.66' @ 12.09 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.37' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.13 cfs @ 12.09 hrs HW=47.66' TW=45.97' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.13 cfs @ 1.86 fps)



Stage-Area-Storage for Pond 2: CB2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0		
48.31	0		
48.36	0		
48.41	0		
48.46	0		
48.51	0		
48.56	0		
48.61	0		
48.66	0		
48.71	0		
48.76	0		
48.81	0		
48.86	0		
48.91	0		
48.96	0		
49.01	0		
49.06	0		
49.11	0		
49.16	0		
49.21	0		
49.26	0		
49.31	0		
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

Summary for Pond 2P: Shea Leaching chambers

Inflow Area = 157,230 sf, 45.56% Impervious, Inflow Depth > 1.47" for 2-Year event
Inflow = 5.82 cfs @ 12.09 hrs, Volume= 19,289 cf
Outflow = 1.42 cfs @ 12.51 hrs, Volume= 19,297 cf, Atten= 76%, Lag= 24.8 min
Discarded = 1.42 cfs @ 12.51 hrs, Volume= 19,297 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 41.02' @ 12.51 hrs Surf.Area= 3,225 sf Storage= 4,854 cf
Flood Elev= 47.17' Surf.Area= 3,225 sf Storage= 19,298 cf

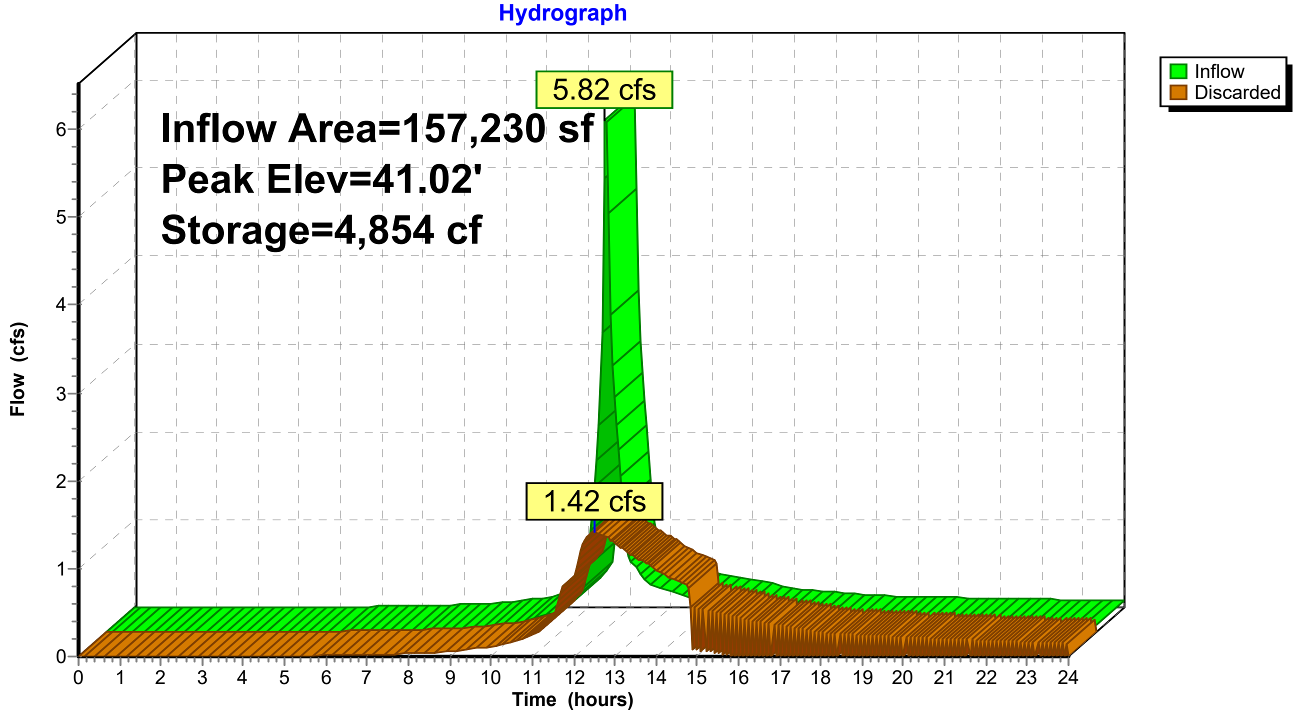
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 23.4 min (845.1 - 821.7)

Volume	Invert	Avail.Storage	Storage Description
#1	39.25'	18,032 cf	**96.0" W x 84.0" H Box Pipe Storage** x 23 Inside #2 L= 14.0' 23,184 cf Overall - 6.0" Wall Thickness = 18,032 cf
#2	38.75'	1,266 cf	**43.00'W x 75.00'L x 8.17'H Prismatoid** 26,348 cf Overall - 23,184 cf Embedded = 3,164 cf x 40.0% Voids
		19,298 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	38.75'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 37.00'

Discarded OutFlow Max=1.42 cfs @ 12.51 hrs HW=41.02' (Free Discharge)
└─**1=Exfiltration** (Controls 1.42 cfs)

Pond 2P: Shea Leaching chambers



Stage-Area-Storage for Pond 2P: Shea Leaching chambers

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
38.75	**3,225**	0	44.05	3,225	13,058
38.85	3,225	13	44.15	3,225	13,329
38.95	3,225	26	44.25	3,225	13,599
39.05	3,225	39	44.35	3,225	13,870
39.15	3,225	52	44.45	3,225	14,141
39.25	3,225	65	44.55	3,225	14,411
39.35	3,225	336	44.65	3,225	14,682
39.45	3,225	607	44.75	3,225	14,953
39.55	3,225	877	44.85	3,225	15,223
39.65	3,225	1,148	44.95	3,225	15,494
39.75	3,225	1,419	45.05	3,225	15,765
39.85	3,225	1,689	45.15	3,225	16,036
39.95	3,225	1,960	45.25	3,225	16,306
40.05	3,225	2,231	45.35	3,225	16,577
40.15	3,225	2,502	45.45	3,225	16,848
40.25	3,225	2,772	45.55	3,225	17,118
40.35	3,225	3,043	45.65	3,225	17,389
40.45	3,225	3,314	45.75	3,225	17,660
40.55	3,225	3,584	45.85	3,225	17,930
40.65	3,225	3,855	45.95	3,225	18,201
40.75	3,225	4,126	46.05	3,225	18,472
40.85	3,225	4,396	46.15	3,225	18,742
40.95	3,225	4,667	46.25	3,225	19,013
41.05	3,225	4,938	46.35	3,225	19,026
41.15	3,225	5,208	46.45	3,225	19,039
41.25	3,225	5,479	46.55	3,225	19,052
41.35	3,225	5,750	46.65	3,225	19,065
41.45	3,225	6,020	46.75	3,225	19,078
41.55	3,225	6,291	46.85	3,225	**19,207**
41.65	3,225	6,562	46.95	3,225	**19,298**
41.75	3,225	6,832	47.05	3,225	19,298
41.85	3,225	7,103	47.15	3,225	19,298
41.95	3,225	7,374			
42.05	3,225	7,644			
42.15	3,225	7,915			
42.25	3,225	8,186			
42.35	3,225	8,456			
42.45	3,225	8,727			
42.55	3,225	8,998			
42.65	3,225	9,269			
42.75	3,225	9,539			
42.85	3,225	9,810			
42.95	3,225	10,081			
43.05	3,225	10,351			
43.15	3,225	10,622			
43.25	3,225	10,893			
43.35	3,225	11,163			
43.45	3,225	11,434			
43.55	3,225	11,705			
43.65	3,225	11,975			
43.75	3,225	12,246			
43.85	3,225	12,517			
43.95	3,225	12,787			

Summary for Pond 3: CB3

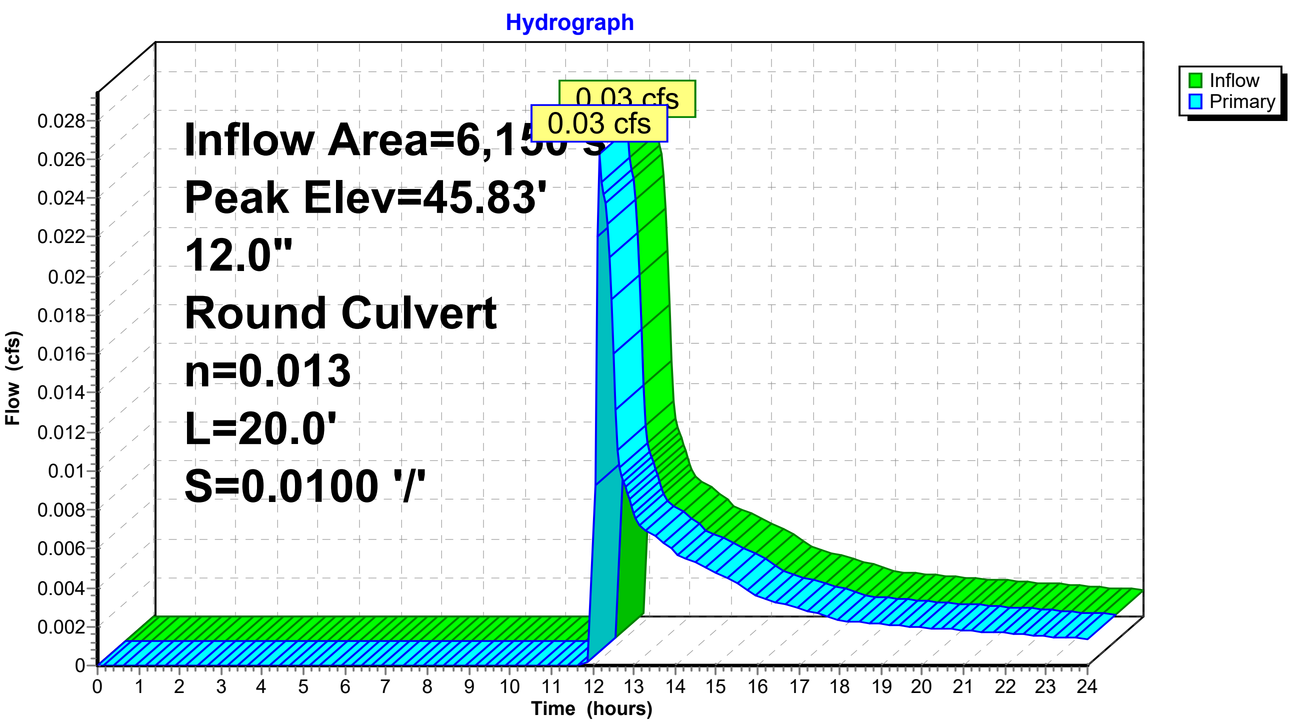
Inflow Area =	6,150 sf,	33.33% Impervious,	Inflow Depth > 0.34"	for 2-Year event
Inflow =	0.03 cfs @	12.16 hrs, Volume=	173 cf	
Outflow =	0.03 cfs @	12.16 hrs, Volume=	173 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.03 cfs @	12.16 hrs, Volume=	173 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.83' @ 12.16 hrs
Flood Elev= 49.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.75'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.75' / 45.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 12.16 hrs HW=45.83' TW=45.20' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.03 cfs @ 1.28 fps)

Pond 3: CB3



Stage-Area-Storage for Pond 3: CB3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.75	**0**	48.40	0
45.80	0	48.45	0
45.85	0	48.50	0
45.90	0	48.55	0
45.95	0	48.60	0
46.00	0	48.65	0
46.05	0	48.70	0
46.10	0	48.75	0
46.15	0	48.80	0
46.20	0	48.85	0
46.25	0	48.90	0
46.30	0	48.95	0
46.35	0	49.00	0
46.40	0	49.05	0
46.45	0	49.10	0
46.50	0	49.15	0
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		
47.05	0		
47.10	0		
47.15	0		
47.20	0		
47.25	0		
47.30	0		
47.35	0		
47.40	0		
47.45	0		
47.50	0		
47.55	0		
47.60	0		
47.65	0		
47.70	0		
47.75	0		
47.80	0		
47.85	0		
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		

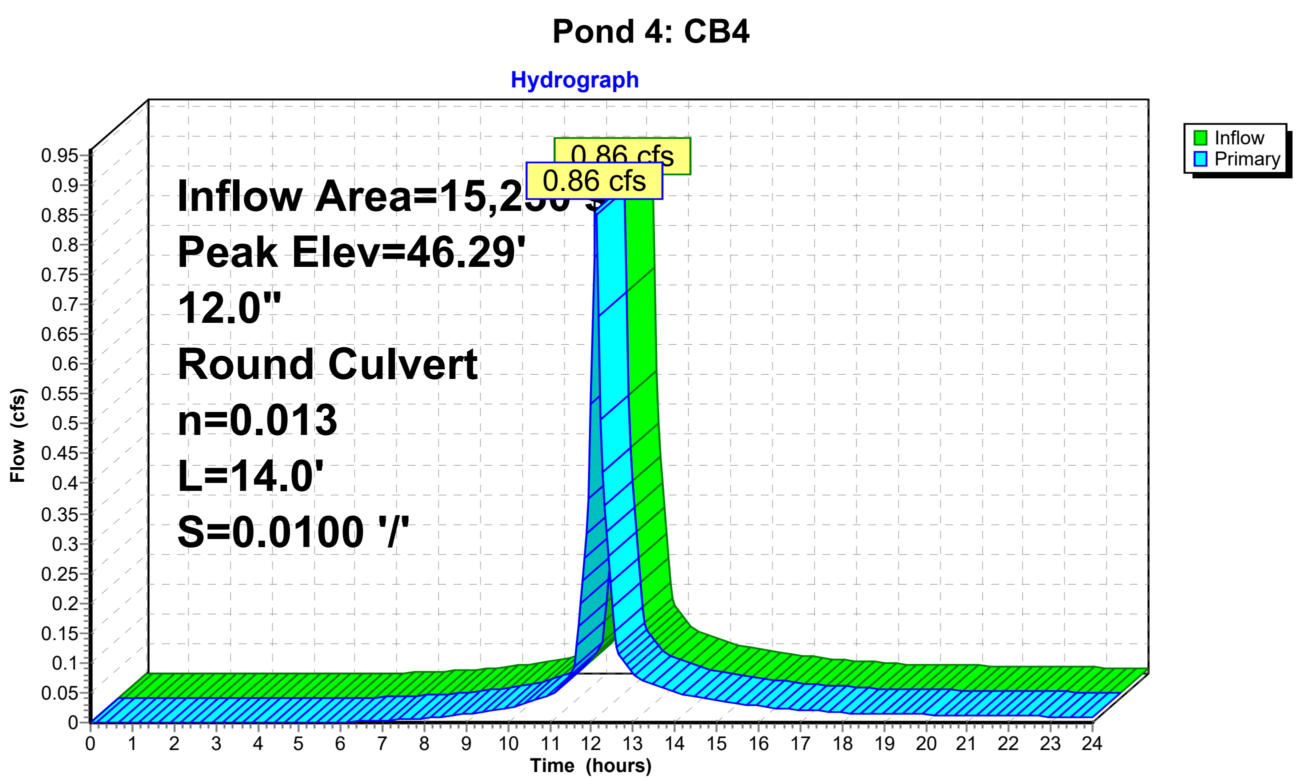
Summary for Pond 4: CB4

Inflow Area =	15,230 sf,	87.72% Impervious,	Inflow Depth > 2.16"	for 2-Year event
Inflow =	0.86 cfs @	12.09 hrs, Volume=	2,745 cf	
Outflow =	0.86 cfs @	12.09 hrs, Volume=	2,745 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.86 cfs @	12.09 hrs, Volume=	2,745 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.29' @ 12.09 hrs
Flood Elev= 49.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.76'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.76' / 45.62' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.84 cfs @ 12.09 hrs HW=46.28' TW=45.28' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.84 cfs @ 2.92 fps)



Stage-Area-Storage for Pond 4: CB4

Elevation (feet)	Storage (cubic-feet)
45.76	**0**
45.81	0
45.86	0
45.91	0
45.96	0
46.01	0
46.06	0
46.11	0
46.16	0
46.21	0
46.26	0
46.31	0
46.36	0
46.41	0
46.46	0
46.51	0
46.56	0
46.61	0
46.66	0
46.71	0
46.76	0
46.81	0
46.86	0
46.91	0
46.96	0
47.01	0
47.06	0
47.11	0
47.16	0
47.21	0
47.26	0
47.31	0
47.36	0
47.41	0
47.46	0
47.51	0
47.56	0
47.61	0
47.66	0
47.71	0
47.76	0
47.81	0
47.86	0
47.91	0
47.96	0
48.01	0
48.06	0
48.11	0
48.16	0
48.21	0
48.26	0
48.31	0
48.36	0

Elevation (feet)	Storage (cubic-feet)
48.41	0
48.46	0
48.51	0
48.56	0
48.61	0
48.66	0
48.71	0
48.76	0
48.81	0
48.86	0
48.91	0
48.96	0
49.01	0
49.06	0
49.11	0
49.16	0

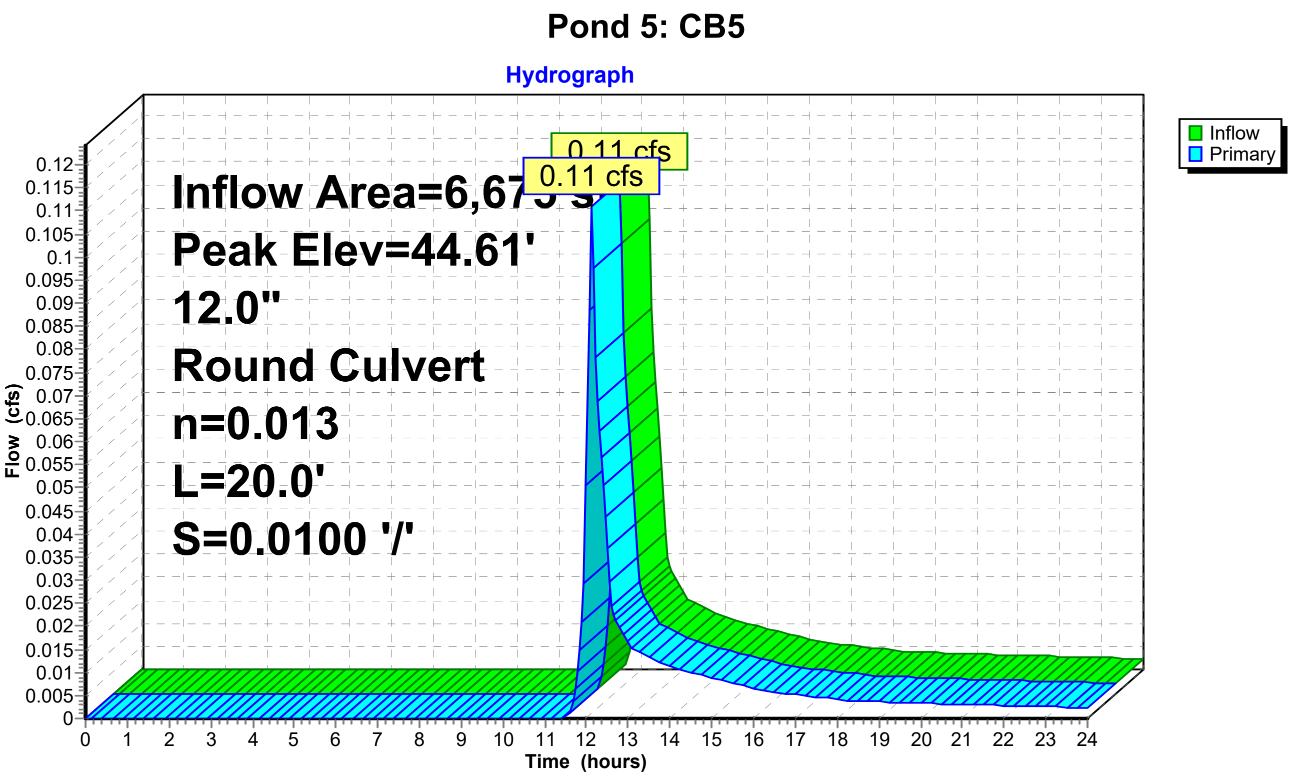
Summary for Pond 5: CB5

Inflow Area = 6,675 sf, 50.86% Impervious, Inflow Depth > 0.72" for 2-Year event
Inflow = 0.11 cfs @ 12.11 hrs, Volume= 402 cf
Outflow = 0.11 cfs @ 12.11 hrs, Volume= 402 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.11 cfs @ 12.11 hrs, Volume= 402 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.61' @ 12.11 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 44.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.10 cfs @ 12.11 hrs HW=44.61' TW=44.51' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.10 cfs @ 1.27 fps)



Stage-Area-Storage for Pond 5: CB5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	47.05	0
44.45	0	47.10	0
44.50	0	47.15	0
44.55	0	47.20	0
44.60	0	47.25	0
44.65	0	47.30	0
44.70	0	47.35	0
44.75	0	47.40	0
44.80	0	47.45	0
44.85	0	47.50	0
44.90	0	47.55	0
44.95	0	47.60	0
45.00	0	47.65	0
45.05	0	47.70	0
45.10	0	47.75	0
45.15	0	47.80	0
45.20	0		
45.25	0		
45.30	0		
45.35	0		
45.40	0		
45.45	0		
45.50	0		
45.55	0		
45.60	0		
45.65	0		
45.70	0		
45.75	0		
45.80	0		
45.85	0		
45.90	0		
45.95	0		
46.00	0		
46.05	0		
46.10	0		
46.15	0		
46.20	0		
46.25	0		
46.30	0		
46.35	0		
46.40	0		
46.45	0		
46.50	0		
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		

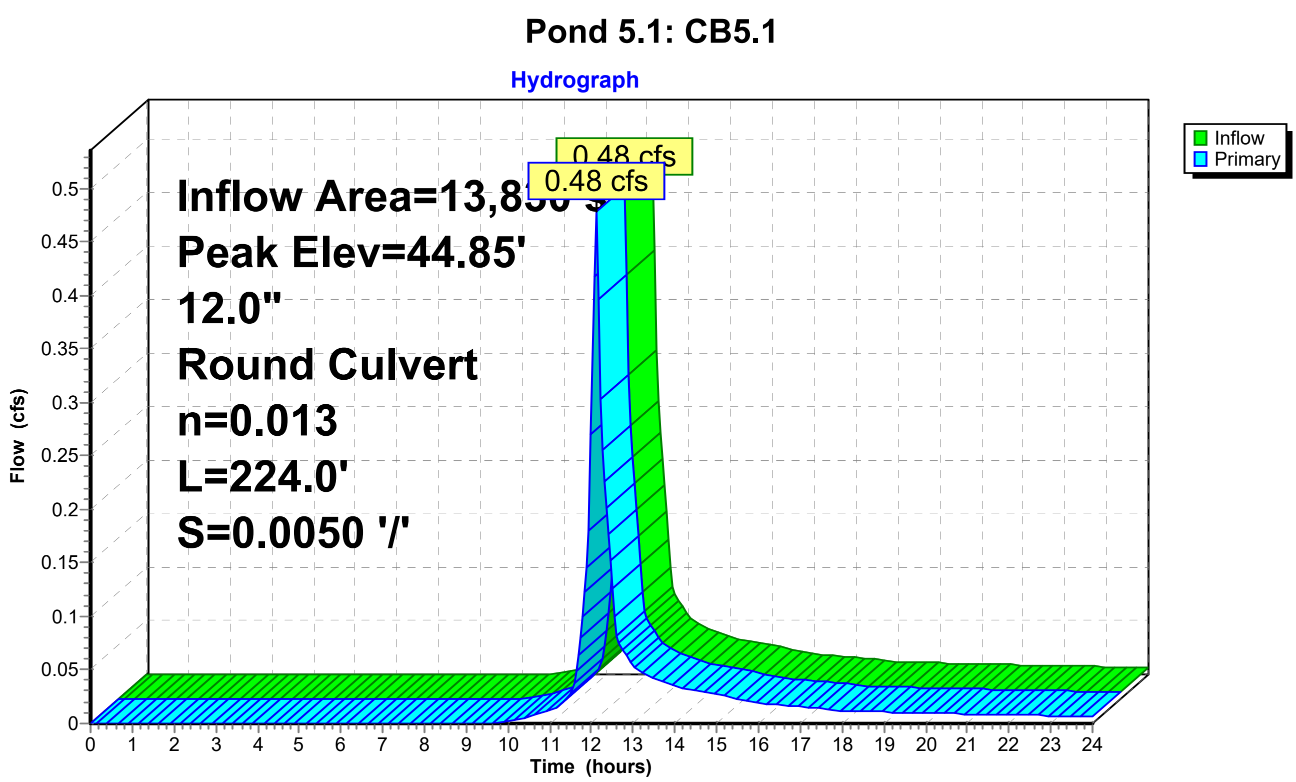
Summary for Pond 5.1: CB5.1

Inflow Area = 13,830 sf, 63.16% Impervious, Inflow Depth > 1.32" for 2-Year event
Inflow = 0.48 cfs @ 12.10 hrs, Volume= 1,526 cf
Outflow = 0.48 cfs @ 12.10 hrs, Volume= 1,526 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.10 hrs, Volume= 1,526 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.85' @ 12.10 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 43.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.47 cfs @ 12.10 hrs HW=44.85' TW=44.08' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.47 cfs @ 2.05 fps)



Stage-Area-Storage for Pond 5.1: CB5.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	47.05	0
44.45	0	47.10	0
44.50	0	47.15	0
44.55	0	47.20	0
44.60	0	47.25	0
44.65	0	47.30	0
44.70	0	47.35	0
44.75	0	47.40	0
44.80	0	47.45	0
44.85	0	47.50	0
44.90	0	47.55	0
44.95	0	47.60	0
45.00	0	47.65	0
45.05	0	47.70	0
45.10	0	47.75	0
45.15	0	47.80	0
45.20	0		
45.25	0		
45.30	0		
45.35	0		
45.40	0		
45.45	0		
45.50	0		
45.55	0		
45.60	0		
45.65	0		
45.70	0		
45.75	0		
45.80	0		
45.85	0		
45.90	0		
45.95	0		
46.00	0		
46.05	0		
46.10	0		
46.15	0		
46.20	0		
46.25	0		
46.30	0		
46.35	0		
46.40	0		
46.45	0		
46.50	0		
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		

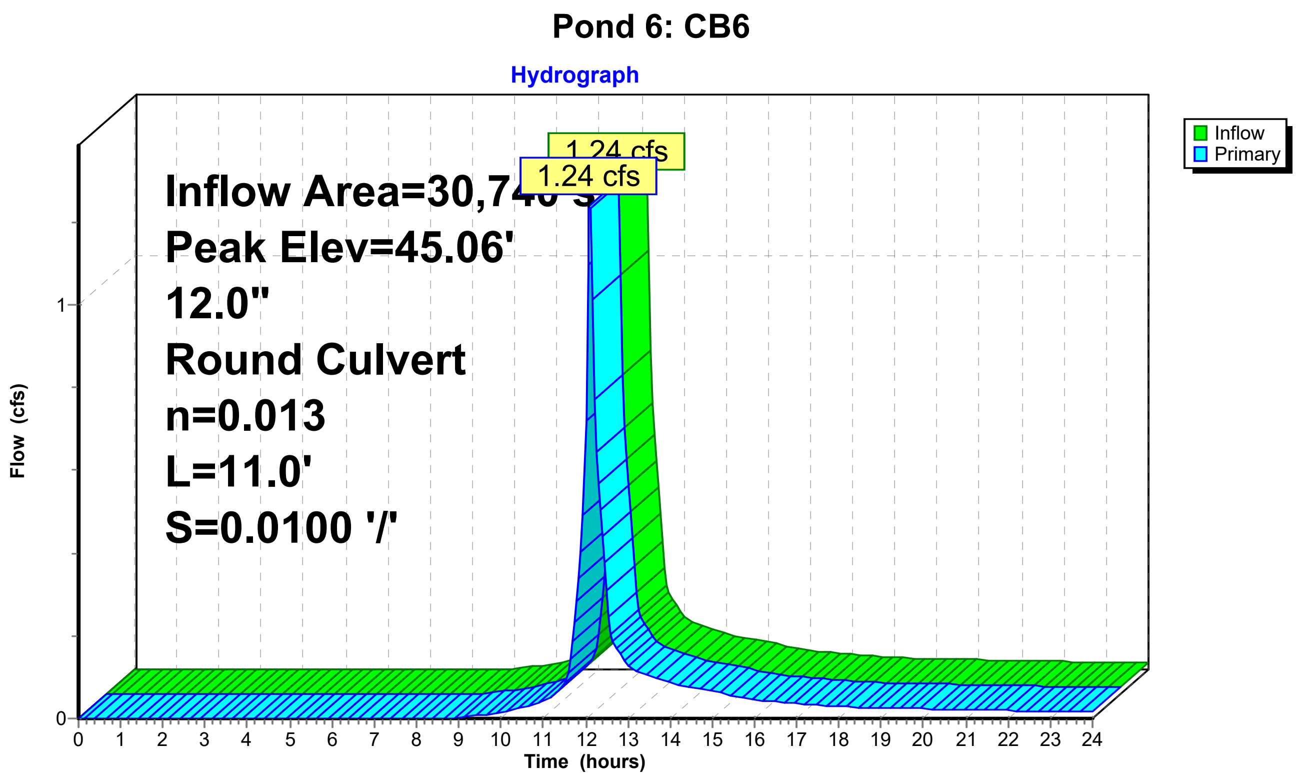
Summary for Pond 6: CB6

Inflow Area =	30,740 sf, 21.05% Impervious,	Inflow Depth > 1.53" for 2-Year event		
Inflow =	1.24 cfs @	12.09 hrs, Volume=	3,909 cf	
Outflow =	1.24 cfs @	12.09 hrs, Volume=	3,909 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.24 cfs @	12.09 hrs, Volume=	3,909 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.06' @ 12.09 hrs
Flood Elev= 47.79'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.39'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.39' / 44.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.22 cfs @ 12.09 hrs HW=45.06' TW=44.52' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.22 cfs @ 3.11 fps)



Stage-Area-Storage for Pond 6: CB6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.39	**0**	47.04	0
44.44	0	47.09	0
44.49	0	47.14	0
44.54	0	47.19	0
44.59	0	47.24	0
44.64	0	47.29	0
44.69	0	47.34	0
44.74	0	47.39	0
44.79	0	47.44	0
44.84	0	47.49	0
44.89	0	47.54	0
44.94	0	47.59	0
44.99	0	47.64	0
45.04	0	47.69	0
45.09	0	47.74	0
45.14	0	47.79	0
45.19	0		
45.24	0		
45.29	0		
45.34	0		
45.39	0		
45.44	0		
45.49	0		
45.54	0		
45.59	0		
45.64	0		
45.69	0		
45.74	0		
45.79	0		
45.84	0		
45.89	0		
45.94	0		
45.99	0		
46.04	0		
46.09	0		
46.14	0		
46.19	0		
46.24	0		
46.29	0		
46.34	0		
46.39	0		
46.44	0		
46.49	0		
46.54	0		
46.59	0		
46.64	0		
46.69	0		
46.74	0		
46.79	0		
46.84	0		
46.89	0		
46.94	0		
46.99	0		

Summary for Pond 7: CB7

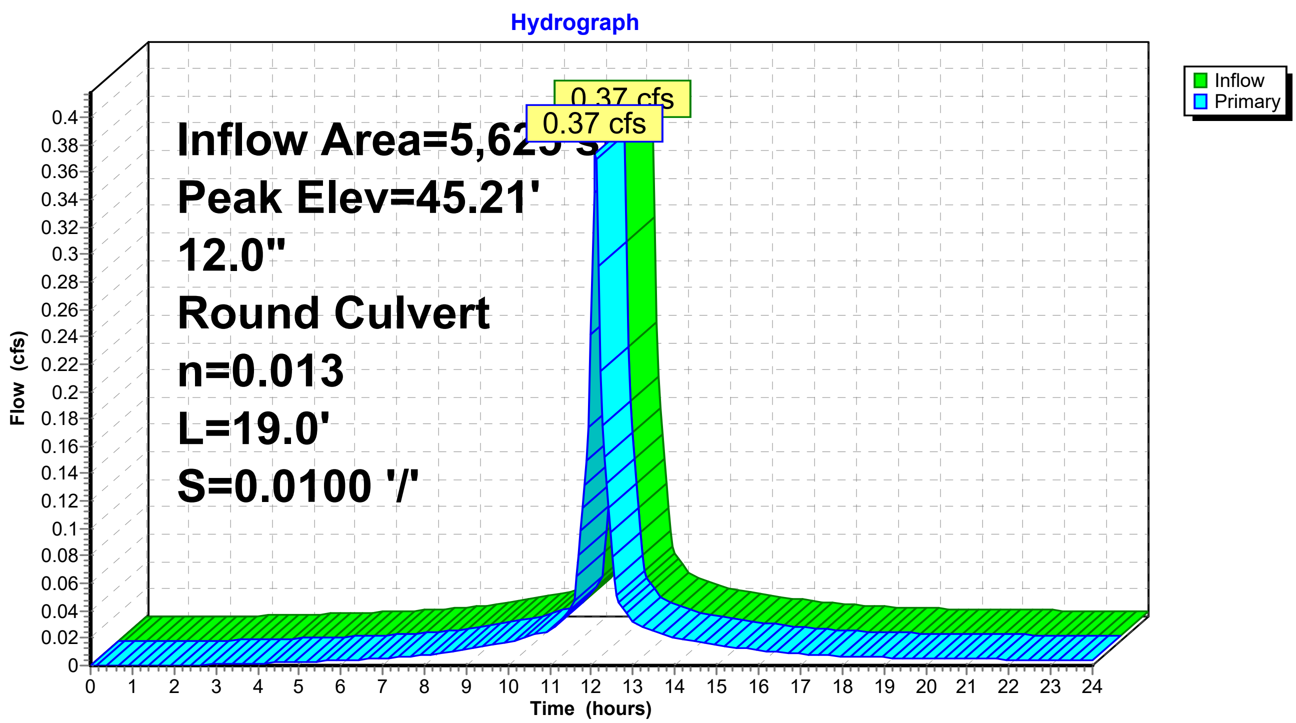
Inflow Area = 5,625 sf, 44.44% Impervious, Inflow Depth > 2.76" for 2-Year event
Inflow = 0.37 cfs @ 12.09 hrs, Volume= 1,292 cf
Outflow = 0.37 cfs @ 12.09 hrs, Volume= 1,292 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.37 cfs @ 12.09 hrs, Volume= 1,292 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.21' @ 12.09 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.69' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.36 cfs @ 12.09 hrs HW=45.20' TW=44.08' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.36 cfs @ 2.50 fps)

Pond 7: CB7



Stage-Area-Storage for Pond 7: CB7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.88	**0**	47.53	0
44.93	0	47.58	0
44.98	0	47.63	0
45.03	0	47.68	0
45.08	0	47.73	0
45.13	0	47.78	0
45.18	0	47.83	0
45.23	0	47.88	0
45.28	0	47.93	0
45.33	0	47.98	0
45.38	0	48.03	0
45.43	0	48.08	0
45.48	0	48.13	0
45.53	0	48.18	0
45.58	0	48.23	0
45.63	0	48.28	0
45.68	0		
45.73	0		
45.78	0		
45.83	0		
45.88	0		
45.93	0		
45.98	0		
46.03	0		
46.08	0		
46.13	0		
46.18	0		
46.23	0		
46.28	0		
46.33	0		
46.38	0		
46.43	0		
46.48	0		
46.53	0		
46.58	0		
46.63	0		
46.68	0		
46.73	0		
46.78	0		
46.83	0		
46.88	0		
46.93	0		
46.98	0		
47.03	0		
47.08	0		
47.13	0		
47.18	0		
47.23	0		
47.28	0		
47.33	0		
47.38	0		
47.43	0		
47.48	0		

Summary for Pond 8: CB8

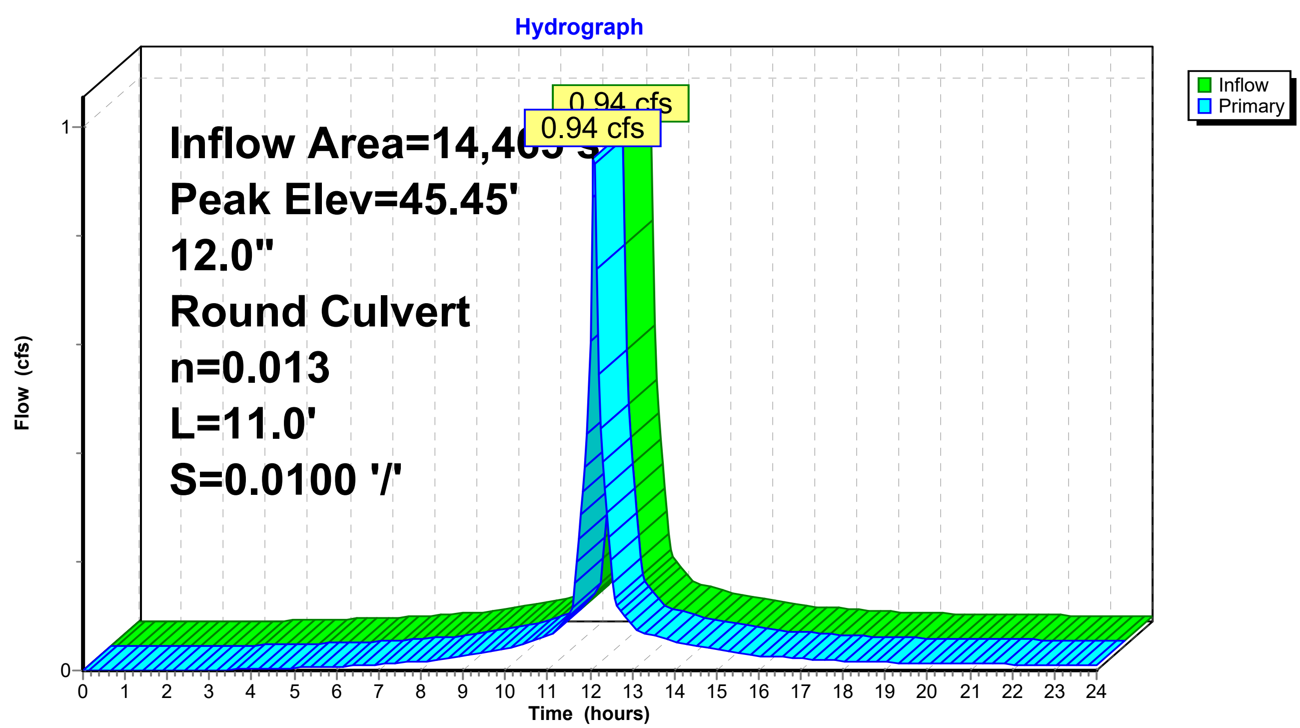
Inflow Area = 14,465 sf, 70.83% Impervious, Inflow Depth > 2.65" for 2-Year event
Inflow = 0.94 cfs @ 12.09 hrs, Volume= 3,193 cf
Outflow = 0.94 cfs @ 12.09 hrs, Volume= 3,193 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.94 cfs @ 12.09 hrs, Volume= 3,193 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.45' @ 12.09 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.77' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.92 cfs @ 12.09 hrs HW=45.44' TW=44.08' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.92 cfs @ 2.91 fps)

Pond 8: CB8



Stage-Area-Storage for Pond 8: CB8

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.88	**0**	47.53	0
44.93	0	47.58	0
44.98	0	47.63	0
45.03	0	47.68	0
45.08	0	47.73	0
45.13	0	47.78	0
45.18	0	47.83	0
45.23	0	47.88	0
45.28	0	47.93	0
45.33	0	47.98	0
45.38	0	48.03	0
45.43	0	48.08	0
45.48	0	48.13	0
45.53	0	48.18	0
45.58	0	48.23	0
45.63	0	48.28	0
45.68	0		
45.73	0		
45.78	0		
45.83	0		
45.88	0		
45.93	0		
45.98	0		
46.03	0		
46.08	0		
46.13	0		
46.18	0		
46.23	0		
46.28	0		
46.33	0		
46.38	0		
46.43	0		
46.48	0		
46.53	0		
46.58	0		
46.63	0		
46.68	0		
46.73	0		
46.78	0		
46.83	0		
46.88	0		
46.93	0		
46.98	0		
47.03	0		
47.08	0		
47.13	0		
47.18	0		
47.23	0		
47.28	0		
47.33	0		
47.38	0		
47.43	0		
47.48	0		

Summary for Pond 8.1: CB8.1

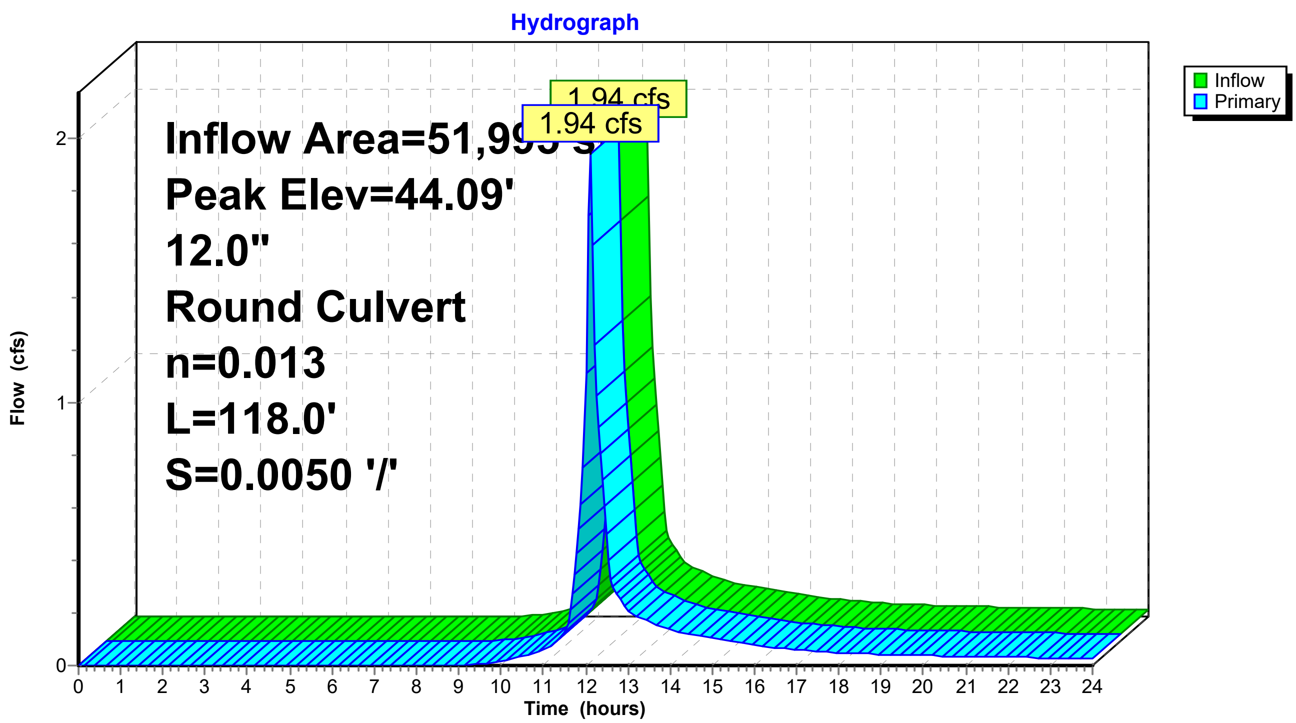
Inflow Area = 51,995 sf, 41.63% Impervious, Inflow Depth > 1.42" for 2-Year event
Inflow = 1.94 cfs @ 12.10 hrs, Volume= 6,159 cf
Outflow = 1.94 cfs @ 12.10 hrs, Volume= 6,159 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.94 cfs @ 12.10 hrs, Volume= 6,159 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.09' @ 12.10 hrs
Flood Elev= 48.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.18'	**12.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.18' / 42.59' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.92 cfs @ 12.10 hrs HW=44.08' TW=43.22' (Dynamic Tailwater)
└1=Culvert (Barrel Controls 1.92 cfs @ 3.41 fps)

Pond 8.1: CB8.1



Stage-Area-Storage for Pond 8.1: CB8.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.18	**0**	45.30	0	47.42	0
43.22	0	45.34	0	47.46	0
43.26	0	45.38	0	47.50	0
43.30	0	45.42	0	47.54	0
43.34	0	45.46	0	47.58	0
43.38	0	45.50	0	47.62	0
43.42	0	45.54	0	47.66	0
43.46	0	45.58	0	47.70	0
43.50	0	45.62	0	47.74	0
43.54	0	45.66	0	47.78	0
43.58	0	45.70	0	47.82	0
43.62	0	45.74	0	47.86	0
43.66	0	45.78	0	47.90	0
43.70	0	45.82	0	47.94	0
43.74	0	45.86	0	47.98	0
43.78	0	45.90	0	48.02	0
43.82	0	45.94	0	48.06	0
43.86	0	45.98	0	48.10	0
43.90	0	46.02	0	48.14	0
43.94	0	46.06	0	48.18	0
43.98	0	46.10	0		
44.02	0	46.14	0		
44.06	0	46.18	0		
44.10	0	46.22	0		
44.14	0	46.26	0		
44.18	0	46.30	0		
44.22	0	46.34	0		
44.26	0	46.38	0		
44.30	0	46.42	0		
44.34	0	46.46	0		
44.38	0	46.50	0		
44.42	0	46.54	0		
44.46	0	46.58	0		
44.50	0	46.62	0		
44.54	0	46.66	0		
44.58	0	46.70	0		
44.62	0	46.74	0		
44.66	0	46.78	0		
44.70	0	46.82	0		
44.74	0	46.86	0		
44.78	0	46.90	0		
44.82	0	46.94	0		
44.86	0	46.98	0		
44.90	0	47.02	0		
44.94	0	47.06	0		
44.98	0	47.10	0		
45.02	0	47.14	0		
45.06	0	47.18	0		
45.10	0	47.22	0		
45.14	0	47.26	0		
45.18	0	47.30	0		
45.22	0	47.34	0		
45.26	0	47.38	0		

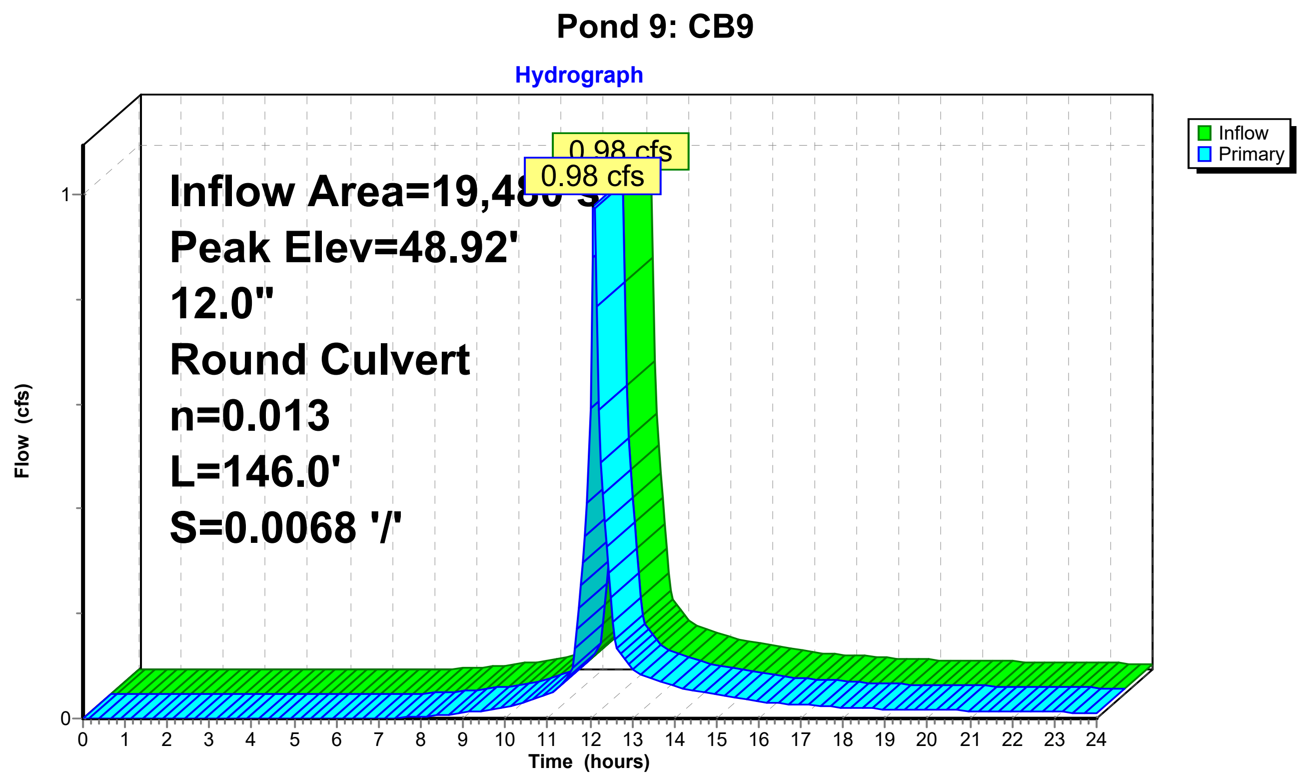
Summary for Pond 9: CB9

Inflow Area =	19,480 sf,	3.08% Impervious,	Inflow Depth > 1.91"	for 2-Year event	
Inflow =	0.98 cfs @	12.09 hrs,	Volume=	3,094 cf	
Outflow =	0.98 cfs @	12.09 hrs,	Volume=	3,094 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.98 cfs @	12.09 hrs,	Volume=	3,094 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.92' @ 12.10 hrs
Flood Elev= 50.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.30'	**12.0" Round Culvert** L= 146.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.30' / 47.30' S= 0.0068 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.93 cfs @ 12.09 hrs HW=48.91' TW=48.20' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.93 cfs @ 2.65 fps)



Stage-Area-Storage for Pond 9: CB9

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
48.30	**0**	49.36	0	50.42	0
48.32	0	49.38	0	50.44	0
48.34	0	49.40	0	50.46	0
48.36	0	49.42	0	50.48	0
48.38	0	49.44	0	50.50	0
48.40	0	49.46	0	50.52	0
48.42	0	49.48	0	50.54	0
48.44	0	49.50	0	50.56	0
48.46	0	49.52	0	50.58	0
48.48	0	49.54	0	50.60	0
48.50	0	49.56	0	50.62	0
48.52	0	49.58	0	50.64	0
48.54	0	49.60	0	50.66	0
48.56	0	49.62	0	50.68	0
48.58	0	49.64	0	50.70	0
48.60	0	49.66	0	50.72	0
48.62	0	49.68	0	50.74	0
48.64	0	49.70	0	50.76	0
48.66	0	49.72	0	50.78	0
48.68	0	49.74	0	50.80	0
48.70	0	49.76	0		
48.72	0	49.78	0		
48.74	0	49.80	0		
48.76	0	49.82	0		
48.78	0	49.84	0		
48.80	0	49.86	0		
48.82	0	49.88	0		
48.84	0	49.90	0		
48.86	0	49.92	0		
48.88	0	49.94	0		
48.90	0	49.96	0		
48.92	0	49.98	0		
48.94	0	50.00	0		
48.96	0	50.02	0		
48.98	0	50.04	0		
49.00	0	50.06	0		
49.02	0	50.08	0		
49.04	0	50.10	0		
49.06	0	50.12	0		
49.08	0	50.14	0		
49.10	0	50.16	0		
49.12	0	50.18	0		
49.14	0	50.20	0		
49.16	0	50.22	0		
49.18	0	50.24	0		
49.20	0	50.26	0		
49.22	0	50.28	0		
49.24	0	50.30	0		
49.26	0	50.32	0		
49.28	0	50.34	0		
49.30	0	50.36	0		
49.32	0	50.38	0		
49.34	0	50.40	0		

Summary for Pond 10: CB10

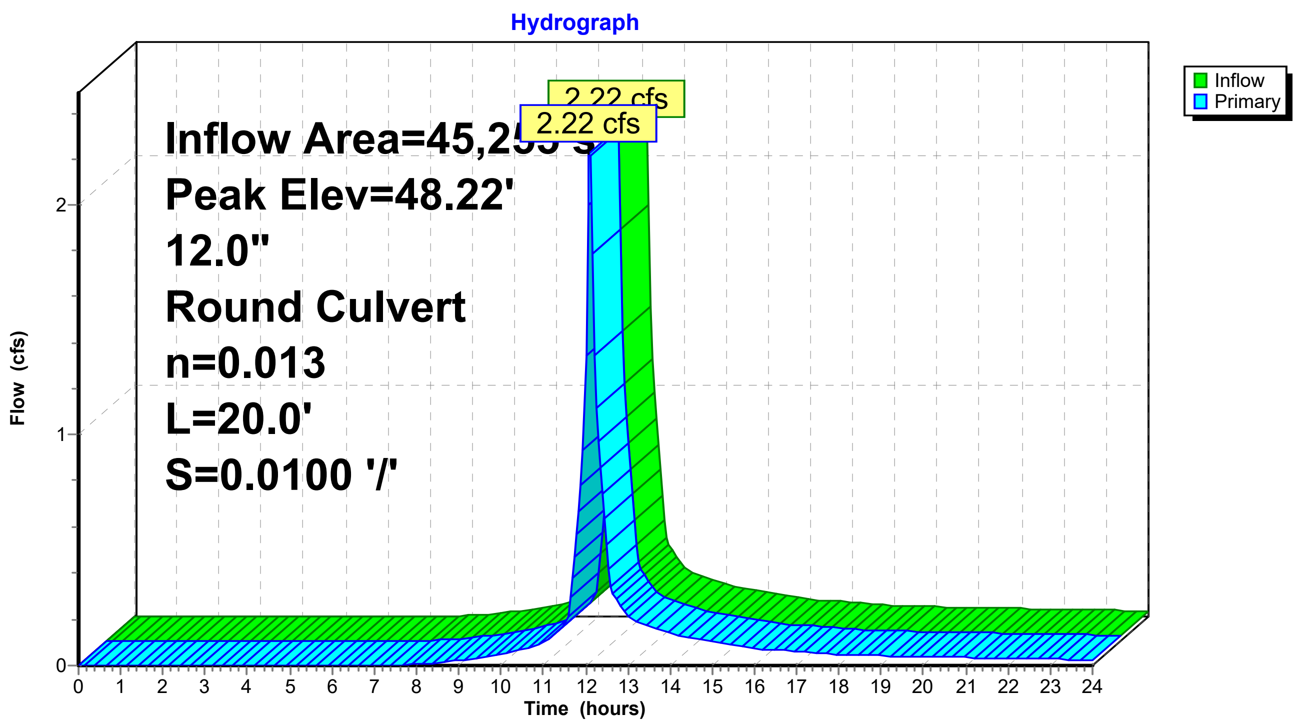
Inflow Area =	45,255 sf,	1.33% Impervious,	Inflow Depth > 1.86"	for 2-Year event	
Inflow =	2.22 cfs @	12.09 hrs,	Volume=	7,014 cf	
Outflow =	2.22 cfs @	12.09 hrs,	Volume=	7,014 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.22 cfs @	12.09 hrs,	Volume=	7,014 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.22' @ 12.09 hrs
Flood Elev= 50.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.20'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.20' / 47.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.17 cfs @ 12.09 hrs HW=48.21' TW=47.84' (Dynamic Tailwater)
1=Culvert (Outlet Controls 2.17 cfs @ 3.42 fps)

Pond 10: CB10



Stage-Area-Storage for Pond 10: CB10

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.20	**0**	49.85	0
47.25	0	49.90	0
47.30	0	49.95	0
47.35	0	50.00	0
47.40	0	50.05	0
47.45	0	50.10	0
47.50	0	50.15	0
47.55	0	50.20	0
47.60	0	50.25	0
47.65	0	50.30	0
47.70	0	50.35	0
47.75	0	50.40	0
47.80	0	50.45	0
47.85	0	50.50	0
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		
49.25	0		
49.30	0		
49.35	0		
49.40	0		
49.45	0		
49.50	0		
49.55	0		
49.60	0		
49.65	0		
49.70	0		
49.75	0		
49.80	0		

Summary for Pond 104P: Inf Area 2

Inflow Area = 100,255 sf, 0.60% Impervious, Inflow Depth > 2.29" for 2-Year event
Inflow = 5.79 cfs @ 12.09 hrs, Volume= 19,154 cf
Outflow = 1.56 cfs @ 12.45 hrs, Volume= 19,192 cf, Atten= 73%, Lag= 21.8 min
Discarded = 1.56 cfs @ 12.45 hrs, Volume= 19,192 cf
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.83' @ 12.45 hrs Surf.Area= 4,886 sf Storage= 4,316 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 16.2 min (806.6 - 790.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	46.50'	4,360 cf	**44.25'W x 110.42'L x 3.50'H Field A** 17,101 cf Overall - 6,202 cf Embedded = 10,899 cf x 40.0% Voids
#2A	47.00'	6,202 cf	**ADS_StormTech SC-740 +Cap** x 135 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 135 Chambers in 9 Rows
		10,561 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 44.50'
#2	Primary	46.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.50' / 44.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	49.20'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	48.20'	**2.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=1.56 cfs @ 12.45 hrs HW=47.83' (Free Discharge)
└─**1=Exfiltration** (Controls 1.56 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=46.50' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Controls 0.00 cfs)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Pond 104P: Inf Area 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

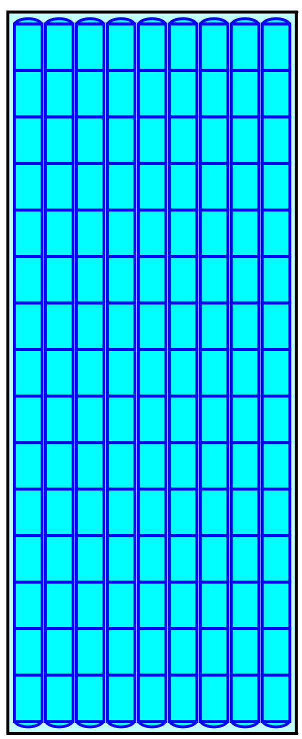
15 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 108.42' Row Length +12.0" End Stone x 2 = 110.42' Base Length
9 Rows x 51.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 44.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

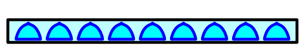
135 Chambers x 45.9 cf = 6,201.9 cf Chamber Storage

17,100.8 cf Field - 6,201.9 cf Chambers = 10,898.9 cf Stone x 40.0% Voids = 4,359.6 cf Stone Storage

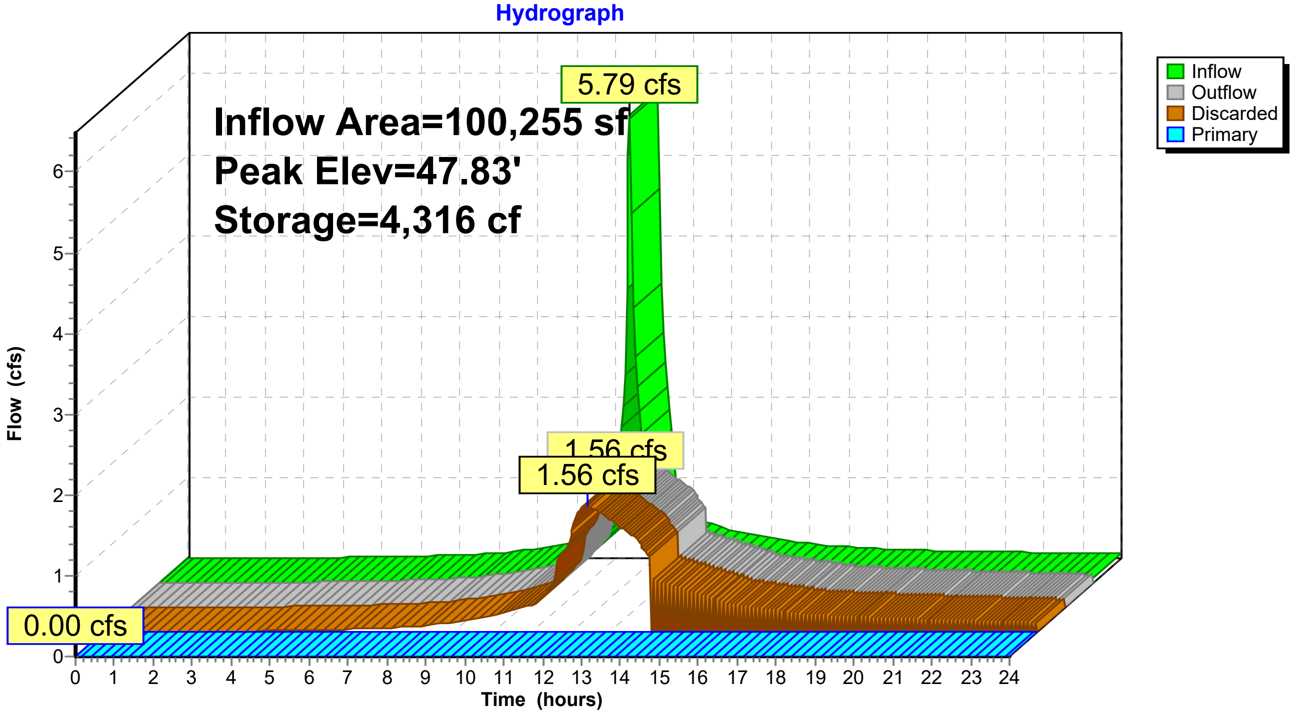
Chamber Storage + Stone Storage = 10,561.5 cf = 0.242 af
Overall Storage Efficiency = 61.8%
Overall System Size = 110.42' x 44.25' x 3.50'

135 Chambers
633.4 cy Field
403.7 cy Stone





Pond 104P: Inf Area 2



Stage-Area-Storage for Pond 104P: Inf Area 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
46.50	**4,886**	0	49.15	4,886	8,797
46.55	4,886	98	49.20	4,886	8,927
46.60	4,886	195	49.25	4,886	9,050
46.65	4,886	293	49.30	4,886	9,167
46.70	4,886	391	49.35	4,886	9,276
46.75	4,886	489	49.40	4,886	9,382
46.80	4,886	586	49.45	4,886	9,485
46.85	4,886	684	49.50	4,886	9,584
46.90	4,886	782	49.55	4,886	9,682
46.95	4,886	879	49.60	4,886	9,780
47.00	4,886	977	49.65	4,886	9,877
47.05	4,886	1,182	49.70	4,886	9,975
47.10	4,886	1,387	49.75	4,886	10,073
47.15	4,886	1,591	49.80	4,886	10,171
47.20	4,886	1,795	49.85	4,886	10,268
47.25	4,886	1,999	49.90	4,886	10,366
47.30	4,886	2,202	49.95	4,886	10,464
47.35	4,886	2,404	50.00	4,886	**10,561**
47.40	4,886	2,605			
47.45	4,886	2,805			
47.50	4,886	3,005			
47.55	4,886	3,204			
47.60	4,886	3,402			
47.65	4,886	3,599			
47.70	4,886	3,795			
47.75	4,886	3,990			
47.80	4,886	4,184			
47.85	4,886	4,376			
47.90	4,886	4,568			
47.95	4,886	4,759			
48.00	4,886	4,948			
48.05	4,886	5,136			
48.10	4,886	5,323			
48.15	4,886	5,509			
48.20	4,886	5,692			
48.25	4,886	5,875			
48.30	4,886	6,056			
48.35	4,886	6,235			
48.40	4,886	6,413			
48.45	4,886	6,588			
48.50	4,886	6,762			
48.55	4,886	6,935			
48.60	4,886	7,105			
48.65	4,886	7,273			
48.70	4,886	7,438			
48.75	4,886	7,601			
48.80	4,886	7,761			
48.85	4,886	7,919			
48.90	4,886	8,074			
48.95	4,886	8,226			
49.00	4,886	8,374			
49.05	4,886	8,519			
49.10	4,886	8,660			

Summary for Pond A: DMH 1

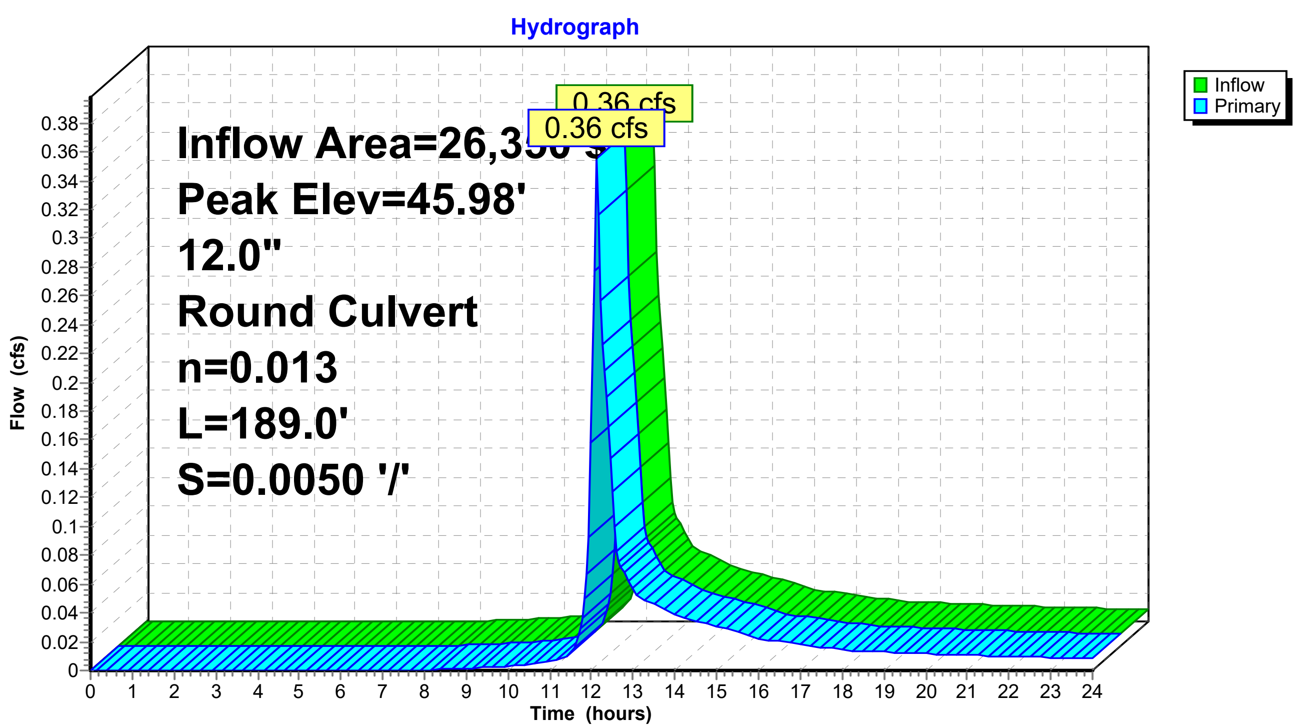
Inflow Area =	26,350 sf,	45.43% Impervious,	Inflow Depth > 0.65"	for 2-Year event
Inflow =	0.36 cfs @	12.11 hrs, Volume=	1,416 cf	
Outflow =	0.36 cfs @	12.11 hrs, Volume=	1,416 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.36 cfs @	12.11 hrs, Volume=	1,416 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.98' @ 12.11 hrs
Flood Elev= 51.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.60'	**12.0" Round Culvert** L= 189.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.60' / 44.66' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.11 hrs HW=45.97' TW=45.29' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.34 cfs @ 1.91 fps)

Pond A: DMH 1



Stage-Area-Storage for Pond A: DMH 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.60	**0**	47.72	0	49.84	0
45.64	0	47.76	0	49.88	0
45.68	0	47.80	0	49.92	0
45.72	0	47.84	0	49.96	0
45.76	0	47.88	0	50.00	0
45.80	0	47.92	0	50.04	0
45.84	0	47.96	0	50.08	0
45.88	0	48.00	0	50.12	0
45.92	0	48.04	0	50.16	0
45.96	0	48.08	0	50.20	0
46.00	0	48.12	0	50.24	0
46.04	0	48.16	0	50.28	0
46.08	0	48.20	0	50.32	0
46.12	0	48.24	0	50.36	0
46.16	0	48.28	0	50.40	0
46.20	0	48.32	0	50.44	0
46.24	0	48.36	0	50.48	0
46.28	0	48.40	0	50.52	0
46.32	0	48.44	0	50.56	0
46.36	0	48.48	0	50.60	0
46.40	0	48.52	0	50.64	0
46.44	0	48.56	0	50.68	0
46.48	0	48.60	0	50.72	0
46.52	0	48.64	0	50.76	0
46.56	0	48.68	0	50.80	0
46.60	0	48.72	0	50.84	0
46.64	0	48.76	0	50.88	0
46.68	0	48.80	0	50.92	0
46.72	0	48.84	0	50.96	0
46.76	0	48.88	0	51.00	0
46.80	0	48.92	0	51.04	0
46.84	0	48.96	0	51.08	0
46.88	0	49.00	0	51.12	0
46.92	0	49.04	0	51.16	0
46.96	0	49.08	0	51.20	0
47.00	0	49.12	0	51.24	0
47.04	0	49.16	0	51.28	0
47.08	0	49.20	0	51.32	0
47.12	0	49.24	0	51.36	0
47.16	0	49.28	0		
47.20	0	49.32	0		
47.24	0	49.36	0		
47.28	0	49.40	0		
47.32	0	49.44	0		
47.36	0	49.48	0		
47.40	0	49.52	0		
47.44	0	49.56	0		
47.48	0	49.60	0		
47.52	0	49.64	0		
47.56	0	49.68	0		
47.60	0	49.72	0		
47.64	0	49.76	0		
47.68	0	49.80	0		

Summary for Pond B: DMH2

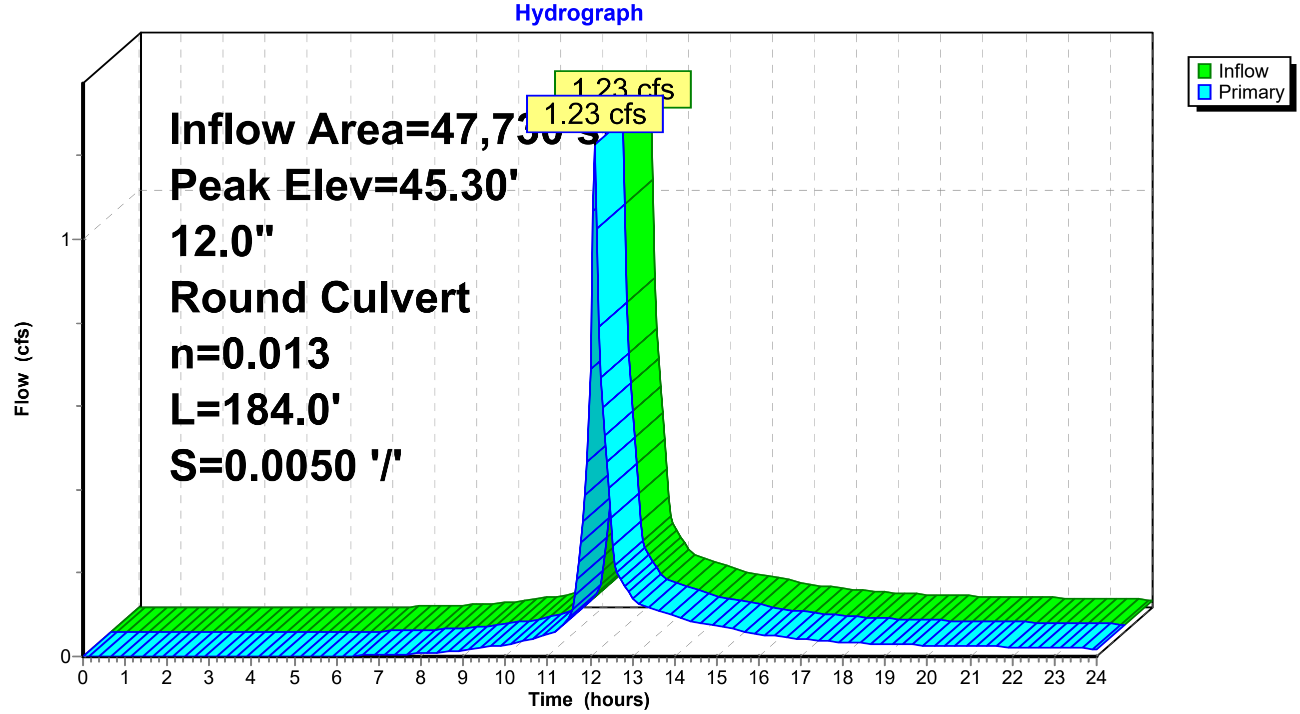
Inflow Area = 47,730 sf, 57.36% Impervious, Inflow Depth > 1.09" for 2-Year event
Inflow = 1.23 cfs @ 12.10 hrs, Volume= 4,334 cf
Outflow = 1.23 cfs @ 12.10 hrs, Volume= 4,334 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.23 cfs @ 12.10 hrs, Volume= 4,334 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.30' @ 12.10 hrs
Flood Elev= 49.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.56'	**12.0" Round Culvert** L= 184.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.56' / 43.64' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.10 hrs HW=45.29' TW=44.52' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.19 cfs @ 2.70 fps)

Pond B: DMH2



Stage-Area-Storage for Pond B: DMH2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.56	**0**	47.21	0
44.61	0	47.26	0
44.66	0	47.31	0
44.71	0	47.36	0
44.76	0	47.41	0
44.81	0	47.46	0
44.86	0	47.51	0
44.91	0	47.56	0
44.96	0	47.61	0
45.01	0	47.66	0
45.06	0	47.71	0
45.11	0	47.76	0
45.16	0	47.81	0
45.21	0	47.86	0
45.26	0	47.91	0
45.31	0	47.96	0
45.36	0	48.01	0
45.41	0	48.06	0
45.46	0	48.11	0
45.51	0	48.16	0
45.56	0	48.21	0
45.61	0	48.26	0
45.66	0	48.31	0
45.71	0	48.36	0
45.76	0	48.41	0
45.81	0	48.46	0
45.86	0	48.51	0
45.91	0	48.56	0
45.96	0	48.61	0
46.01	0	48.66	0
46.06	0	48.71	0
46.11	0	48.76	0
46.16	0	48.81	0
46.21	0	48.86	0
46.26	0	48.91	0
46.31	0	48.96	0
46.36	0	49.01	0
46.41	0	49.06	0
46.46	0	49.11	0
46.51	0	49.16	0
46.56	0	49.21	0
46.61	0	49.26	0
46.66	0	49.31	0
46.71	0	49.36	0
46.76	0	49.41	0
46.81	0	49.46	0
46.86	0		
46.91	0		
46.96	0		
47.01	0		
47.06	0		
47.11	0		
47.16	0		

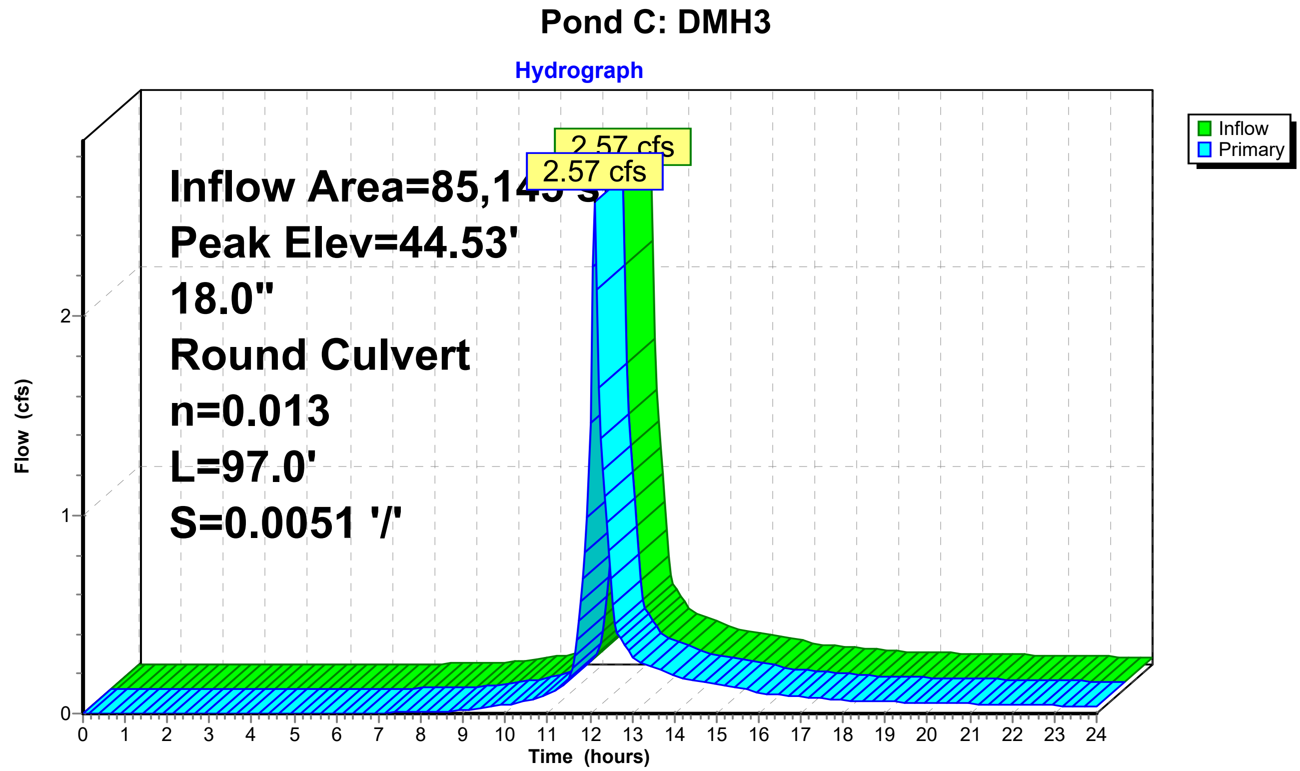
Summary for Pond C: DMH3

Inflow Area = 85,145 sf, 43.74% Impervious, Inflow Depth > 1.22" for 2-Year event
Inflow = 2.57 cfs @ 12.10 hrs, Volume= 8,646 cf
Outflow = 2.57 cfs @ 12.10 hrs, Volume= 8,646 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.57 cfs @ 12.10 hrs, Volume= 8,646 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.53' @ 12.10 hrs
Flood Elev= 48.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.54'	**18.0" Round Culvert** L= 97.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.54' / 43.05' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.48 cfs @ 12.10 hrs HW=44.52' TW=44.09' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 2.48 cfs @ 2.88 fps)



Stage-Area-Storage for Pond C: DMH3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.54	**0**	46.19	0
43.59	0	46.24	0
43.64	0	46.29	0
43.69	0	46.34	0
43.74	0	46.39	0
43.79	0	46.44	0
43.84	0	46.49	0
43.89	0	46.54	0
43.94	0	46.59	0
43.99	0	46.64	0
44.04	0	46.69	0
44.09	0	46.74	0
44.14	0	46.79	0
44.19	0	46.84	0
44.24	0	46.89	0
44.29	0	46.94	0
44.34	0	46.99	0
44.39	0	47.04	0
44.44	0	47.09	0
44.49	0	47.14	0
44.54	0	47.19	0
44.59	0	47.24	0
44.64	0	47.29	0
44.69	0	47.34	0
44.74	0	47.39	0
44.79	0	47.44	0
44.84	0	47.49	0
44.89	0	47.54	0
44.94	0	47.59	0
44.99	0	47.64	0
45.04	0	47.69	0
45.09	0	47.74	0
45.14	0	47.79	0
45.19	0	47.84	0
45.24	0	47.89	0
45.29	0	47.94	0
45.34	0	47.99	0
45.39	0	48.04	0
45.44	0	48.09	0
45.49	0	48.14	0
45.54	0		
45.59	0		
45.64	0		
45.69	0		
45.74	0		
45.79	0		
45.84	0		
45.89	0		
45.94	0		
45.99	0		
46.04	0		
46.09	0		
46.14	0		

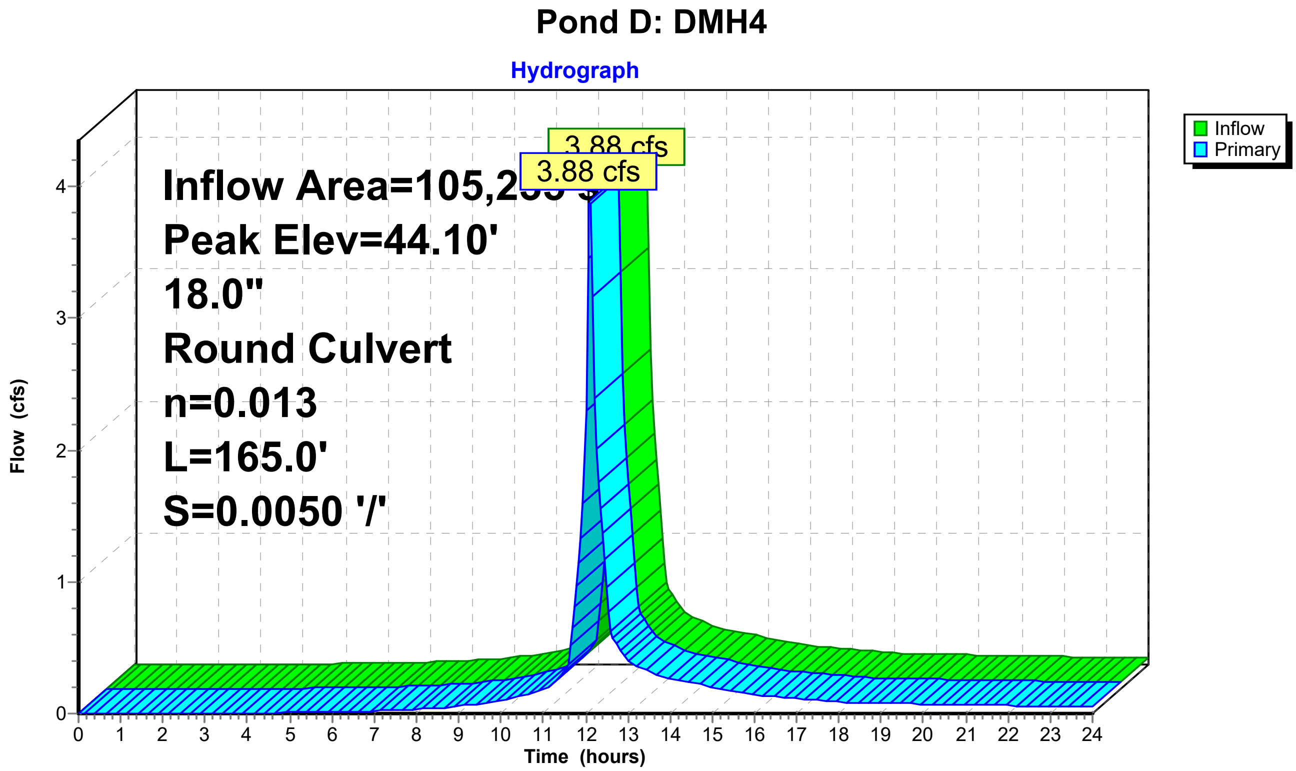
Summary for Pond D: DMH4

Inflow Area =	105,235 sf,	47.50% Impervious,	Inflow Depth > 1.50"	for 2-Year event	
Inflow =	3.88 cfs @	12.09 hrs,	Volume=	13,130 cf	
Outflow =	3.88 cfs @	12.09 hrs,	Volume=	13,130 cf,	Atten= 0%, Lag= 0.0 min
Primary =	3.88 cfs @	12.09 hrs,	Volume=	13,130 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.10' @ 12.10 hrs
Flood Elev= 48.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.95'	**18.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.95' / 42.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.78 cfs @ 12.09 hrs HW=44.09' TW=43.22' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.78 cfs @ 3.64 fps)



Stage-Area-Storage for Pond D: DMH4

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
42.95	**0**	45.07	0	47.19	0
42.99	0	45.11	0	47.23	0
43.03	0	45.15	0	47.27	0
43.07	0	45.19	0	47.31	0
43.11	0	45.23	0	47.35	0
43.15	0	45.27	0	47.39	0
43.19	0	45.31	0	47.43	0
43.23	0	45.35	0	47.47	0
43.27	0	45.39	0	47.51	0
43.31	0	45.43	0	47.55	0
43.35	0	45.47	0	47.59	0
43.39	0	45.51	0	47.63	0
43.43	0	45.55	0	47.67	0
43.47	0	45.59	0	47.71	0
43.51	0	45.63	0	47.75	0
43.55	0	45.67	0	47.79	0
43.59	0	45.71	0	47.83	0
43.63	0	45.75	0	47.87	0
43.67	0	45.79	0	47.91	0
43.71	0	45.83	0	47.95	0
43.75	0	45.87	0	47.99	0
43.79	0	45.91	0	48.03	0
43.83	0	45.95	0	48.07	0
43.87	0	45.99	0	48.11	0
43.91	0	46.03	0	48.15	0
43.95	0	46.07	0	48.19	0
43.99	0	46.11	0	48.23	0
44.03	0	46.15	0	48.27	0
44.07	0	46.19	0	48.31	0
44.11	0	46.23	0	48.35	0
44.15	0	46.27	0	48.39	0
44.19	0	46.31	0	48.43	0
44.23	0	46.35	0	48.47	0
44.27	0	46.39	0		
44.31	0	46.43	0		
44.35	0	46.47	0		
44.39	0	46.51	0		
44.43	0	46.55	0		
44.47	0	46.59	0		
44.51	0	46.63	0		
44.55	0	46.67	0		
44.59	0	46.71	0		
44.63	0	46.75	0		
44.67	0	46.79	0		
44.71	0	46.83	0		
44.75	0	46.87	0		
44.79	0	46.91	0		
44.83	0	46.95	0		
44.87	0	46.99	0		
44.91	0	47.03	0		
44.95	0	47.07	0		
44.99	0	47.11	0		
45.03	0	47.15	0		

Summary for Pond E: DMH5

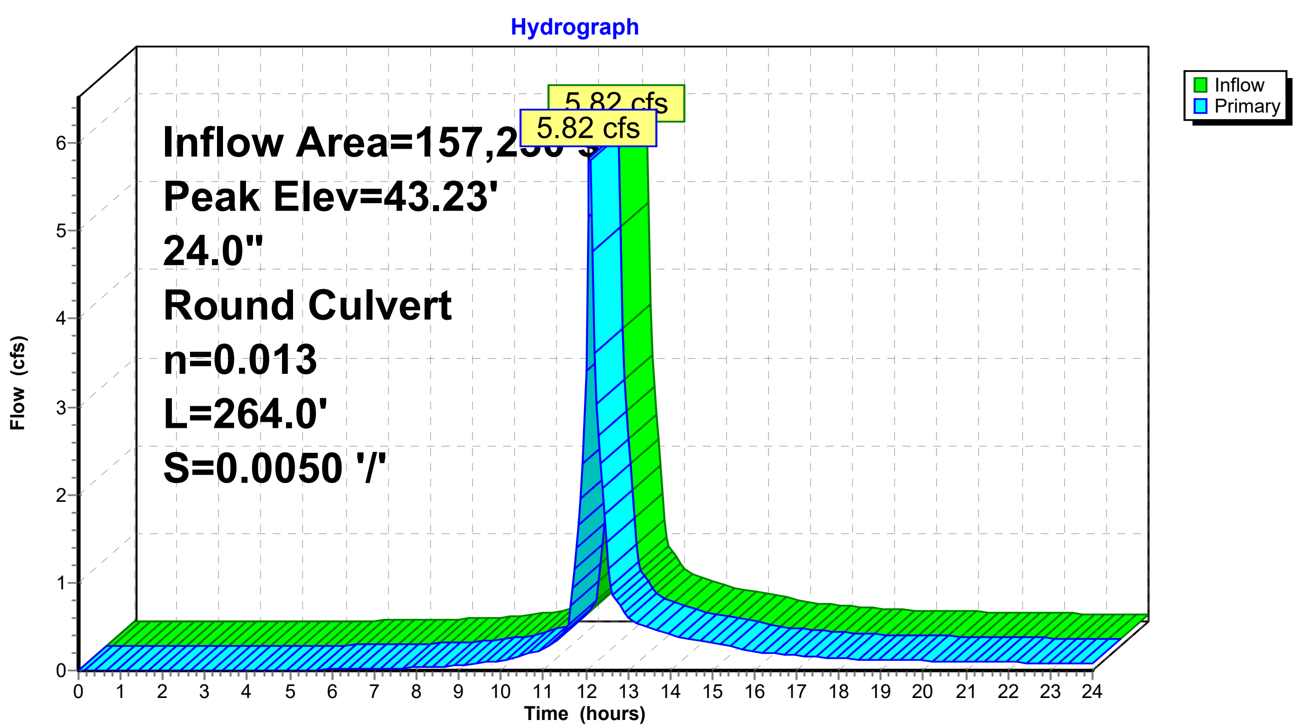
Inflow Area =	157,230 sf,	45.56% Impervious,	Inflow Depth > 1.47"	for 2-Year event	
Inflow =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf	
Outflow =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf,	Atten= 0%, Lag= 0.0 min
Primary =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 43.23' @ 12.09 hrs
Flood Elev= 50.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.03'	**24.0" Round Culvert** L= 264.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.03' / 40.71' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.73 cfs @ 12.09 hrs HW=43.22' TW=41.79' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 5.73 cfs @ 4.23 fps)

Pond E: DMH5



Stage-Area-Storage for Pond E: DMH5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
42.03	**0**	47.33	0
42.13	0	47.43	0
42.23	0	47.53	0
42.33	0	47.63	0
42.43	0	47.73	0
42.53	0	47.83	0
42.63	0	47.93	0
42.73	0	48.03	0
42.83	0	48.13	0
42.93	0	48.23	0
43.03	0	48.33	0
43.13	0	48.43	0
43.23	0	48.53	0
43.33	0	48.63	0
43.43	0	48.73	0
43.53	0	48.83	0
43.63	0	48.93	0
43.73	0	49.03	0
43.83	0	49.13	0
43.93	0	49.23	0
44.03	0	49.33	0
44.13	0	49.43	0
44.23	0	49.53	0
44.33	0	49.63	0
44.43	0	49.73	0
44.53	0	49.83	0
44.63	0	49.93	0
44.73	0	50.03	0
44.83	0	50.13	0
44.93	0		
45.03	0		
45.13	0		
45.23	0		
45.33	0		
45.43	0		
45.53	0		
45.63	0		
45.73	0		
45.83	0		
45.93	0		
46.03	0		
46.13	0		
46.23	0		
46.33	0		
46.43	0		
46.53	0		
46.63	0		
46.73	0		
46.83	0		
46.93	0		
47.03	0		
47.13	0		
47.23	0		

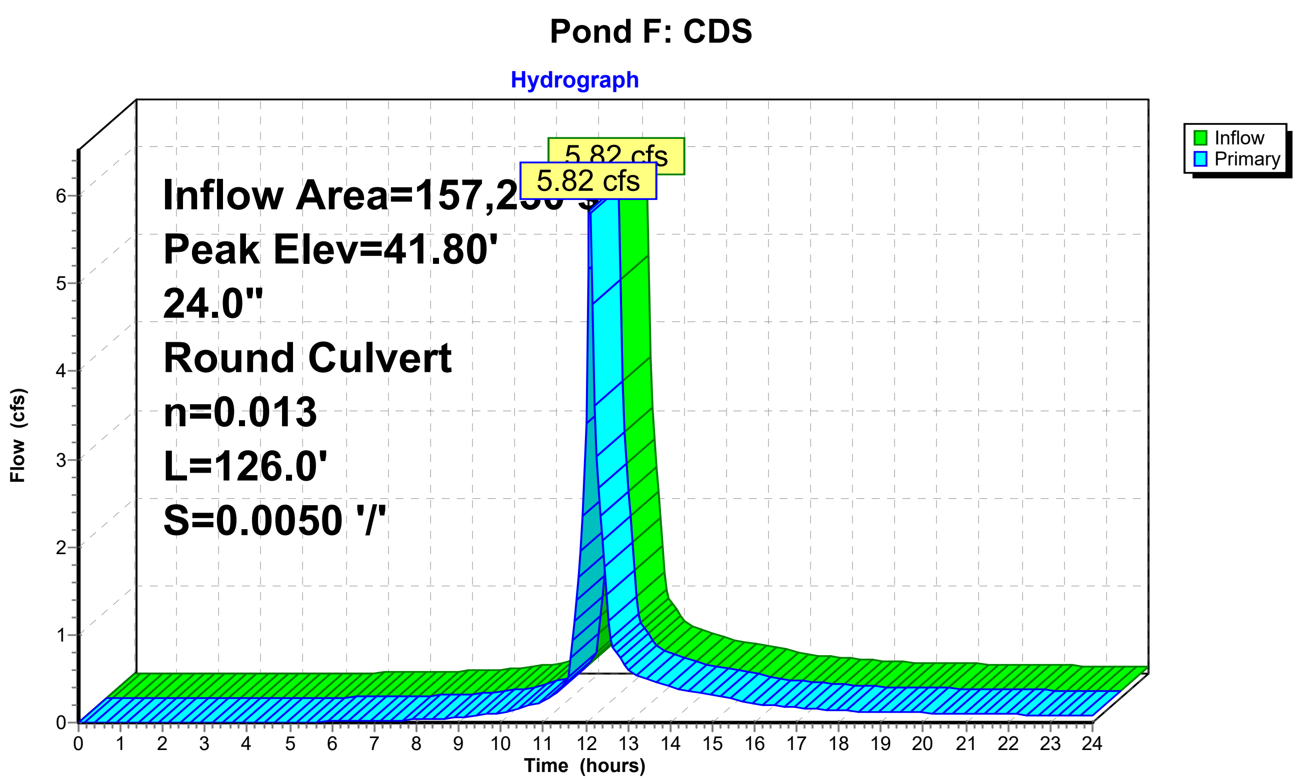
Summary for Pond F: CDS

Inflow Area =	157,230 sf,	45.56% Impervious,	Inflow Depth > 1.47"	for 2-Year event	
Inflow =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf	
Outflow =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf,	Atten= 0%, Lag= 0.0 min
Primary =	5.82 cfs @	12.09 hrs,	Volume=	19,289 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 41.80' @ 12.09 hrs
Flood Elev= 49.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	40.61'	**24.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.61' / 39.98' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=5.73 cfs @ 12.09 hrs HW=41.79' TW=40.10' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 5.73 cfs @ 4.28 fps)



Stage-Area-Storage for Pond F: CDS

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
40.61	**0**	45.91	0
40.71	0	46.01	0
40.81	0	46.11	0
40.91	0	46.21	0
41.01	0	46.31	0
41.11	0	46.41	0
41.21	0	46.51	0
41.31	0	46.61	0
41.41	0	46.71	0
41.51	0	46.81	0
41.61	0	46.91	0
41.71	0	47.01	0
41.81	0	47.11	0
41.91	0	47.21	0
42.01	0	47.31	0
42.11	0	47.41	0
42.21	0	47.51	0
42.31	0	47.61	0
42.41	0	47.71	0
42.51	0	47.81	0
42.61	0	47.91	0
42.71	0	48.01	0
42.81	0	48.11	0
42.91	0	48.21	0
43.01	0	48.31	0
43.11	0	48.41	0
43.21	0	48.51	0
43.31	0	48.61	0
43.41	0	48.71	0
43.51	0	48.81	0
43.61	0	48.91	0
43.71	0		
43.81	0		
43.91	0		
44.01	0		
44.11	0		
44.21	0		
44.31	0		
44.41	0		
44.51	0		
44.61	0		
44.71	0		
44.81	0		
44.91	0		
45.01	0		
45.11	0		
45.21	0		
45.31	0		
45.41	0		
45.51	0		
45.61	0		
45.71	0		
45.81	0		

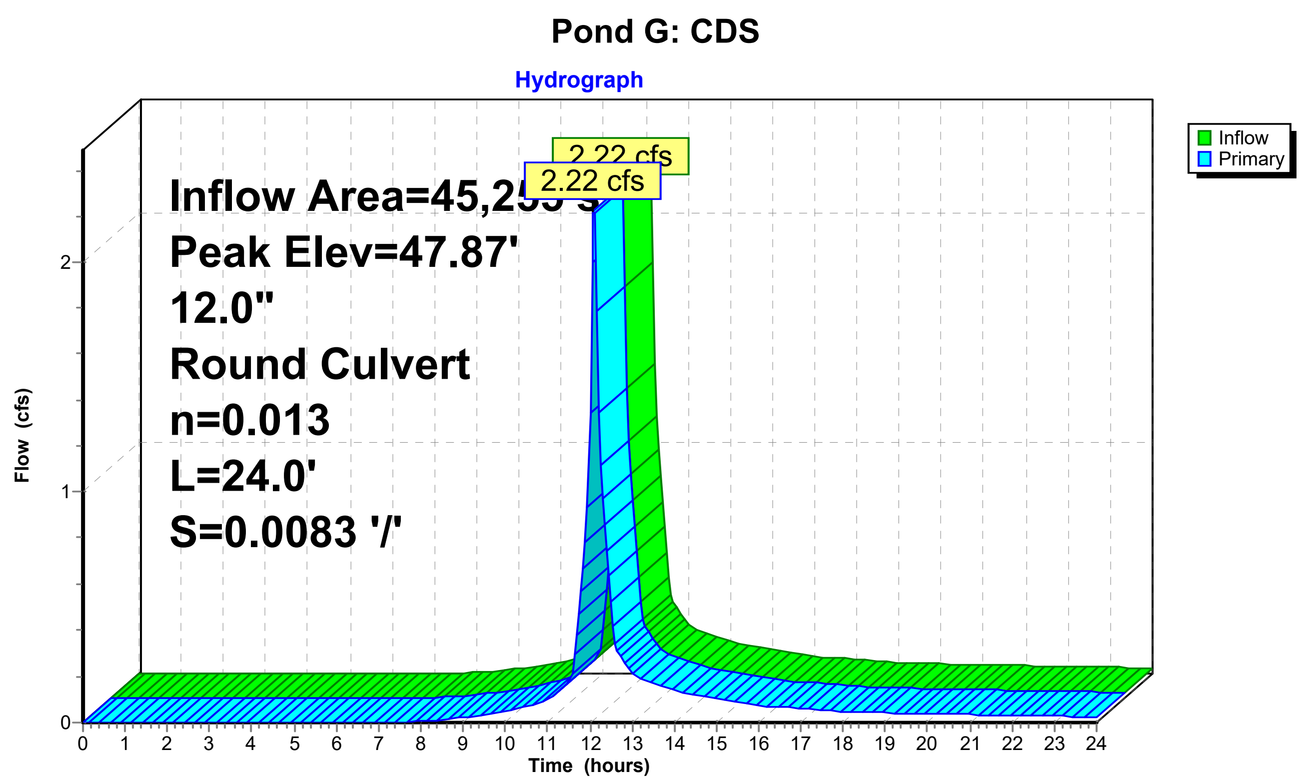
Summary for Pond G: CDS

Inflow Area = 45,255 sf, 1.33% Impervious, Inflow Depth > 1.86" for 2-Year event
Inflow = 2.22 cfs @ 12.09 hrs, Volume= 7,014 cf
Outflow = 2.22 cfs @ 12.09 hrs, Volume= 7,014 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.22 cfs @ 12.09 hrs, Volume= 7,014 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.87' @ 12.40 hrs
Flood Elev= 50.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.90'	**12.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.90' / 46.70' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.17 cfs @ 12.09 hrs HW=47.84' TW=47.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 2.17 cfs @ 3.66 fps)



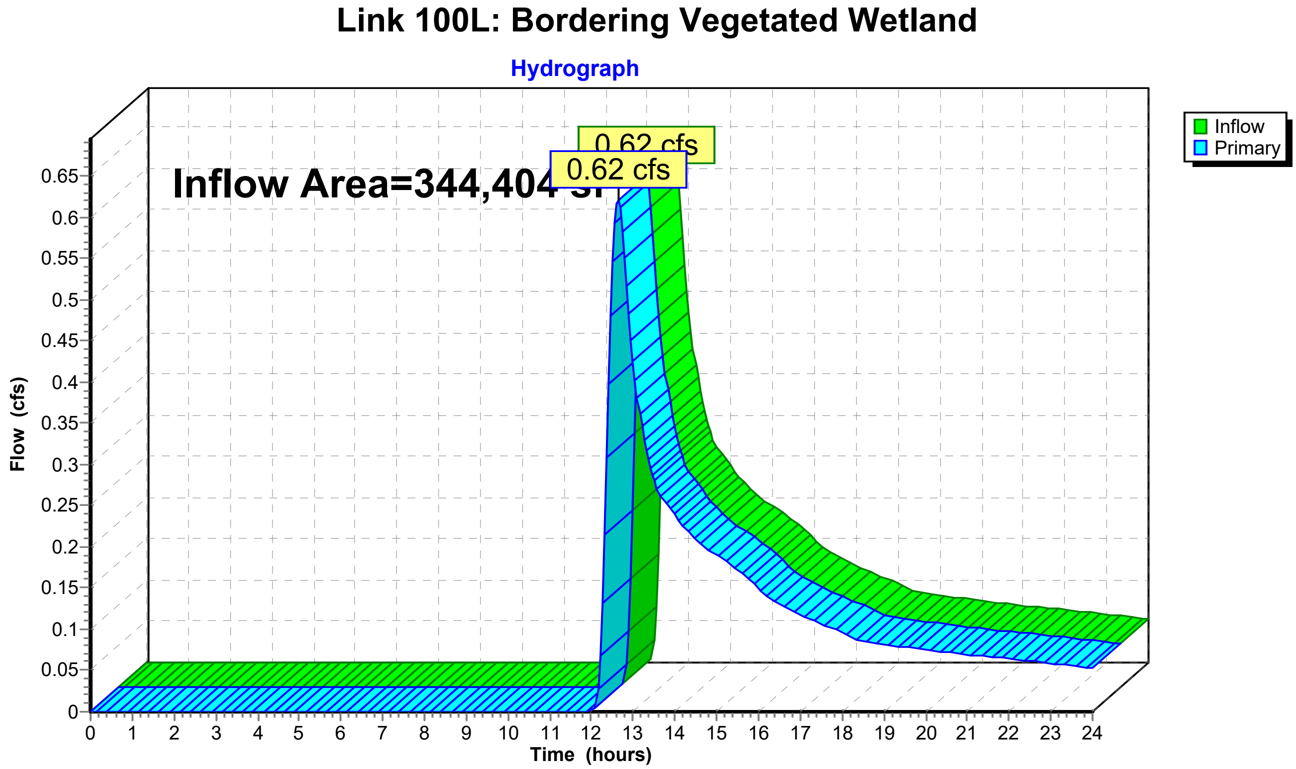
Stage-Area-Storage for Pond G: CDS

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
46.90	**0**	49.55	0
46.95	0	49.60	0
47.00	0	49.65	0
47.05	0	49.70	0
47.10	0	49.75	0
47.15	0	49.80	0
47.20	0	49.85	0
47.25	0	49.90	0
47.30	0	49.95	0
47.35	0	50.00	0
47.40	0	50.05	0
47.45	0	50.10	0
47.50	0	50.15	0
47.55	0	50.20	0
47.60	0	50.25	0
47.65	0	50.30	0
47.70	0	50.35	0
47.75	0	50.40	0
47.80	0	50.45	0
47.85	0	50.50	0
47.90	0	50.55	0
47.95	0	50.60	0
48.00	0	50.65	0
48.05	0	50.70	0
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		
49.25	0		
49.30	0		
49.35	0		
49.40	0		
49.45	0		
49.50	0		

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,404 sf,	0.17% Impervious,	Inflow Depth > 0.21"	for 2-Year event
Inflow =	0.62 cfs @	12.63 hrs, Volume=	6,160 cf	
Primary =	0.62 cfs @	12.63 hrs, Volume=	6,160 cf,	Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Area 1S Runoff Area=5,035 sf 31.38% Impervious Runoff Depth>0.90"
Tc=6.0 min CN=58 Runoff=0.10 cfs 379 cf

Subcatchment 2S: Area 2S Runoff Area=2,730 sf 83.15% Impervious Runoff Depth>3.19"
Tc=6.0 min CN=88 Runoff=0.23 cfs 727 cf

Subcatchment 3.1S: Area 3.1S Runoff Area=6,480 sf 100.00% Impervious Runoff Depth>4.26"
Tc=6.0 min CN=98 Runoff=0.64 cfs 2,301 cf

Subcatchment 3S: Area 3S Runoff Area=18,585 sf 43.69% Impervious Runoff Depth>1.33"
Tc=6.0 min CN=65 Runoff=0.61 cfs 2,058 cf

Subcatchment 4S: Area 4S Runoff Area=6,150 sf 33.33% Impervious Runoff Depth>0.96"
Tc=6.0 min CN=59 Runoff=0.13 cfs 492 cf

Subcatchment 5S: Area 5S Runoff Area=15,230 sf 87.72% Impervious Runoff Depth>3.50"
Tc=6.0 min CN=91 Runoff=1.35 cfs 4,436 cf

Subcatchment 6S: Area 6S Runoff Area=6,675 sf 50.86% Impervious Runoff Depth>1.60"
Tc=6.0 min CN=69 Runoff=0.27 cfs 890 cf

Subcatchment 7S: Area 7S Runoff Area=30,740 sf 21.05% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=83 Runoff=2.20 cfs 6,976 cf

Subcatchment 8S: Area 8S Runoff Area=5,625 sf 44.44% Impervious Runoff Depth>4.15"
Tc=6.0 min CN=97 Runoff=0.55 cfs 1,944 cf

Subcatchment 9S: Area 9S Runoff Area=14,465 sf 70.83% Impervious Runoff Depth>4.03"
Tc=6.0 min CN=96 Runoff=1.40 cfs 4,862 cf

Subcatchment 10S: Area 10S Runoff Area=13,830 sf 63.16% Impervious Runoff Depth>2.46"
Tc=6.0 min CN=80 Runoff=0.90 cfs 2,834 cf

Subcatchment 11S: Area 11S Runoff Area=38,165 sf 33.83% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=82 Runoff=2.65 cfs 8,377 cf

Subcatchment 12S: Area 12S Runoff Area=19,480 sf 3.08% Impervious Runoff Depth>3.19"
Tc=6.0 min CN=88 Runoff=1.61 cfs 5,185 cf

Subcatchment 13S: Area 13S Runoff Area=25,775 sf 0.00% Impervious Runoff Depth>3.10"
Tc=6.0 min CN=87 Runoff=2.08 cfs 6,651 cf

Subcatchment 14S: Area 14S Runoff Area=55,000 sf 0.00% Impervious Runoff Depth>4.03"
Tc=6.0 min CN=96 Runoff=5.32 cfs 18,486 cf

Subcatchment 100S: Area 100S Runoff Area=244,149 sf 0.00% Impervious Runoff Depth>0.90"
Flow Length=805' Tc=30.0 min CN=58 Runoff=2.75 cfs 18,230 cf

Pond 1: CB1 Peak Elev=47.62' Inflow=0.10 cfs 379 cf
12.0" Round Culvert n=0.013 L=16.0' S=0.0100 '/' Outflow=0.10 cfs 379 cf

Pond 1.1: CB1.1 Peak Elev=47.02' Inflow=0.61 cfs 2,058 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=0.61 cfs 2,058 cf

Pond 1P: Cultec 180HD Peak Elev=48.20' Storage=352 cf Inflow=0.64 cfs 2,301 cf
Outflow=0.22 cfs 2,301 cf

Pond 2: CB2 Peak Elev=47.72' Inflow=0.23 cfs 727 cf
12.0" Round Culvert n=0.013 L=9.0' S=0.0100 '/' Outflow=0.23 cfs 727 cf

Pond 2P: Shea Leaching chambers Peak Elev=43.03' Storage=10,303 cf Inflow=10.38 cfs 33,975 cf
Outflow=2.13 cfs 33,980 cf

Pond 3: CB3 Peak Elev=46.04' Inflow=0.13 cfs 492 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.13 cfs 492 cf

Pond 4: CB4 Peak Elev=46.46' Inflow=1.35 cfs 4,436 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=1.35 cfs 4,436 cf

Pond 5: CB5 Peak Elev=45.12' Inflow=0.27 cfs 890 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.27 cfs 890 cf

Pond 5.1: CB5.1 Peak Elev=45.48' Inflow=0.90 cfs 2,834 cf
12.0" Round Culvert n=0.013 L=224.0' S=0.0050 '/' Outflow=0.90 cfs 2,834 cf

Pond 6: CB6 Peak Elev=45.40' Inflow=2.20 cfs 6,976 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=2.20 cfs 6,976 cf

Pond 7: CB7 Peak Elev=45.28' Inflow=0.55 cfs 1,944 cf
12.0" Round Culvert n=0.013 L=19.0' S=0.0100 '/' Outflow=0.55 cfs 1,944 cf

Pond 8: CB8 Peak Elev=45.60' Inflow=1.40 cfs 4,862 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=1.40 cfs 4,862 cf

Pond 8.1: CB8.1 Peak Elev=45.39' Inflow=3.55 cfs 11,211 cf
12.0" Round Culvert n=0.013 L=118.0' S=0.0050 '/' Outflow=3.55 cfs 11,211 cf

Pond 9: CB9 Peak Elev=49.79' Inflow=1.61 cfs 5,185 cf
12.0" Round Culvert n=0.013 L=146.0' S=0.0068 '/' Outflow=1.61 cfs 5,185 cf

Pond 10: CB10 Peak Elev=49.50' Inflow=3.69 cfs 11,836 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=3.69 cfs 11,836 cf

Pond 104P: Inf Area 2 Peak Elev=48.90' Storage=8,060 cf Inflow=9.00 cfs 30,322 cf
Discarded=2.06 cfs 30,135 cf Primary=0.08 cfs 210 cf Outflow=2.14 cfs 30,345 cf

Pond A: DMH 1 Peak Elev=46.38' Inflow=0.93 cfs 3,164 cf
12.0" Round Culvert n=0.013 L=189.0' S=0.0050 '/' Outflow=0.93 cfs 3,164 cf

Pond B: DMH2 Peak Elev=46.12' Inflow=2.41 cfs 8,092 cf
12.0" Round Culvert n=0.013 L=184.0' S=0.0050 '/' Outflow=2.41 cfs 8,092 cf

Pond C: DMH3 Peak Elev=45.15' Inflow=4.88 cfs 15,958 cf
18.0" Round Culvert n=0.013 L=97.0' S=0.0051 '/' Outflow=4.88 cfs 15,958 cf

Pond D: DMH4 Peak Elev=44.74' Inflow=6.83 cfs 22,764 cf
18.0" Round Culvert n=0.013 L=165.0' S=0.0050 '/' Outflow=6.83 cfs 22,764 cf

Pond E: DMH5 Peak Elev=43.78' Inflow=10.38 cfs 33,975 cf
24.0" Round Culvert n=0.013 L=264.0' S=0.0050 '/' Outflow=10.38 cfs 33,975 cf

Pond F: CDS Peak Elev=43.06' Inflow=10.38 cfs 33,975 cf
24.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=10.38 cfs 33,975 cf

Pond G: CDS Peak Elev=48.97' Inflow=3.69 cfs 11,836 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=3.69 cfs 11,836 cf

Link 100L: Bordering Vegetated Wetland Inflow=2.83 cfs 18,440 cf
Primary=2.83 cfs 18,440 cf

Total Runoff Area = 508,114 sf Runoff Volume = 84,828 cf Average Runoff Depth = 2.00"
84.51% Pervious = 429,399 sf 15.49% Impervious = 78,715 sf

Summary for Subcatchment 1S: Area 1S

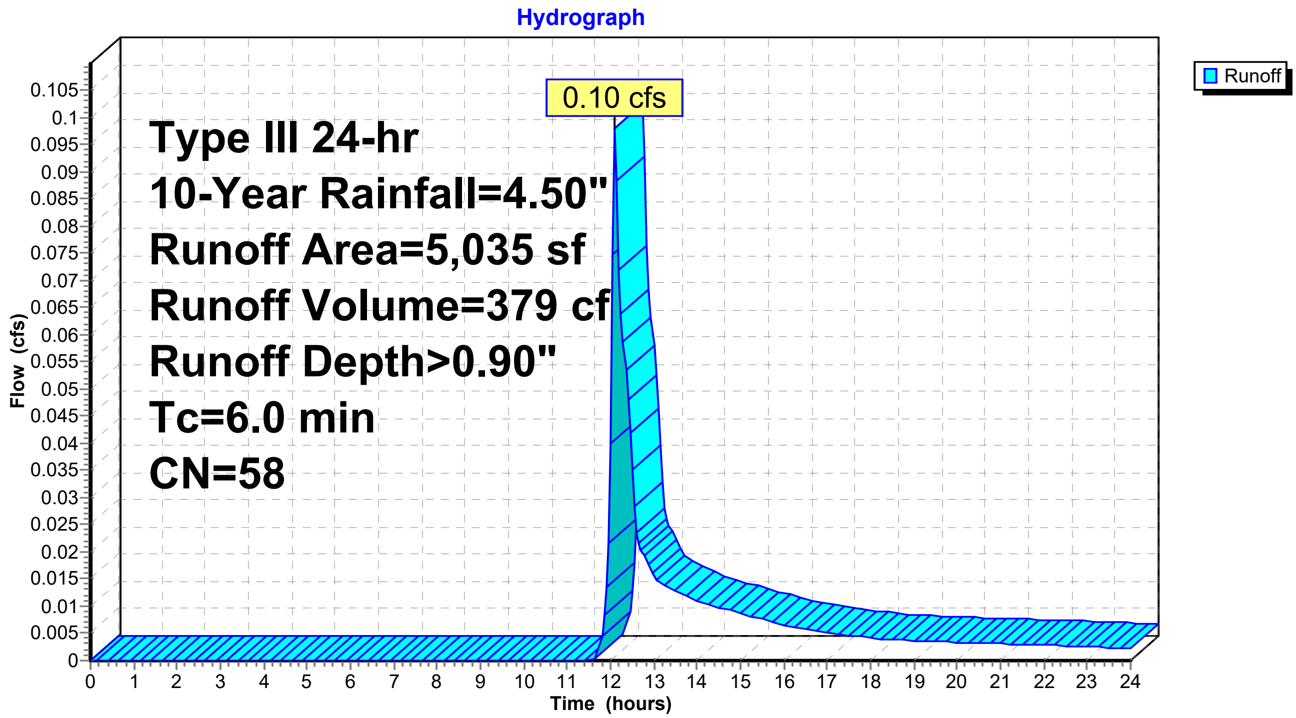
Runoff = 0.10 cfs @ 12.11 hrs, Volume= 379 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
1,580	98	Paved parking, HSG A
3,455	39	>75% Grass cover, Good, HSG A
5,035	58	Weighted Average
3,455		68.62% Pervious Area
1,580		31.38% Impervious Area

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

Subcatchment 1S: Area 1S



Summary for Subcatchment 2S: Area 2S

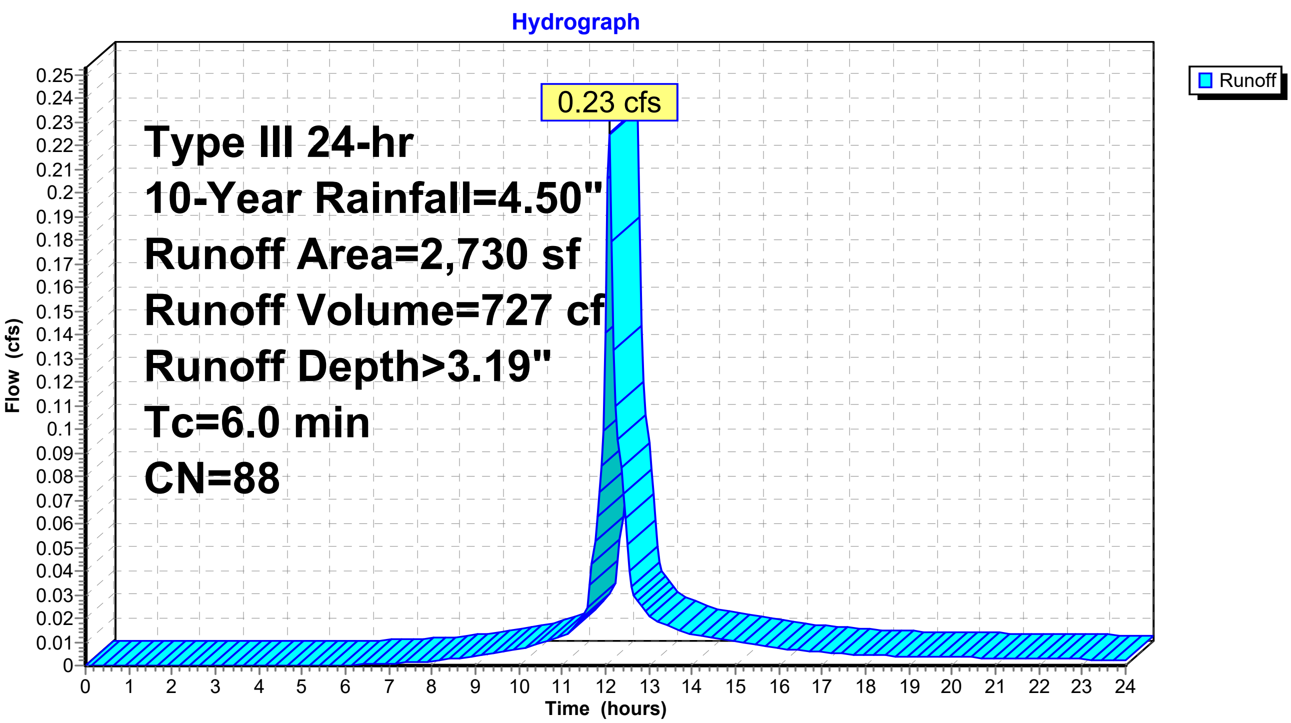
Runoff = 0.23 cfs @ 12.09 hrs, Volume= 727 cf, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,270	98	Paved parking, HSG A
460	39	>75% Grass cover, Good, HSG A
2,730	88	Weighted Average
460		16.85% Pervious Area
2,270		83.15% Impervious Area

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

Subcatchment 2S: Area 2S



Summary for Subcatchment 3.1S: Area 3.1S

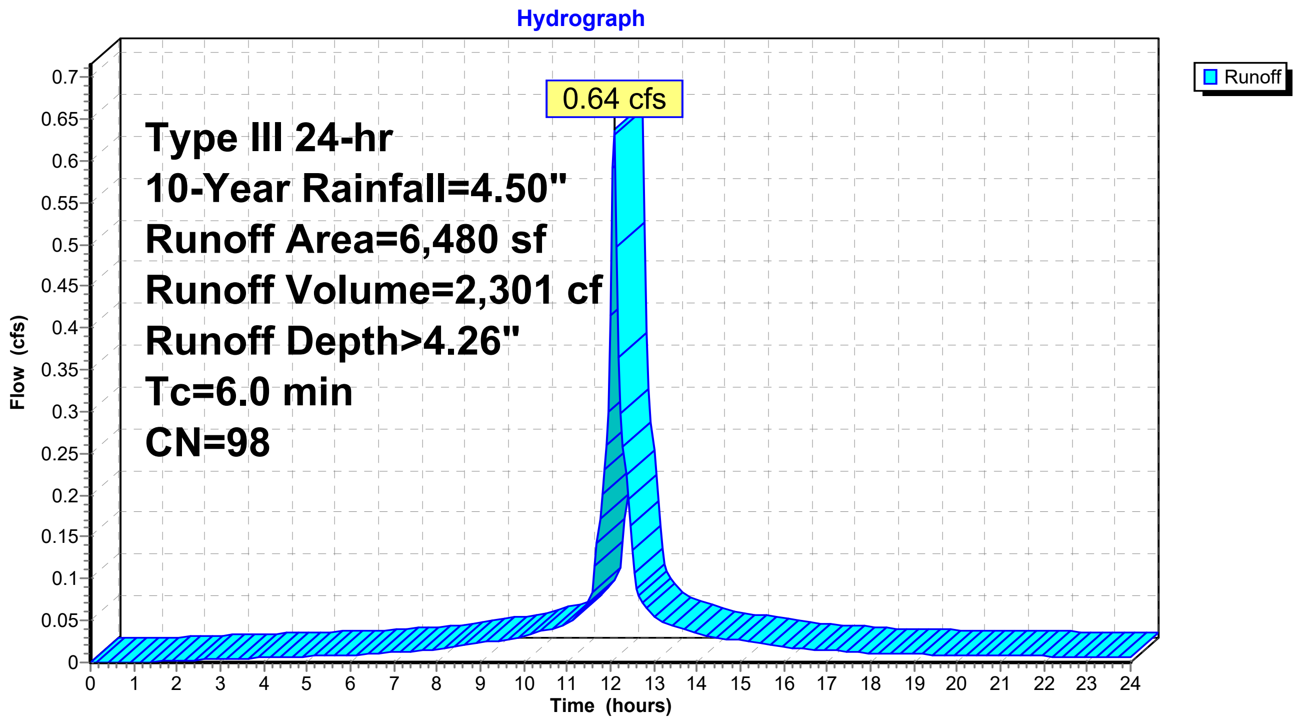
Runoff = 0.64 cfs @ 12.09 hrs, Volume= 2,301 cf, Depth> 4.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,480	98	Roofs, HSG A
6,480		100.00% Impervious Area

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

Subcatchment 3.1S: Area 3.1S



Summary for Subcatchment 3S: Area 3S

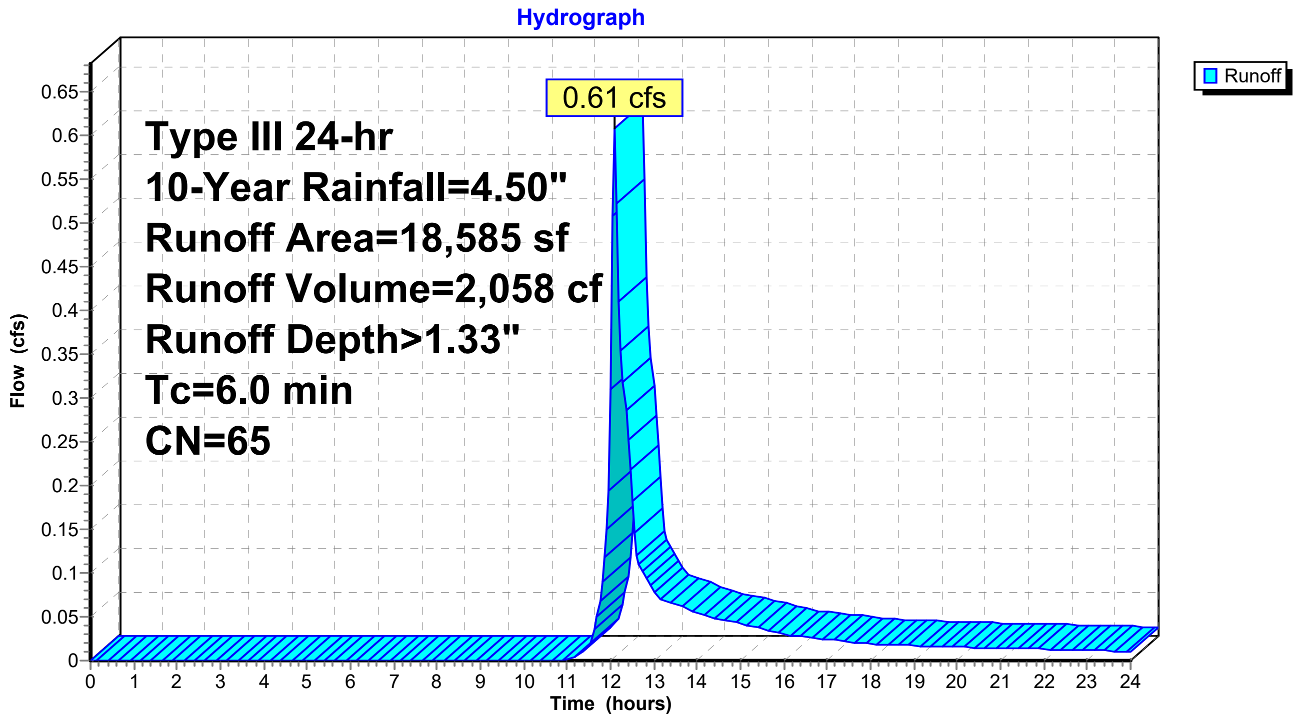
Runoff = 0.61 cfs @ 12.10 hrs, Volume= 2,058 cf, Depth> 1.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
8,120	98	Paved parking, HSG A
10,465	39	>75% Grass cover, Good, HSG A
18,585	65	Weighted Average
10,465		56.31% Pervious Area
8,120		43.69% Impervious Area

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

Subcatchment 3S: Area 3S



Summary for Subcatchment 4S: Area 4S

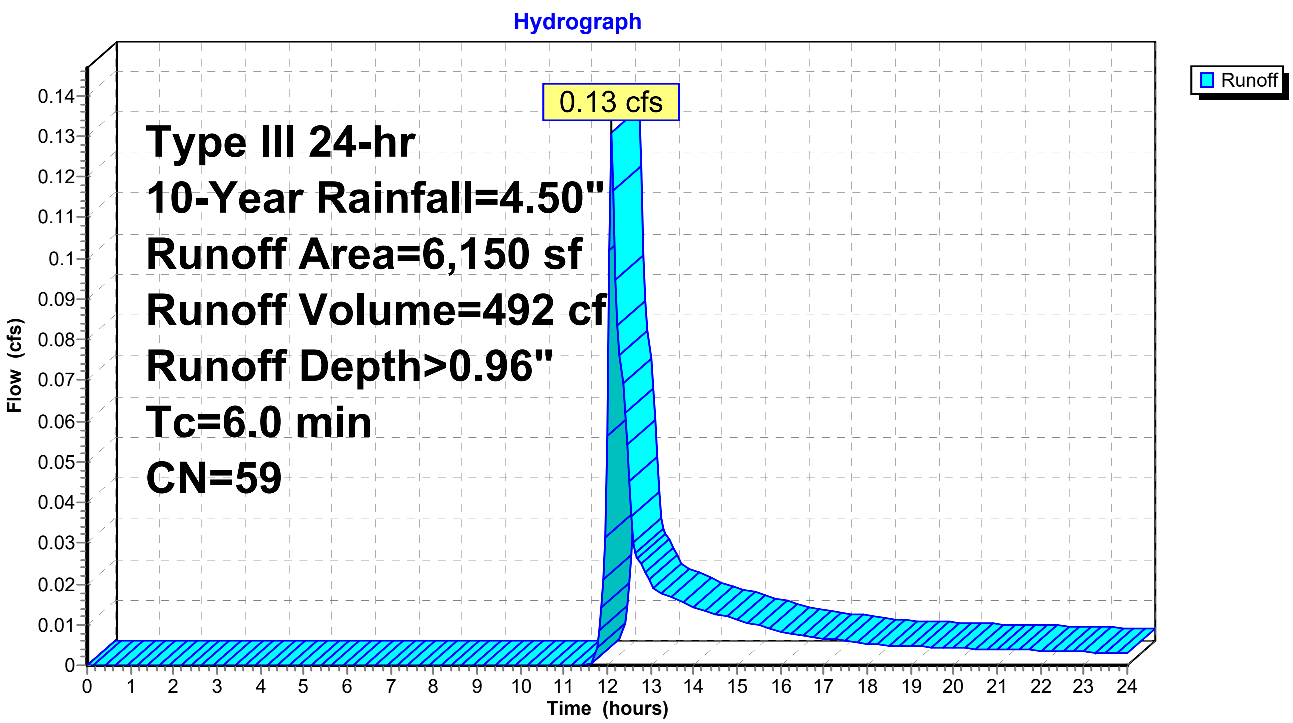
Runoff = 0.13 cfs @ 12.11 hrs, Volume= 492 cf, Depth> 0.96"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,050	98	Paved parking, HSG A
4,100	39	>75% Grass cover, Good, HSG A
6,150	59	Weighted Average
4,100		66.67% Pervious Area
2,050		33.33% Impervious Area

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

Subcatchment 4S: Area 4S



Summary for Subcatchment 5S: Area 5S

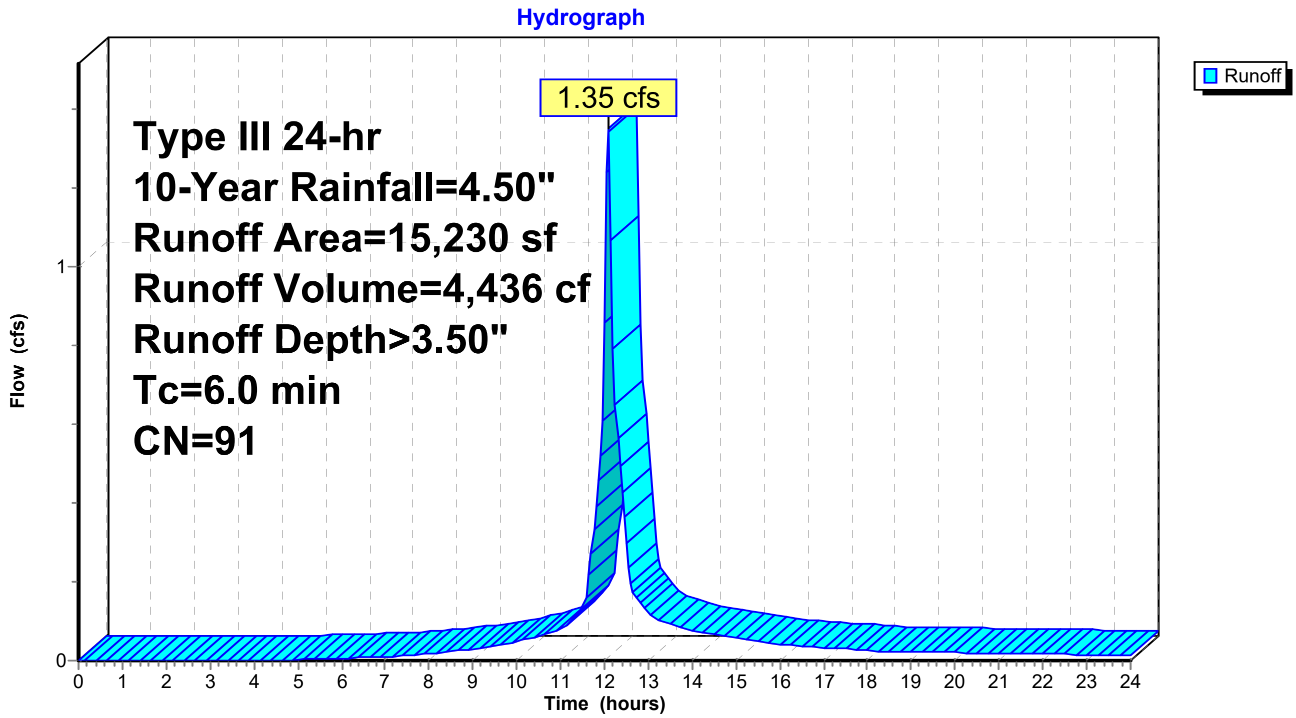
Runoff = 1.35 cfs @ 12.09 hrs, Volume= 4,436 cf, Depth> 3.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
13,360	98	Paved parking, HSG A
1,870	39	>75% Grass cover, Good, HSG A
15,230	91	Weighted Average
1,870		12.28% Pervious Area
13,360		87.72% Impervious Area

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

Subcatchment 5S: Area 5S



Summary for Subcatchment 6S: Area 6S

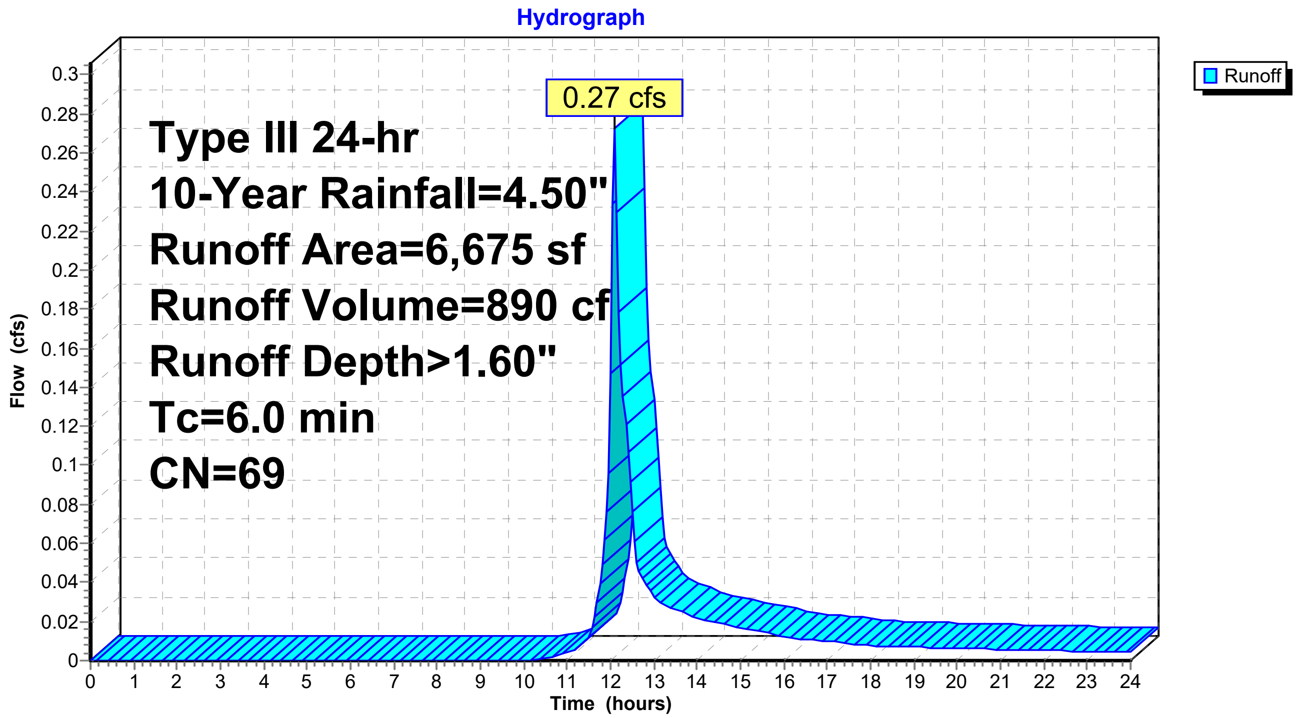
Runoff = 0.27 cfs @ 12.10 hrs, Volume= 890 cf, Depth> 1.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,395	98	Paved parking, HSG A
3,280	39	>75% Grass cover, Good, HSG A
6,675	69	Weighted Average
3,280		49.14% Pervious Area
3,395		50.86% Impervious Area

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

Subcatchment 6S: Area 6S



Summary for Subcatchment 7S: Area 7S

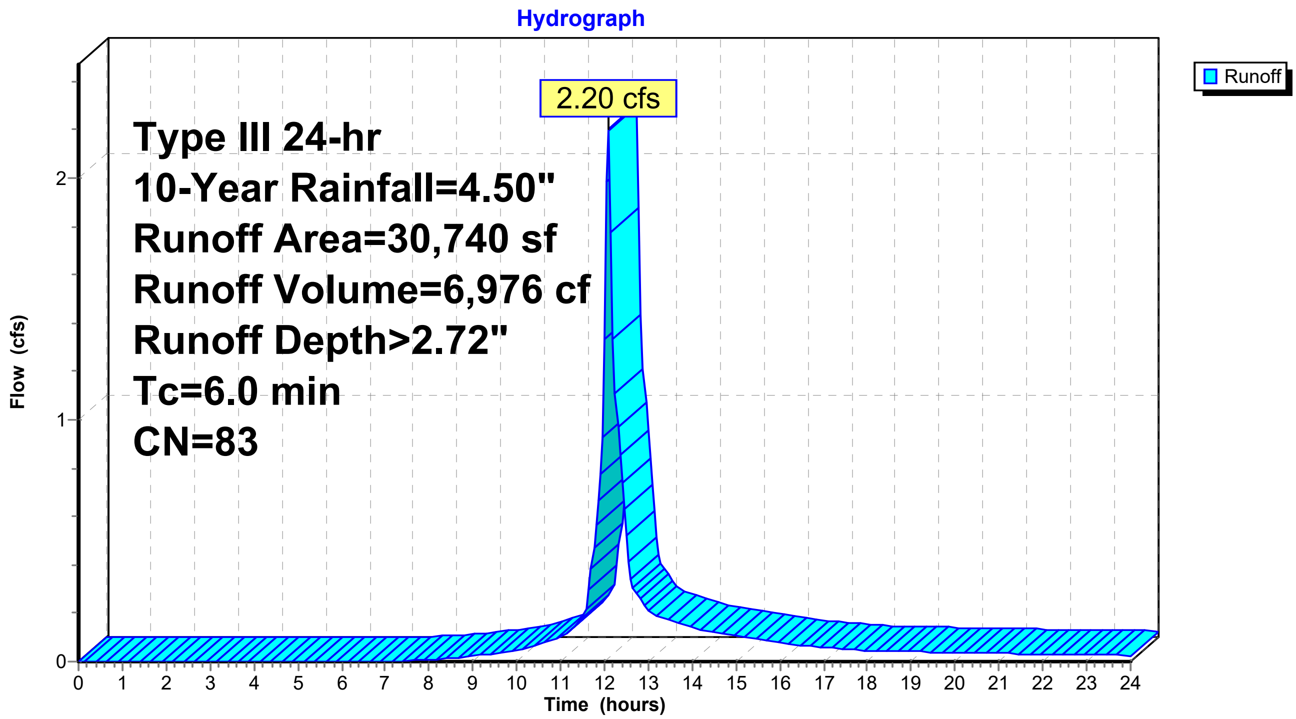
Runoff = 2.20 cfs @ 12.09 hrs, Volume= 6,976 cf, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
6,470	98	Paved parking, HSG A
17,620	96	Gravel surface, HSG A
4,150	39	>75% Grass cover, Good, HSG A
2,500	30	Woods, Good, HSG A
30,740	83	Weighted Average
24,270		78.95% Pervious Area
6,470		21.05% Impervious Area

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

Subcatchment 7S: Area 7S



Summary for Subcatchment 8S: Area 8S

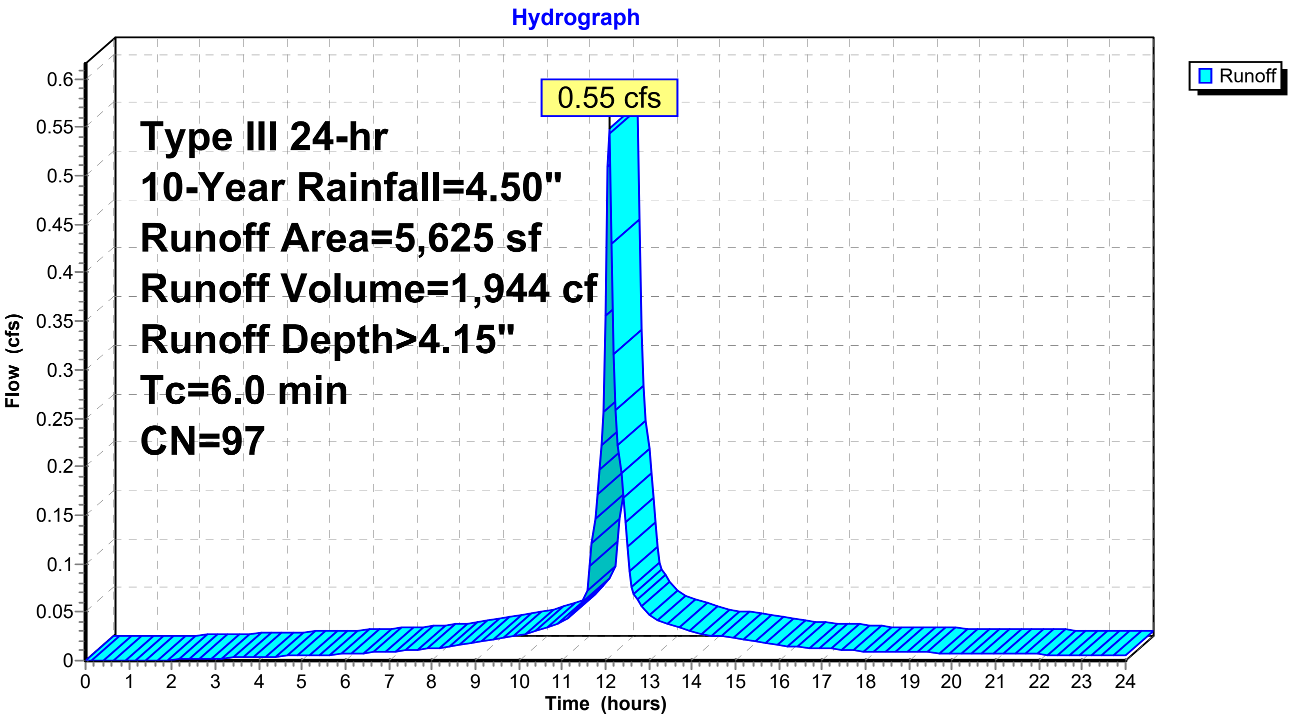
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 1,944 cf, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
2,500	98	Paved parking, HSG A
3,125	96	Gravel surface, HSG A
5,625	97	Weighted Average
3,125		55.56% Pervious Area
2,500		44.44% Impervious Area

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

Subcatchment 8S: Area 8S



Summary for Subcatchment 9S: Area 9S

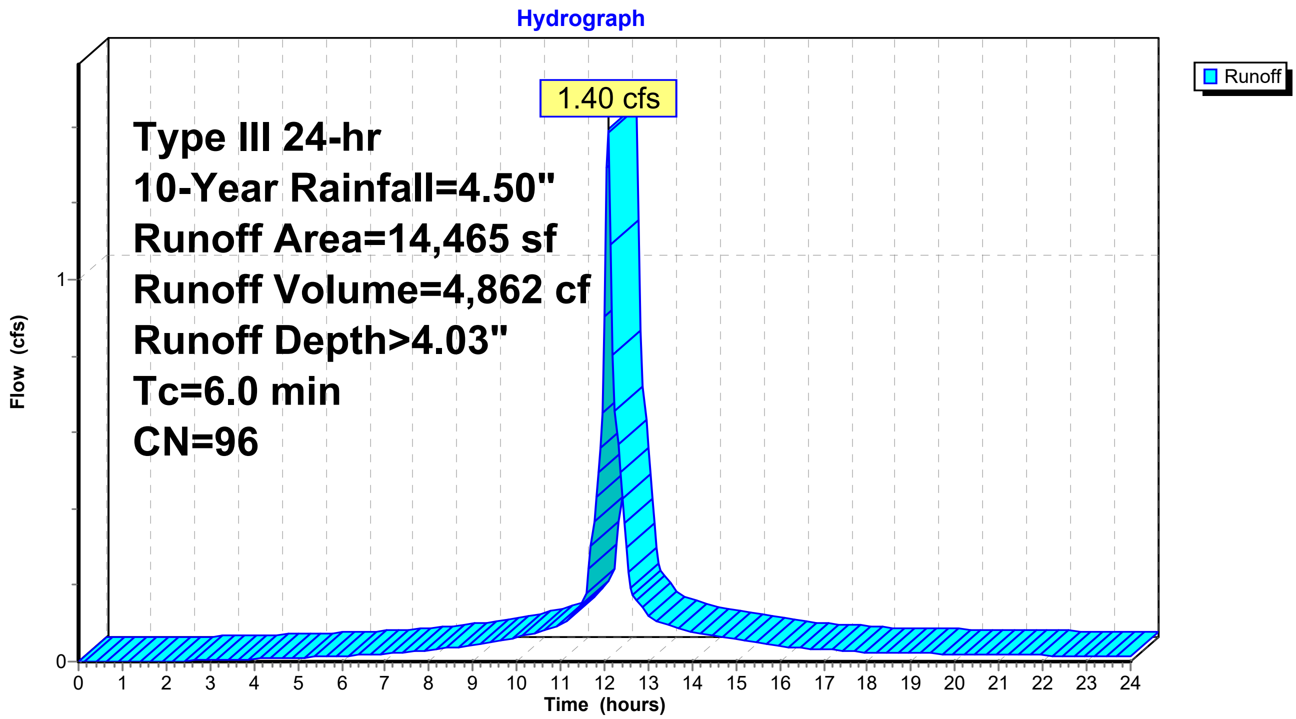
Runoff = 1.40 cfs @ 12.09 hrs, Volume= 4,862 cf, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
4,965	98	Paved parking, HSG A
3,820	96	Gravel surface, HSG A
400	39	>75% Grass cover, Good, HSG A
14,465	96	Weighted Average
4,220		29.17% Pervious Area
10,245		70.83% Impervious Area

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

Subcatchment 9S: Area 9S



Summary for Subcatchment 10S: Area 10S

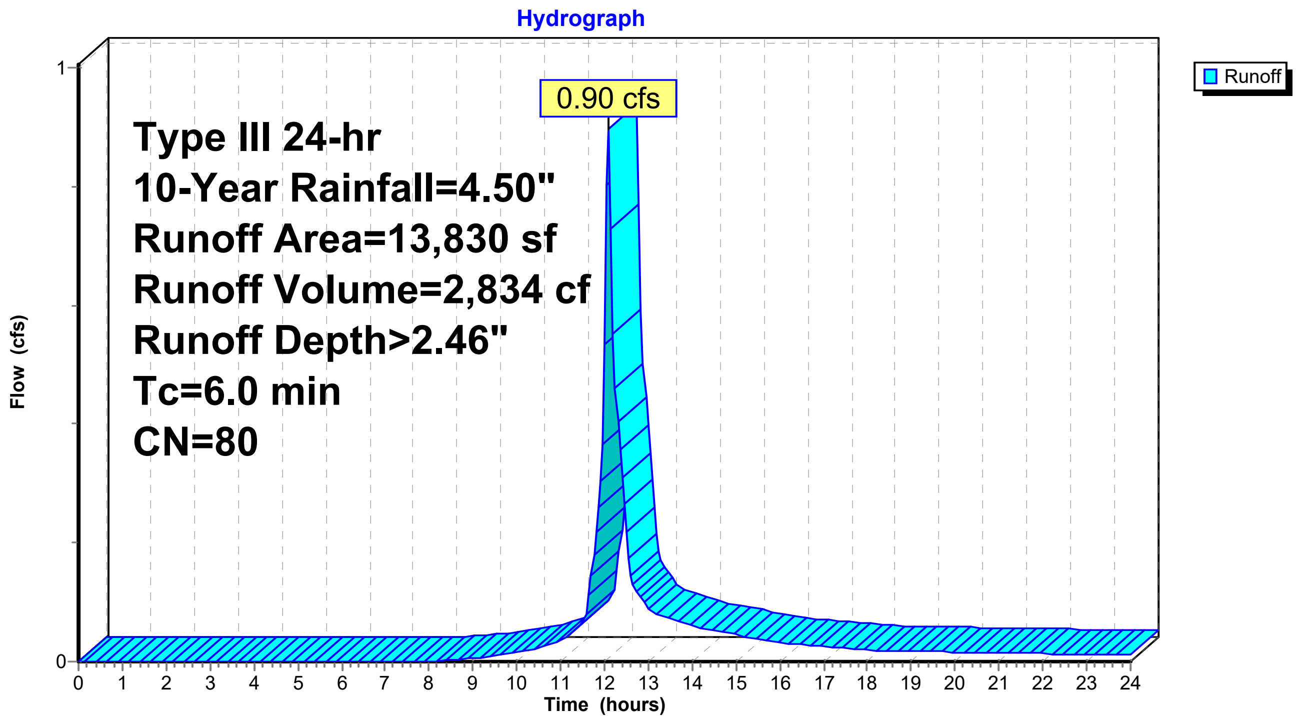
Runoff = 0.90 cfs @ 12.09 hrs, Volume= 2,834 cf, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
8,735	98	Paved parking, HSG A
1,325	96	Gravel surface, HSG A
870	39	>75% Grass cover, Good, HSG A
2,900	30	Woods, Good, HSG A
13,830	80	Weighted Average
5,095		36.84% Pervious Area
8,735		63.16% Impervious Area

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

Subcatchment 10S: Area 10S



Summary for Subcatchment 11S: Area 11S

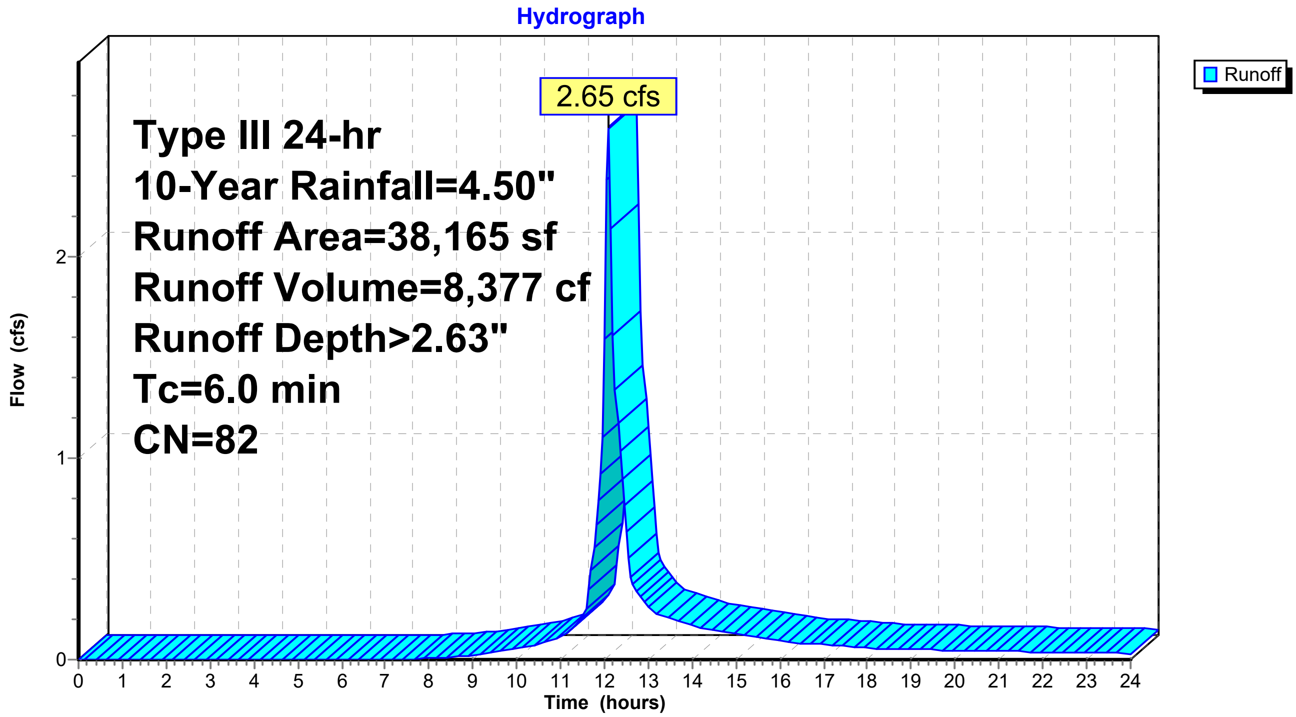
Runoff = 2.65 cfs @ 12.09 hrs, Volume= 8,377 cf, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
7,630	98	Paved parking, HSG A
16,190	96	Gravel surface, HSG A
3,165	39	>75% Grass cover, Good, HSG A
5,900	30	Woods, Good, HSG A
38,165	82	Weighted Average
25,255		66.17% Pervious Area
12,910		33.83% Impervious Area

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

Subcatchment 11S: Area 11S



Summary for Subcatchment 12S: Area 12S

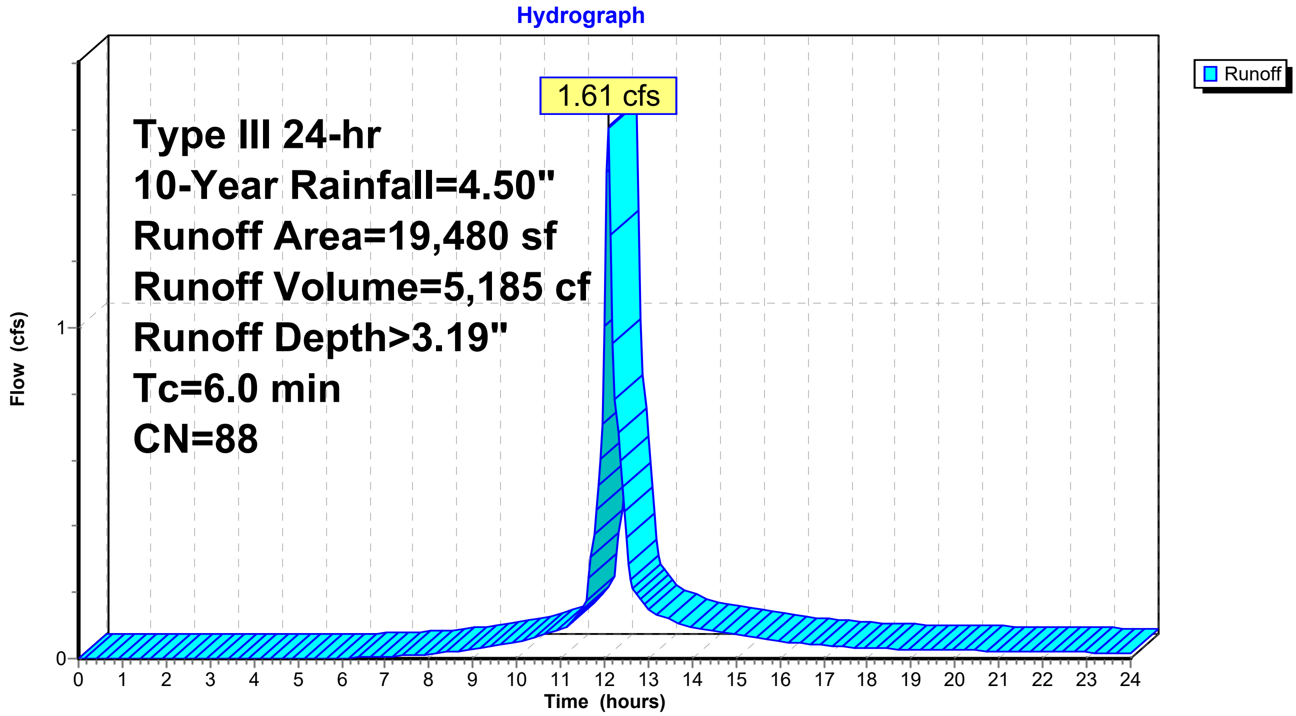
Runoff = 1.61 cfs @ 12.09 hrs, Volume= 5,185 cf, Depth> 3.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
15,960	96	Gravel surface, HSG A
2,920	39	>75% Grass cover, Good, HSG A
600	98	Paved parking, HSG A
19,480	88	Weighted Average
18,880		96.92% Pervious Area
600		3.08% Impervious Area

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

Subcatchment 12S: Area 12S



Summary for Subcatchment 13S: Area 13S

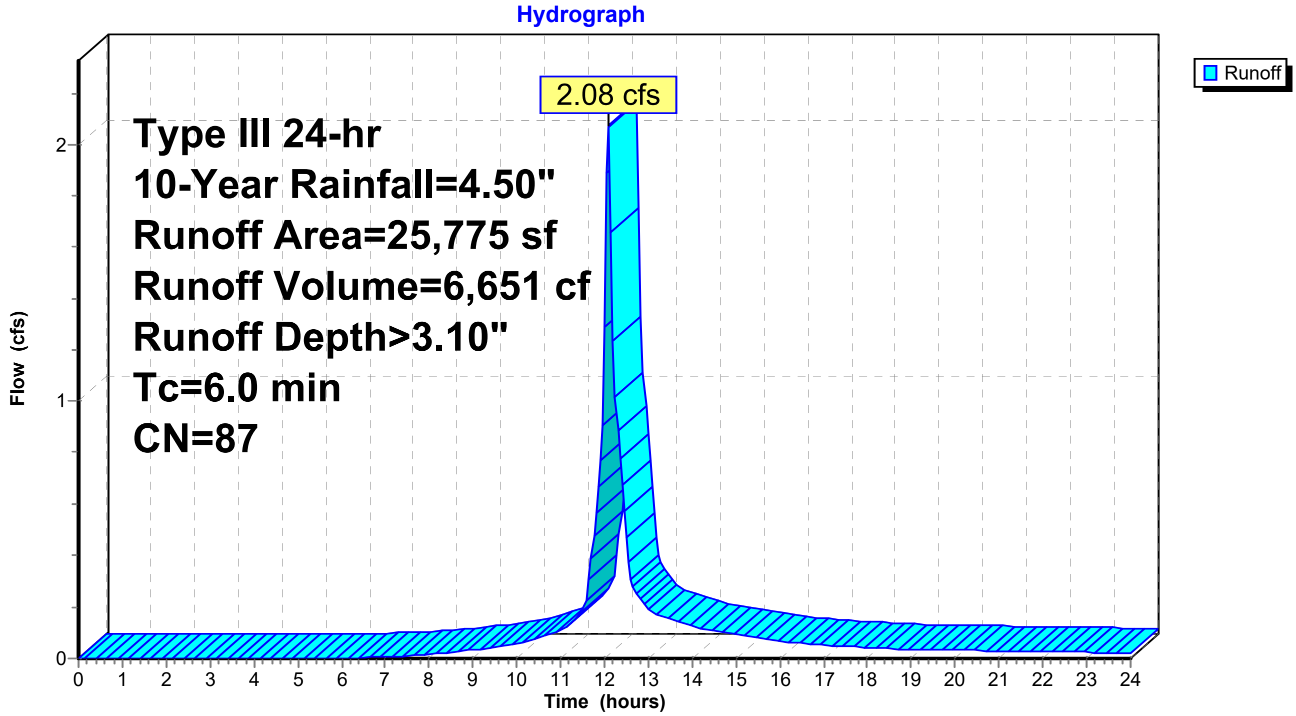
Runoff = 2.08 cfs @ 12.09 hrs, Volume= 6,651 cf, Depth> 3.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
22,400	96	Gravel surface, HSG A
3,375	30	Woods, Good, HSG A
25,775	87	Weighted Average
25,775		100.00% Pervious Area

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

Subcatchment 13S: Area 13S



Summary for Subcatchment 14S: Area 14S

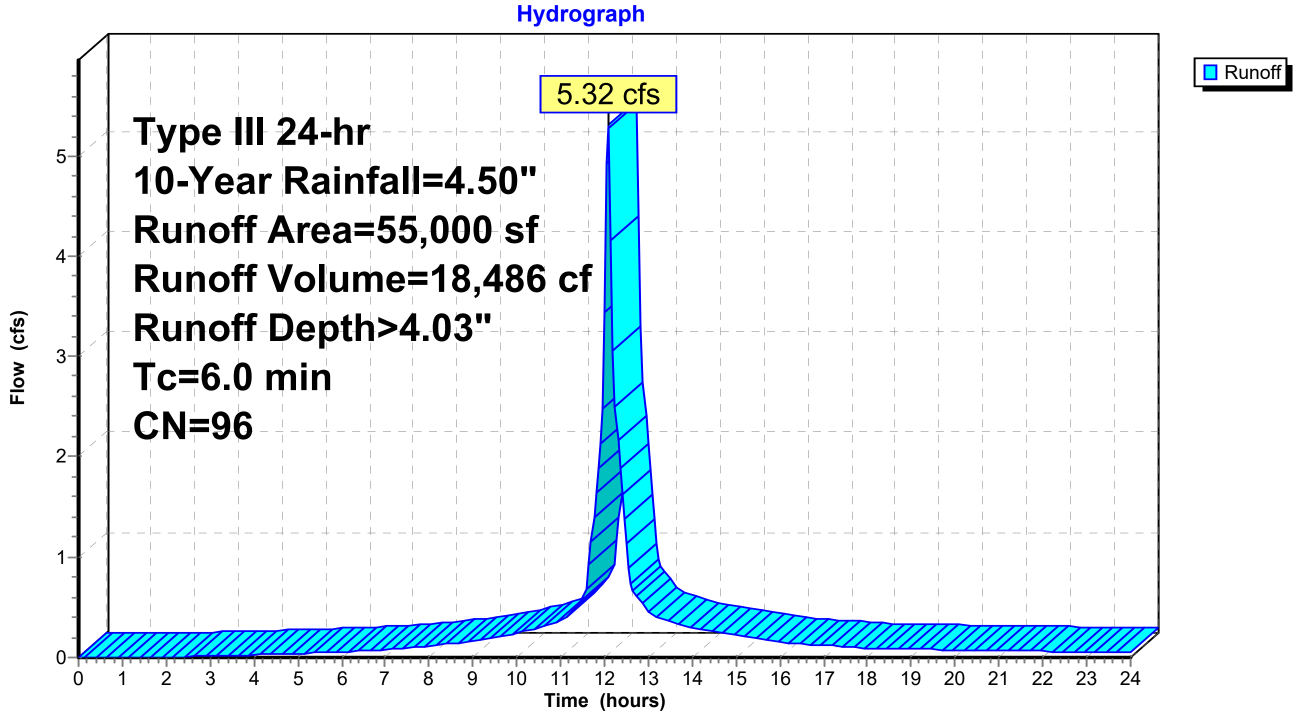
Runoff = 5.32 cfs @ 12.09 hrs, Volume= 18,486 cf, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
55,000	96	Gravel surface, HSG A
55,000		100.00% Pervious Area

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

Subcatchment 14S: Area 14S



Summary for Subcatchment 100S: Area 100S

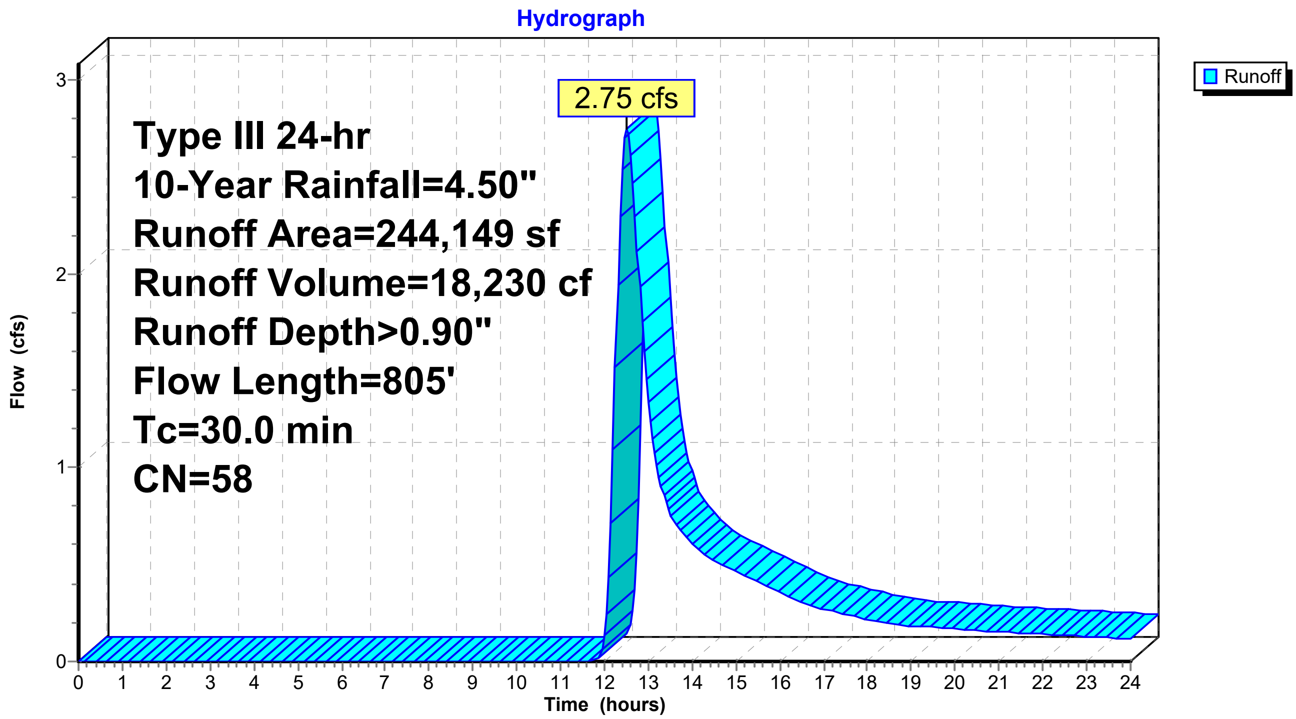
Runoff = 2.75 cfs @ 12.51 hrs, Volume= 18,230 cf, Depth> 0.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-Year Rainfall=4.50"

Area (sf)	CN	Description
3,705	96	Gravel surface, HSG A
32,069	30	Brush, Good, HSG A
43,315	30	Woods, Good, HSG A
165,060	70	Woods, Good, HSG C
244,149	58	Weighted Average
244,149		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	50	0.0080	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.2	291	0.0350	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	464	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.0	805	Total			

Subcatchment 100S: Area 100S



Summary for Pond 1: CB1

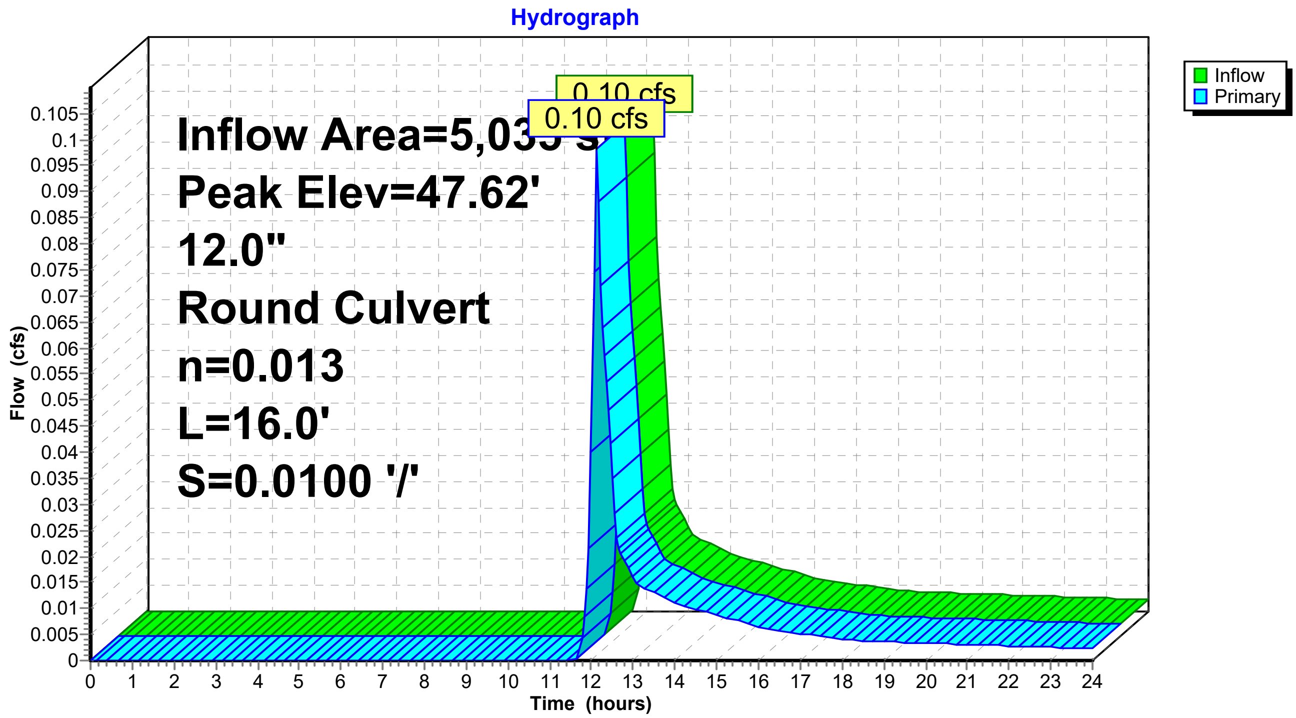
Inflow Area = 5,035 sf, 31.38% Impervious, Inflow Depth > 0.90" for 10-Year event
Inflow = 0.10 cfs @ 12.11 hrs, Volume= 379 cf
Outflow = 0.10 cfs @ 12.11 hrs, Volume= 379 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.10 cfs @ 12.11 hrs, Volume= 379 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.62' @ 12.11 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.10 cfs @ 12.11 hrs HW=47.62' TW=46.36' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.10 cfs @ 1.80 fps)

Pond 1: CB1



Stage-Area-Storage for Pond 1: CB1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0		
48.31	0		
48.36	0		
48.41	0		
48.46	0		
48.51	0		
48.56	0		
48.61	0		
48.66	0		
48.71	0		
48.76	0		
48.81	0		
48.86	0		
48.91	0		
48.96	0		
49.01	0		
49.06	0		
49.11	0		
49.16	0		
49.21	0		
49.26	0		
49.31	0		
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

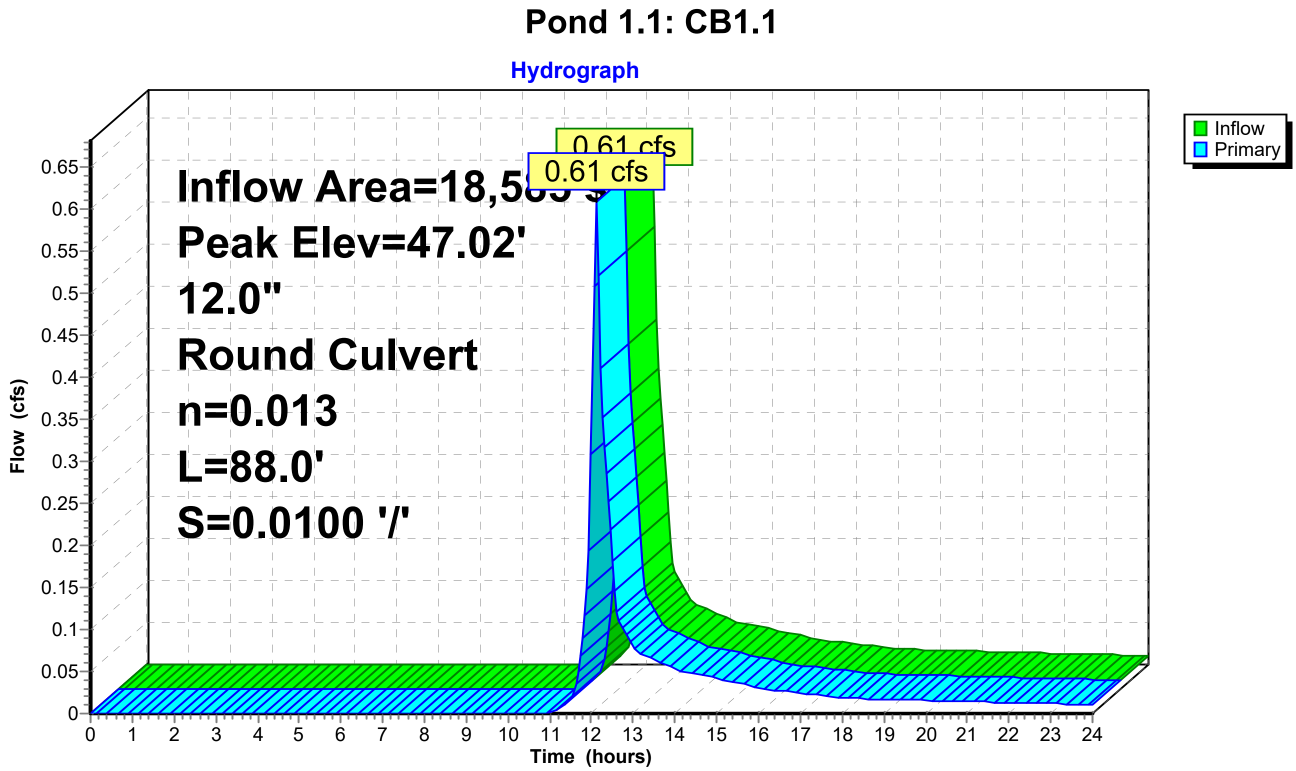
Summary for Pond 1.1: CB1.1

Inflow Area = 18,585 sf, 43.69% Impervious, Inflow Depth > 1.33" for 10-Year event
Inflow = 0.61 cfs @ 12.10 hrs, Volume= 2,058 cf
Outflow = 0.61 cfs @ 12.10 hrs, Volume= 2,058 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.61 cfs @ 12.10 hrs, Volume= 2,058 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.02' @ 12.11 hrs
Flood Elev= 49.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.60'	**12.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.60' / 45.72' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.56 cfs @ 12.10 hrs HW=47.02' TW=46.38' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.56 cfs @ 2.66 fps)



Stage-Area-Storage for Pond 1.1: CB1.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
46.60	**0**	49.25	0
46.65	0	49.30	0
46.70	0	49.35	0
46.75	0	49.40	0
46.80	0	49.45	0
46.85	0	49.50	0
46.90	0	49.55	0
46.95	0	49.60	0
47.00	0	49.65	0
47.05	0	49.70	0
47.10	0	49.75	0
47.15	0	49.80	0
47.20	0	49.85	0
47.25	0	49.90	0
47.30	0		
47.35	0		
47.40	0		
47.45	0		
47.50	0		
47.55	0		
47.60	0		
47.65	0		
47.70	0		
47.75	0		
47.80	0		
47.85	0		
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		

Summary for Pond 1P: Cultec 180HD

Inflow Area = 6,480 sf,100.00% Impervious, Inflow Depth > 4.26" for 10-Year event
Inflow = 0.64 cfs @ 12.09 hrs, Volume= 2,301 cf
Outflow = 0.22 cfs @ 12.35 hrs, Volume= 2,301 cf, Atten= 65%, Lag= 16.1 min
Discarded = 0.22 cfs @ 12.35 hrs, Volume= 2,301 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.20' @ 12.35 hrs Surf.Area= 830 sf Storage= 352 cf
Flood Elev= 49.44' Surf.Area= 830 sf Storage= 889 cf

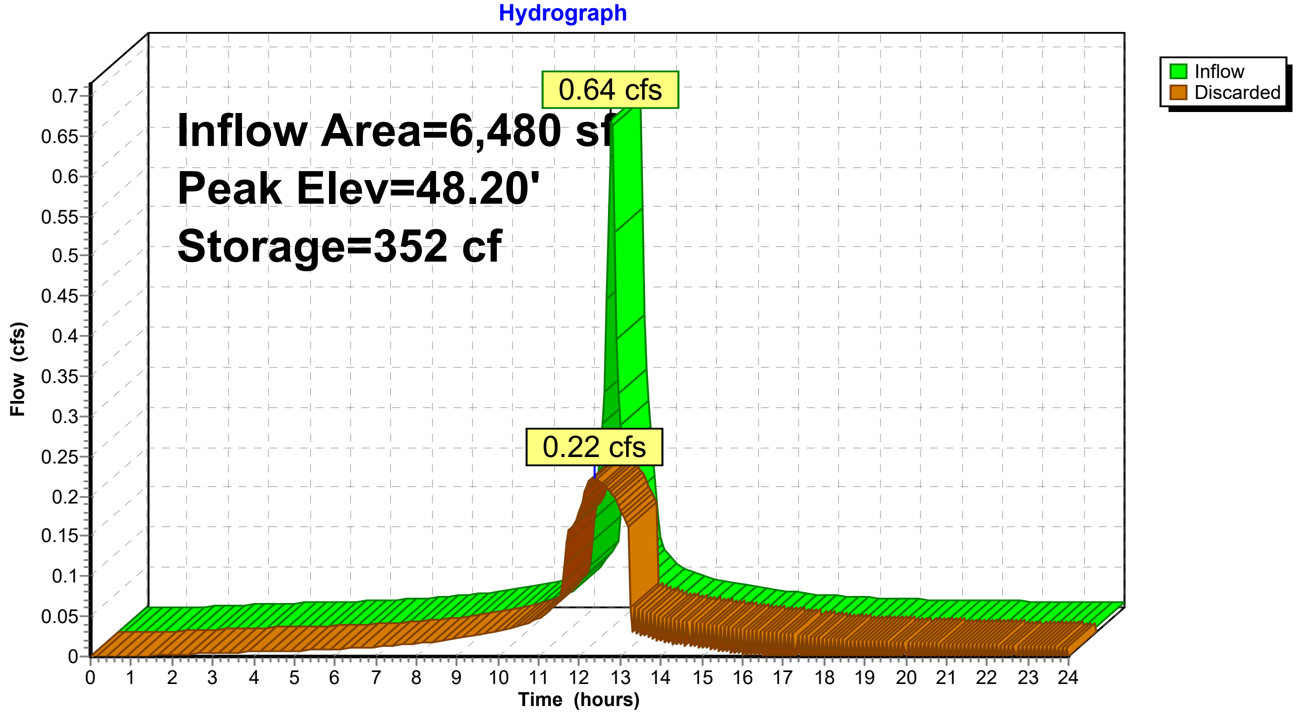
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.1 min (756.5 - 749.4)

Volume	Invert	Avail.Storage	Storage Description
#1	47.90'	354 cf	**Cultec C-100HD** x 25 Inside #2
			Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf
			Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap
			Row Length Adjustment= +0.50' x 1.86 sf x 5 rows
#2	47.40'	758 cf	**21.00'W x 39.50'L x 2.71'H Prismatoid**
			2,248 cf Overall - 354 cf Embedded = 1,894 cf x 40.0% Voids
		1,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	47.40'	**8.270 in/hr Exfiltration over Surface area**
			Conductivity to Groundwater Elevation = 45.40'

Discarded OutFlow Max=0.22 cfs @ 12.35 hrs HW=48.20' (Free Discharge)
└─**1=Exfiltration** (Controls 0.22 cfs)

Pond 1P: Cultec 180HD



Stage-Area-Storage for Pond 1P: Cultec 180HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.40	**830**	0	50.05	830	1,091
47.45	830	17	50.10	830	**1,108**
47.50	830	33			
47.55	830	50			
47.60	830	66			
47.65	830	83			
47.70	830	100			
47.75	830	116			
47.80	830	133			
47.85	830	149			
47.90	830	166			
47.95	830	198			
48.00	830	229			
48.05	830	260			
48.10	830	290			
48.15	830	321			
48.20	830	351			
48.25	830	381			
48.30	830	411			
48.35	830	440			
48.40	830	469			
48.45	830	498			
48.50	830	526			
48.55	830	553			
48.60	830	580			
48.65	830	605			
48.70	830	630			
48.75	830	653			
48.80	830	674			
48.85	830	693			
48.90	830	710			
48.95	830	727			
49.00	830	743			
49.05	830	760			
49.10	830	776			
49.15	830	793			
49.20	830	809			
49.25	830	826			
49.30	830	843			
49.35	830	859			
49.40	830	876			
49.45	830	892			
49.50	830	909			
49.55	830	926			
49.60	830	942			
49.65	830	959			
49.70	830	975			
49.75	830	992			
49.80	830	1,009			
49.85	830	1,025			
49.90	830	1,042			
49.95	830	1,058			
50.00	830	1,075			

Summary for Pond 2: CB2

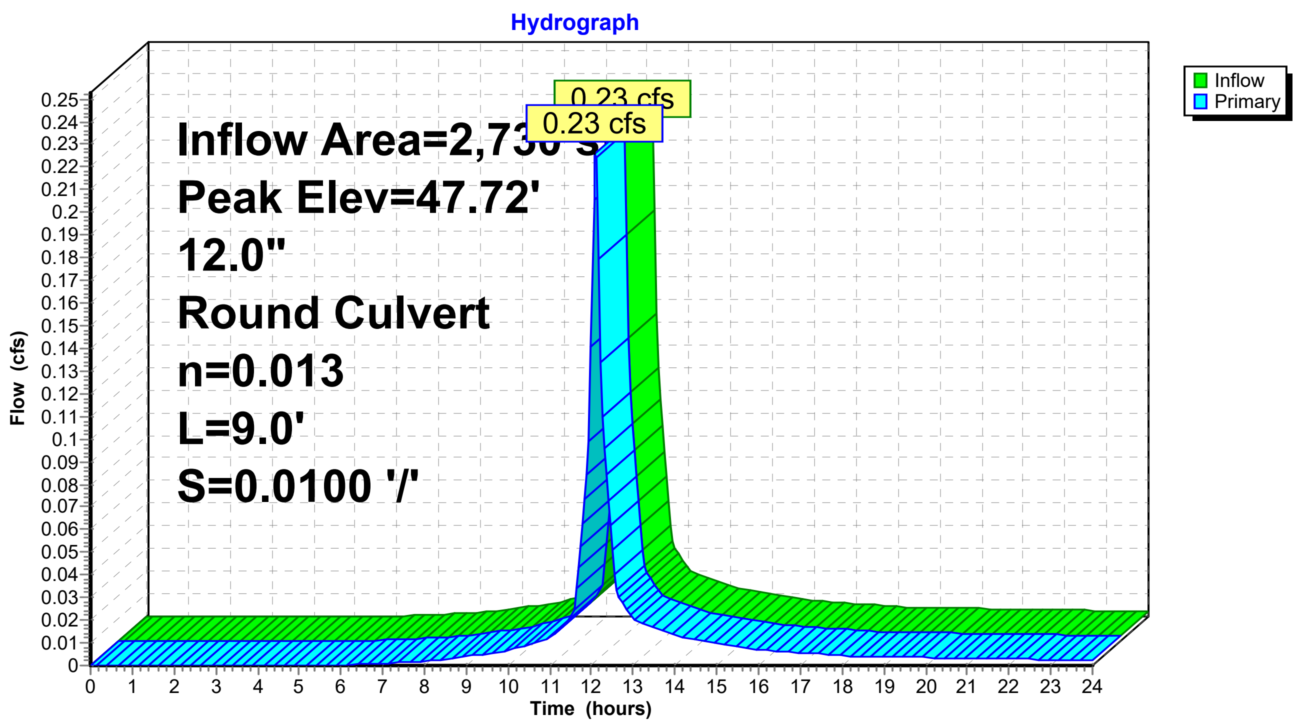
Inflow Area = 2,730 sf, 83.15% Impervious, Inflow Depth > 3.19" for 10-Year event
Inflow = 0.23 cfs @ 12.09 hrs, Volume= 727 cf
Outflow = 0.23 cfs @ 12.09 hrs, Volume= 727 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.23 cfs @ 12.09 hrs, Volume= 727 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 47.72' @ 12.09 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.37' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.22 cfs @ 12.09 hrs HW=47.72' TW=46.35' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.22 cfs @ 2.09 fps)

Pond 2: CB2



Stage-Area-Storage for Pond 2: CB2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0		
48.31	0		
48.36	0		
48.41	0		
48.46	0		
48.51	0		
48.56	0		
48.61	0		
48.66	0		
48.71	0		
48.76	0		
48.81	0		
48.86	0		
48.91	0		
48.96	0		
49.01	0		
49.06	0		
49.11	0		
49.16	0		
49.21	0		
49.26	0		
49.31	0		
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

Summary for Pond 2P: Shea Leaching chambers

Inflow Area = 157,230 sf, 45.56% Impervious, Inflow Depth > 2.59" for 10-Year event
Inflow = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf
Outflow = 2.13 cfs @ 12.54 hrs, Volume= 33,980 cf, Atten= 79%, Lag= 26.6 min
Discarded = 2.13 cfs @ 12.54 hrs, Volume= 33,980 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 43.03' @ 12.54 hrs Surf.Area= 3,225 sf Storage= 10,303 cf
Flood Elev= 47.17' Surf.Area= 3,225 sf Storage= 19,298 cf

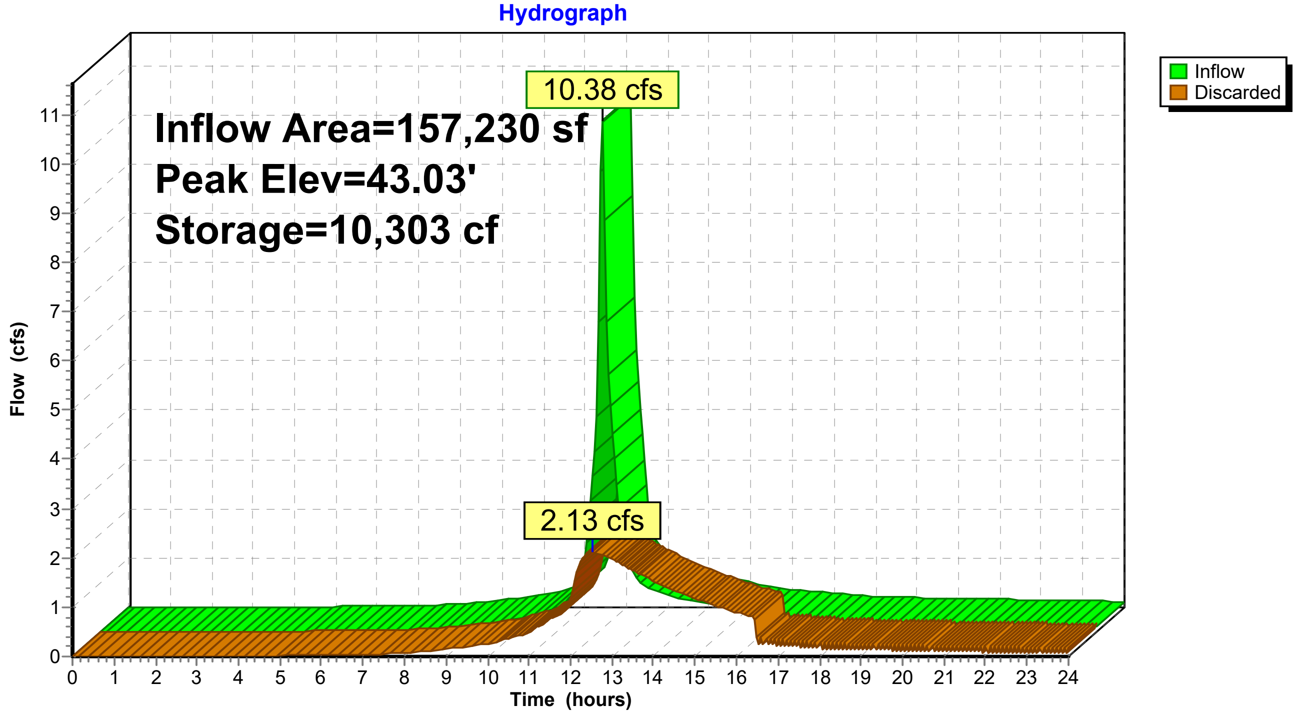
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 40.9 min (850.5 - 809.7)

Volume	Invert	Avail.Storage	Storage Description
#1	39.25'	18,032 cf	**96.0" W x 84.0" H Box Pipe Storage** x 23 Inside #2 L= 14.0' 23,184 cf Overall - 6.0" Wall Thickness = 18,032 cf
#2	38.75'	1,266 cf	**43.00'W x 75.00'L x 8.17'H Prismatoid** 26,348 cf Overall - 23,184 cf Embedded = 3,164 cf x 40.0% Voids
		19,298 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	38.75'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 37.00'

Discarded OutFlow Max=2.13 cfs @ 12.54 hrs HW=43.03' (Free Discharge)
1=Exfiltration (Controls 2.13 cfs)

Pond 2P: Shea Leaching chambers



Stage-Area-Storage for Pond 2P: Shea Leaching chambers

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
38.75	**3,225**	0	44.05	3,225	13,058
38.85	3,225	13	44.15	3,225	13,329
38.95	3,225	26	44.25	3,225	13,599
39.05	3,225	39	44.35	3,225	13,870
39.15	3,225	52	44.45	3,225	14,141
39.25	3,225	65	44.55	3,225	14,411
39.35	3,225	336	44.65	3,225	14,682
39.45	3,225	607	44.75	3,225	14,953
39.55	3,225	877	44.85	3,225	15,223
39.65	3,225	1,148	44.95	3,225	15,494
39.75	3,225	1,419	45.05	3,225	15,765
39.85	3,225	1,689	45.15	3,225	16,036
39.95	3,225	1,960	45.25	3,225	16,306
40.05	3,225	2,231	45.35	3,225	16,577
40.15	3,225	2,502	45.45	3,225	16,848
40.25	3,225	2,772	45.55	3,225	17,118
40.35	3,225	3,043	45.65	3,225	17,389
40.45	3,225	3,314	45.75	3,225	17,660
40.55	3,225	3,584	45.85	3,225	17,930
40.65	3,225	3,855	45.95	3,225	18,201
40.75	3,225	4,126	46.05	3,225	18,472
40.85	3,225	4,396	46.15	3,225	18,742
40.95	3,225	4,667	46.25	3,225	19,013
41.05	3,225	4,938	46.35	3,225	19,026
41.15	3,225	5,208	46.45	3,225	19,039
41.25	3,225	5,479	46.55	3,225	19,052
41.35	3,225	5,750	46.65	3,225	19,065
41.45	3,225	6,020	46.75	3,225	19,078
41.55	3,225	6,291	46.85	3,225	**19,207**
41.65	3,225	6,562	46.95	3,225	**19,298**
41.75	3,225	6,832	47.05	3,225	19,298
41.85	3,225	7,103	47.15	3,225	19,298
41.95	3,225	7,374			
42.05	3,225	7,644			
42.15	3,225	7,915			
42.25	3,225	8,186			
42.35	3,225	8,456			
42.45	3,225	8,727			
42.55	3,225	8,998			
42.65	3,225	9,269			
42.75	3,225	9,539			
42.85	3,225	9,810			
42.95	3,225	10,081			
43.05	3,225	10,351			
43.15	3,225	10,622			
43.25	3,225	10,893			
43.35	3,225	11,163			
43.45	3,225	11,434			
43.55	3,225	11,705			
43.65	3,225	11,975			
43.75	3,225	12,246			
43.85	3,225	12,517			
43.95	3,225	12,787			

Summary for Pond 3: CB3

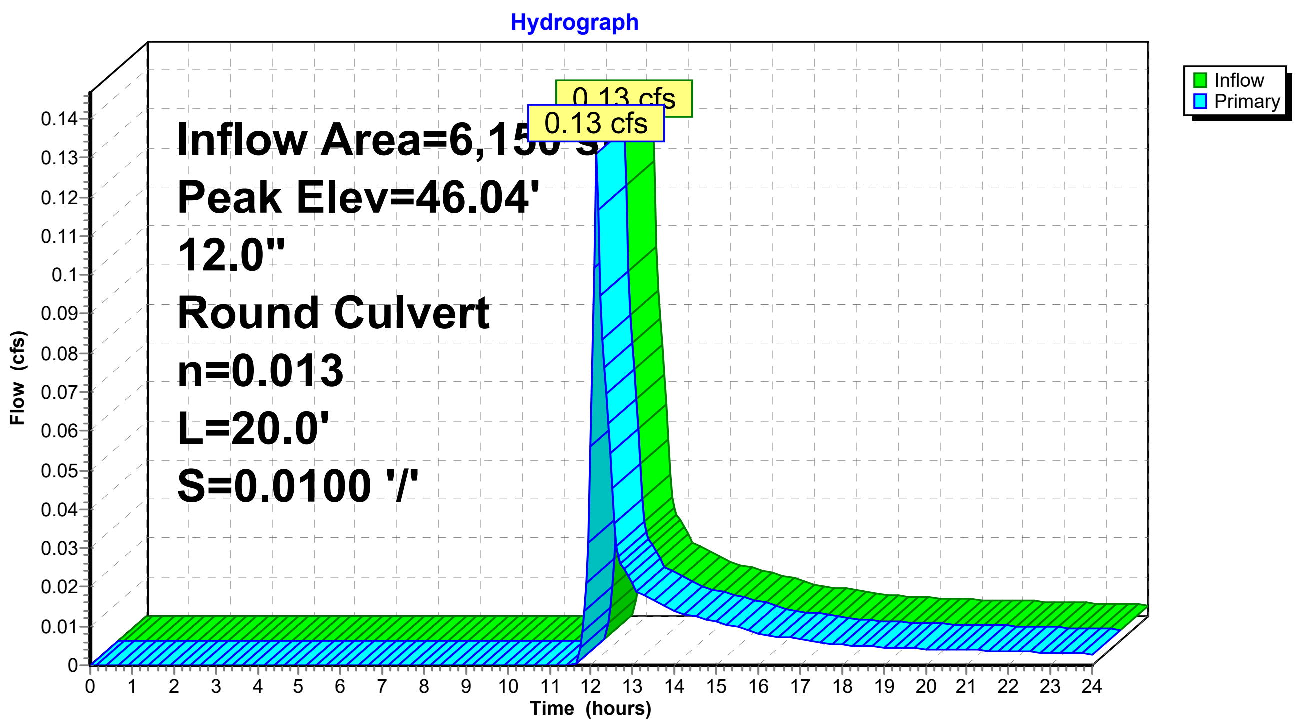
Inflow Area = 6,150 sf, 33.33% Impervious, Inflow Depth > 0.96" for 10-Year event
Inflow = 0.13 cfs @ 12.11 hrs, Volume= 492 cf
Outflow = 0.13 cfs @ 12.11 hrs, Volume= 492 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.13 cfs @ 12.11 hrs, Volume= 492 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.04' @ 12.10 hrs
Flood Elev= 49.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.75'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.75' / 45.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.11 hrs HW=46.02' TW=46.05' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)

Pond 3: CB3



Stage-Area-Storage for Pond 3: CB3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.75	**0**	48.40	0
45.80	0	48.45	0
45.85	0	48.50	0
45.90	0	48.55	0
45.95	0	48.60	0
46.00	0	48.65	0
46.05	0	48.70	0
46.10	0	48.75	0
46.15	0	48.80	0
46.20	0	48.85	0
46.25	0	48.90	0
46.30	0	48.95	0
46.35	0	49.00	0
46.40	0	49.05	0
46.45	0	49.10	0
46.50	0	49.15	0
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		
47.05	0		
47.10	0		
47.15	0		
47.20	0		
47.25	0		
47.30	0		
47.35	0		
47.40	0		
47.45	0		
47.50	0		
47.55	0		
47.60	0		
47.65	0		
47.70	0		
47.75	0		
47.80	0		
47.85	0		
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		

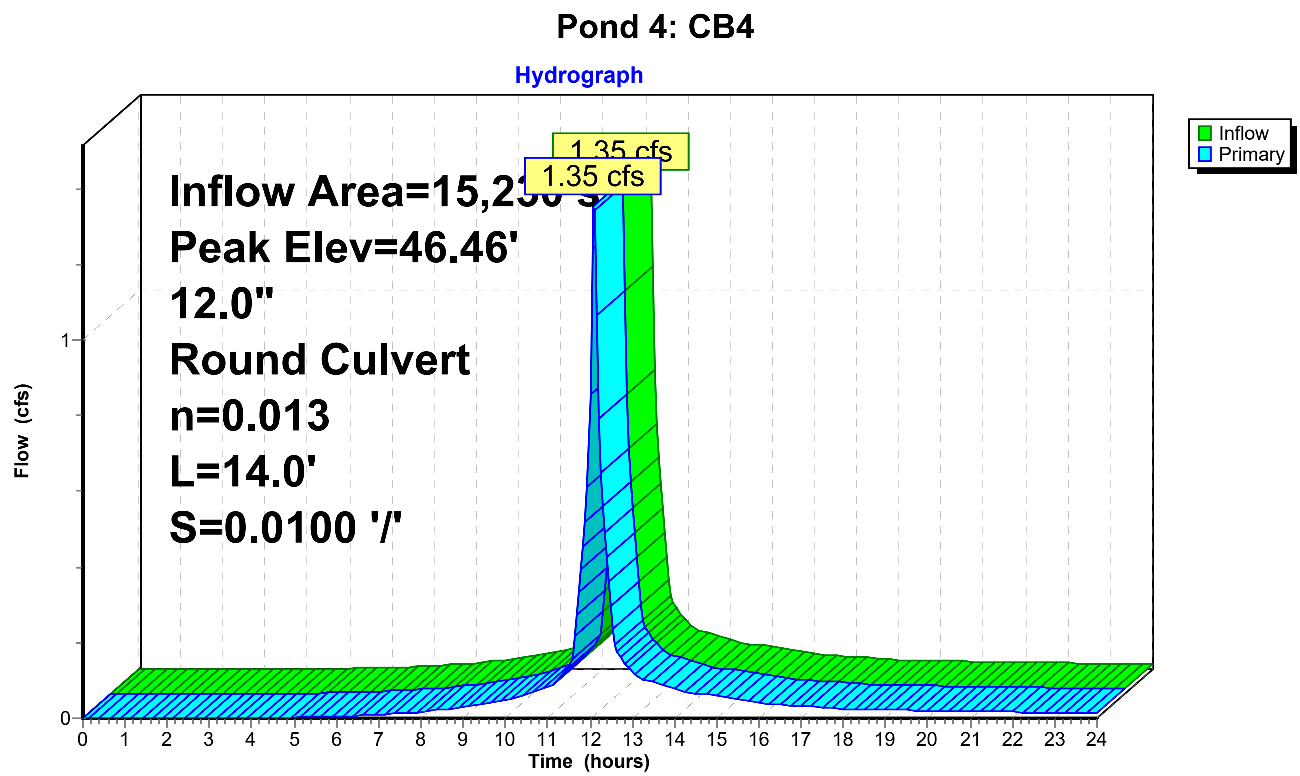
Summary for Pond 4: CB4

Inflow Area = 15,230 sf, 87.72% Impervious, Inflow Depth > 3.50" for 10-Year event
Inflow = 1.35 cfs @ 12.09 hrs, Volume= 4,436 cf
Outflow = 1.35 cfs @ 12.09 hrs, Volume= 4,436 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.35 cfs @ 12.09 hrs, Volume= 4,436 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.46' @ 12.09 hrs
Flood Elev= 49.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.76'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.76' / 45.62' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.32 cfs @ 12.09 hrs HW=46.45' TW=46.01' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 1.32 cfs @ 3.23 fps)



Stage-Area-Storage for Pond 4: CB4

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.76	**0**	48.41	0
45.81	0	48.46	0
45.86	0	48.51	0
45.91	0	48.56	0
45.96	0	48.61	0
46.01	0	48.66	0
46.06	0	48.71	0
46.11	0	48.76	0
46.16	0	48.81	0
46.21	0	48.86	0
46.26	0	48.91	0
46.31	0	48.96	0
46.36	0	49.01	0
46.41	0	49.06	0
46.46	0	49.11	0
46.51	0	49.16	0
46.56	0		
46.61	0		
46.66	0		
46.71	0		
46.76	0		
46.81	0		
46.86	0		
46.91	0		
46.96	0		
47.01	0		
47.06	0		
47.11	0		
47.16	0		
47.21	0		
47.26	0		
47.31	0		
47.36	0		
47.41	0		
47.46	0		
47.51	0		
47.56	0		
47.61	0		
47.66	0		
47.71	0		
47.76	0		
47.81	0		
47.86	0		
47.91	0		
47.96	0		
48.01	0		
48.06	0		
48.11	0		
48.16	0		
48.21	0		
48.26	0		
48.31	0		
48.36	0		

Summary for Pond 5: CB5

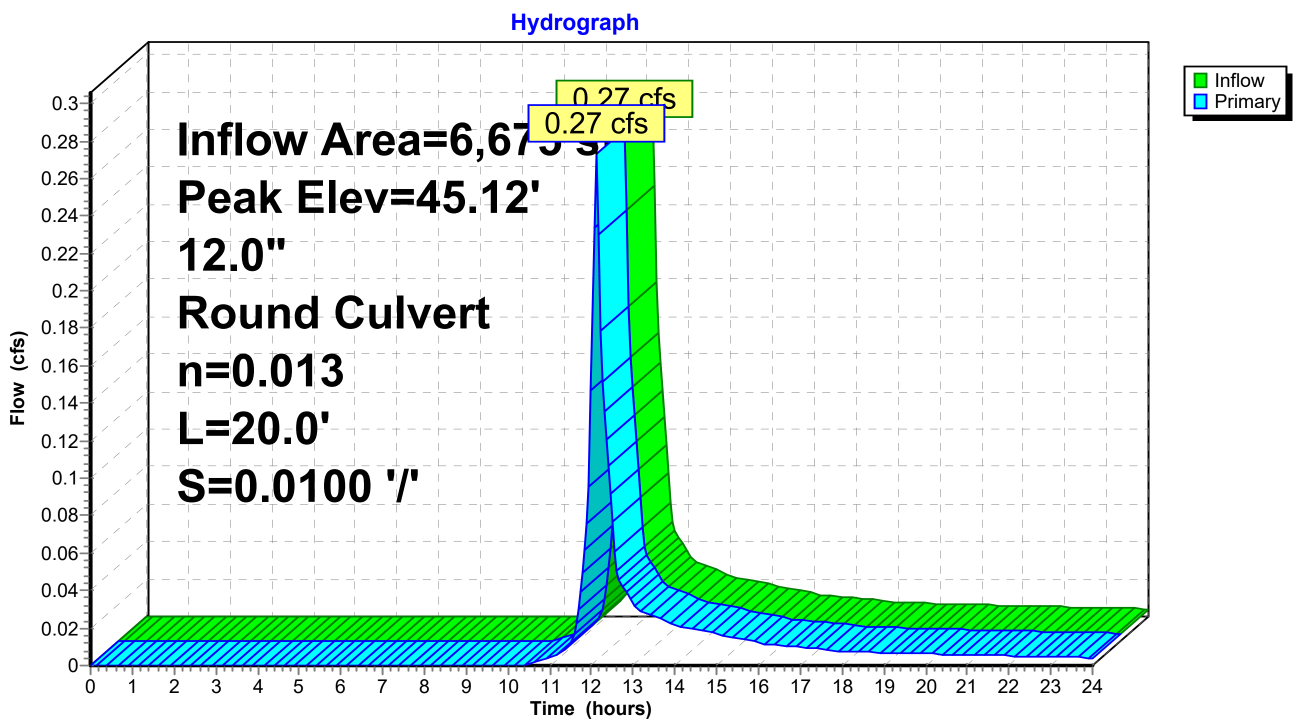
Inflow Area = 6,675 sf, 50.86% Impervious, Inflow Depth > 1.60" for 10-Year event
Inflow = 0.27 cfs @ 12.10 hrs, Volume= 890 cf
Outflow = 0.27 cfs @ 12.10 hrs, Volume= 890 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.27 cfs @ 12.10 hrs, Volume= 890 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.12' @ 12.13 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 44.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=45.07' TW=45.14' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 5: CB5



Stage-Area-Storage for Pond 5: CB5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	47.05	0
44.45	0	47.10	0
44.50	0	47.15	0
44.55	0	47.20	0
44.60	0	47.25	0
44.65	0	47.30	0
44.70	0	47.35	0
44.75	0	47.40	0
44.80	0	47.45	0
44.85	0	47.50	0
44.90	0	47.55	0
44.95	0	47.60	0
45.00	0	47.65	0
45.05	0	47.70	0
45.10	0	47.75	0
45.15	0	47.80	0
45.20	0		
45.25	0		
45.30	0		
45.35	0		
45.40	0		
45.45	0		
45.50	0		
45.55	0		
45.60	0		
45.65	0		
45.70	0		
45.75	0		
45.80	0		
45.85	0		
45.90	0		
45.95	0		
46.00	0		
46.05	0		
46.10	0		
46.15	0		
46.20	0		
46.25	0		
46.30	0		
46.35	0		
46.40	0		
46.45	0		
46.50	0		
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		

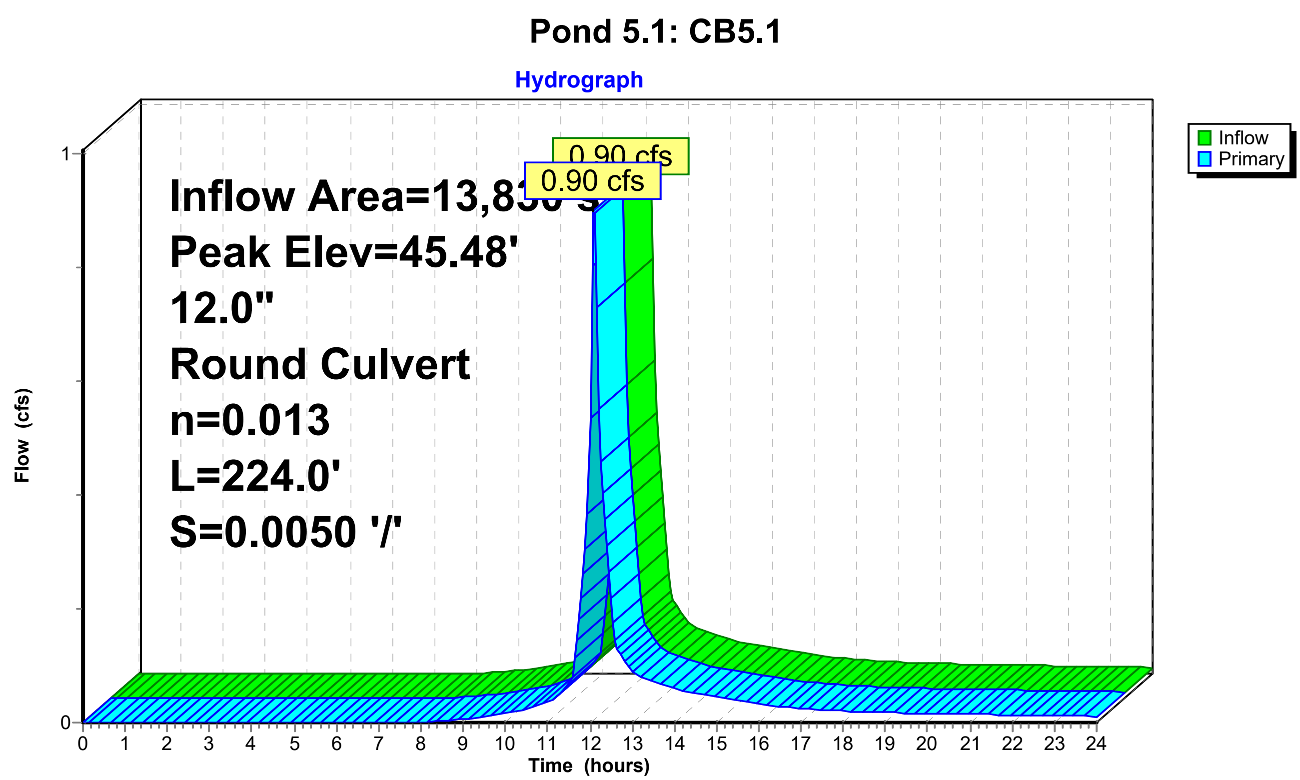
Summary for Pond 5.1: CB5.1

Inflow Area = 13,830 sf, 63.16% Impervious, Inflow Depth > 2.46" for 10-Year event
Inflow = 0.90 cfs @ 12.09 hrs, Volume= 2,834 cf
Outflow = 0.90 cfs @ 12.09 hrs, Volume= 2,834 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.90 cfs @ 12.09 hrs, Volume= 2,834 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.48' @ 12.10 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 43.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.71 cfs @ 12.09 hrs HW=45.44' TW=45.32' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.71 cfs @ 1.08 fps)



Stage-Area-Storage for Pond 5.1: CB5.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	47.05	0
44.45	0	47.10	0
44.50	0	47.15	0
44.55	0	47.20	0
44.60	0	47.25	0
44.65	0	47.30	0
44.70	0	47.35	0
44.75	0	47.40	0
44.80	0	47.45	0
44.85	0	47.50	0
44.90	0	47.55	0
44.95	0	47.60	0
45.00	0	47.65	0
45.05	0	47.70	0
45.10	0	47.75	0
45.15	0	47.80	0
45.20	0		
45.25	0		
45.30	0		
45.35	0		
45.40	0		
45.45	0		
45.50	0		
45.55	0		
45.60	0		
45.65	0		
45.70	0		
45.75	0		
45.80	0		
45.85	0		
45.90	0		
45.95	0		
46.00	0		
46.05	0		
46.10	0		
46.15	0		
46.20	0		
46.25	0		
46.30	0		
46.35	0		
46.40	0		
46.45	0		
46.50	0		
46.55	0		
46.60	0		
46.65	0		
46.70	0		
46.75	0		
46.80	0		
46.85	0		
46.90	0		
46.95	0		
47.00	0		

Summary for Pond 6: CB6

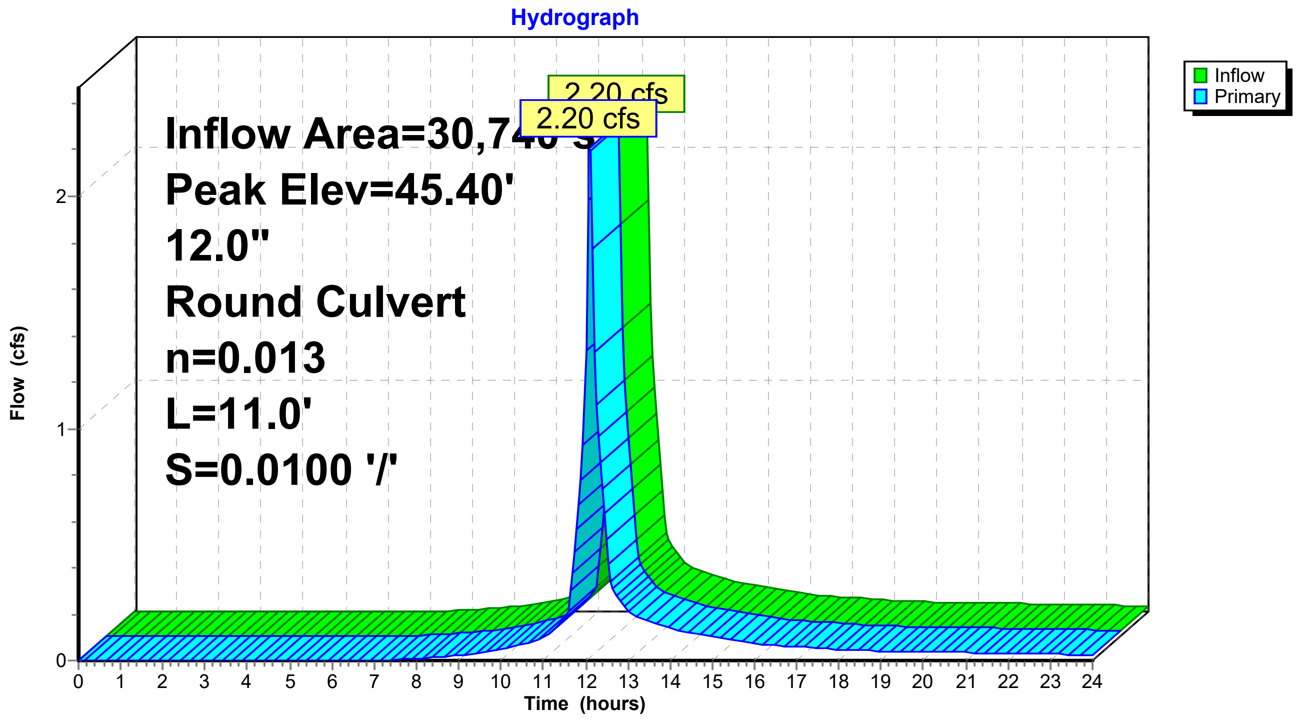
Inflow Area = 30,740 sf, 21.05% Impervious, Inflow Depth > 2.72" for 10-Year event
Inflow = 2.20 cfs @ 12.09 hrs, Volume= 6,976 cf
Outflow = 2.20 cfs @ 12.09 hrs, Volume= 6,976 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.20 cfs @ 12.09 hrs, Volume= 6,976 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.40' @ 12.10 hrs
Flood Elev= 47.79'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.39'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.39' / 44.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.96 cfs @ 12.09 hrs HW=45.38' TW=45.11' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 1.96 cfs @ 3.13 fps)

Pond 6: CB6



Stage-Area-Storage for Pond 6: CB6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.39	**0**	47.04	0
44.44	0	47.09	0
44.49	0	47.14	0
44.54	0	47.19	0
44.59	0	47.24	0
44.64	0	47.29	0
44.69	0	47.34	0
44.74	0	47.39	0
44.79	0	47.44	0
44.84	0	47.49	0
44.89	0	47.54	0
44.94	0	47.59	0
44.99	0	47.64	0
45.04	0	47.69	0
45.09	0	47.74	0
45.14	0	47.79	0
45.19	0		
45.24	0		
45.29	0		
45.34	0		
45.39	0		
45.44	0		
45.49	0		
45.54	0		
45.59	0		
45.64	0		
45.69	0		
45.74	0		
45.79	0		
45.84	0		
45.89	0		
45.94	0		
45.99	0		
46.04	0		
46.09	0		
46.14	0		
46.19	0		
46.24	0		
46.29	0		
46.34	0		
46.39	0		
46.44	0		
46.49	0		
46.54	0		
46.59	0		
46.64	0		
46.69	0		
46.74	0		
46.79	0		
46.84	0		
46.89	0		
46.94	0		
46.99	0		

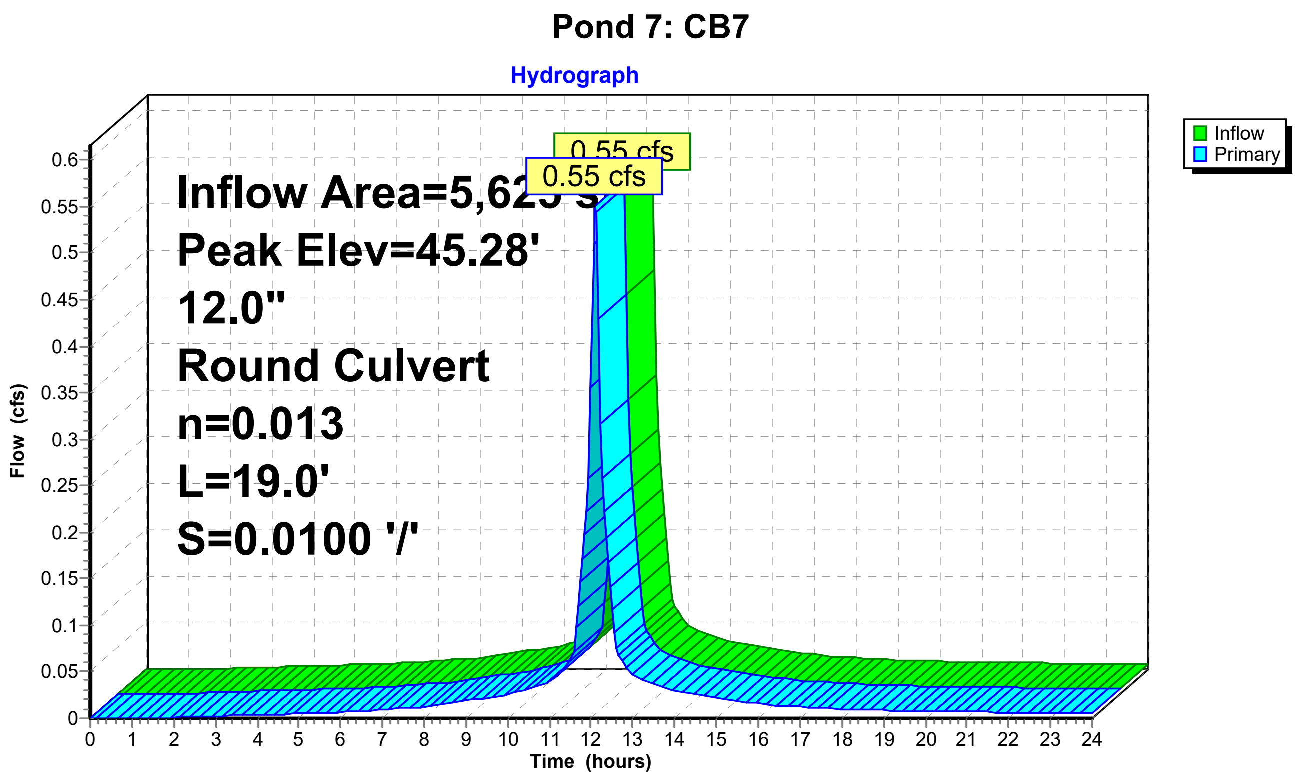
Summary for Pond 7: CB7

Inflow Area =	5,625 sf, 44.44% Impervious,	Inflow Depth > 4.15"	for 10-Year event
Inflow =	0.55 cfs @ 12.09 hrs, Volume=	1,944 cf	
Outflow =	0.55 cfs @ 12.09 hrs, Volume=	1,944 cf, Atten= 0%, Lag= 0.0 min	
Primary =	0.55 cfs @ 12.09 hrs, Volume=	1,944 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.28' @ 12.09 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.69' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.09 hrs HW=45.28' TW=44.69' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 0.53 cfs @ 2.73 fps)



Stage-Area-Storage for Pond 7: CB7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.88	**0**	47.53	0
44.93	0	47.58	0
44.98	0	47.63	0
45.03	0	47.68	0
45.08	0	47.73	0
45.13	0	47.78	0
45.18	0	47.83	0
45.23	0	47.88	0
45.28	0	47.93	0
45.33	0	47.98	0
45.38	0	48.03	0
45.43	0	48.08	0
45.48	0	48.13	0
45.53	0	48.18	0
45.58	0	48.23	0
45.63	0	48.28	0
45.68	0		
45.73	0		
45.78	0		
45.83	0		
45.88	0		
45.93	0		
45.98	0		
46.03	0		
46.08	0		
46.13	0		
46.18	0		
46.23	0		
46.28	0		
46.33	0		
46.38	0		
46.43	0		
46.48	0		
46.53	0		
46.58	0		
46.63	0		
46.68	0		
46.73	0		
46.78	0		
46.83	0		
46.88	0		
46.93	0		
46.98	0		
47.03	0		
47.08	0		
47.13	0		
47.18	0		
47.23	0		
47.28	0		
47.33	0		
47.38	0		
47.43	0		
47.48	0		

Summary for Pond 8: CB8

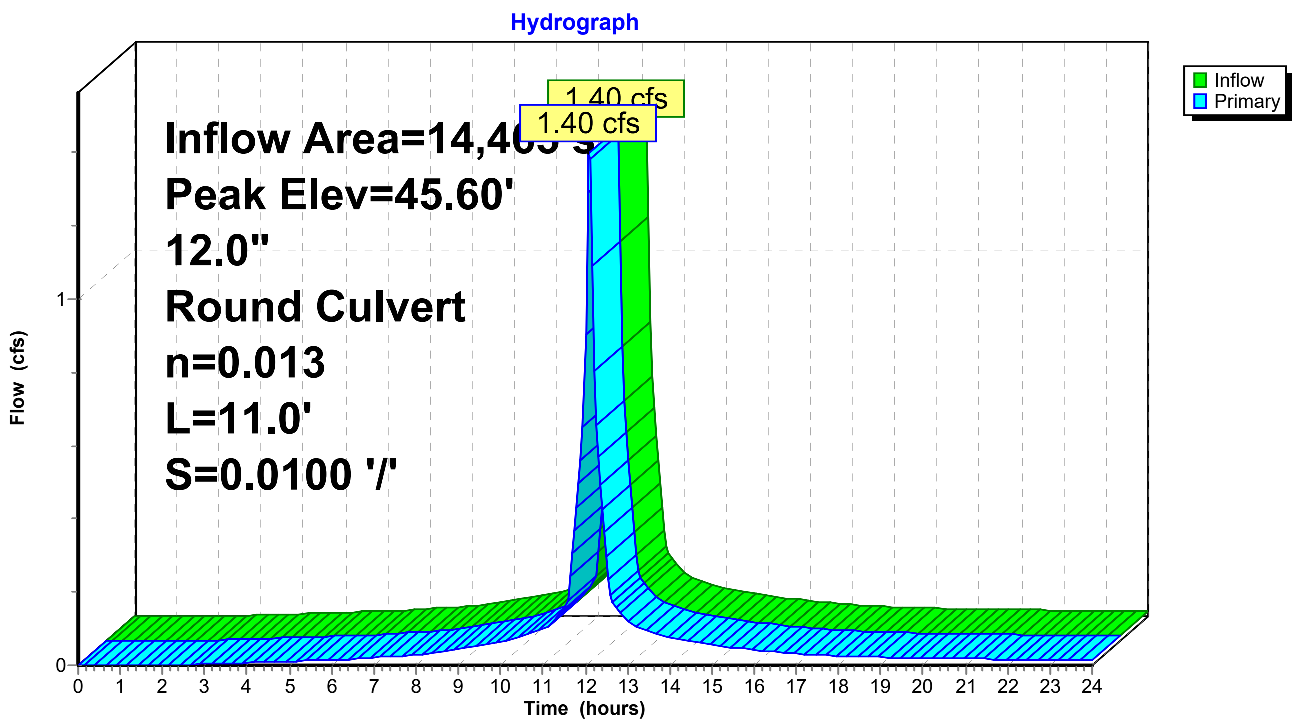
Inflow Area =	14,465 sf,	70.83% Impervious,	Inflow Depth > 4.03"	for 10-Year event
Inflow =	1.40 cfs @	12.09 hrs, Volume=	4,862 cf	
Outflow =	1.40 cfs @	12.09 hrs, Volume=	4,862 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.40 cfs @	12.09 hrs, Volume=	4,862 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.60' @ 12.09 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.77' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.36 cfs @ 12.09 hrs HW=45.59' TW=44.69' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 1.36 cfs @ 3.19 fps)

Pond 8: CB8



Stage-Area-Storage for Pond 8: CB8

Elevation (feet)	Storage (cubic-feet)
44.88	**0**
44.93	0
44.98	0
45.03	0
45.08	0
45.13	0
45.18	0
45.23	0
45.28	0
45.33	0
45.38	0
45.43	0
45.48	0
45.53	0
45.58	0
45.63	0
45.68	0
45.73	0
45.78	0
45.83	0
45.88	0
45.93	0
45.98	0
46.03	0
46.08	0
46.13	0
46.18	0
46.23	0
46.28	0
46.33	0
46.38	0
46.43	0
46.48	0
46.53	0
46.58	0
46.63	0
46.68	0
46.73	0
46.78	0
46.83	0
46.88	0
46.93	0
46.98	0
47.03	0
47.08	0
47.13	0
47.18	0
47.23	0
47.28	0
47.33	0
47.38	0
47.43	0
47.48	0

Elevation (feet)	Storage (cubic-feet)
47.53	0
47.58	0
47.63	0
47.68	0
47.73	0
47.78	0
47.83	0
47.88	0
47.93	0
47.98	0
48.03	0
48.08	0
48.13	0
48.18	0
48.23	0
48.28	0

Summary for Pond 8.1: CB8.1

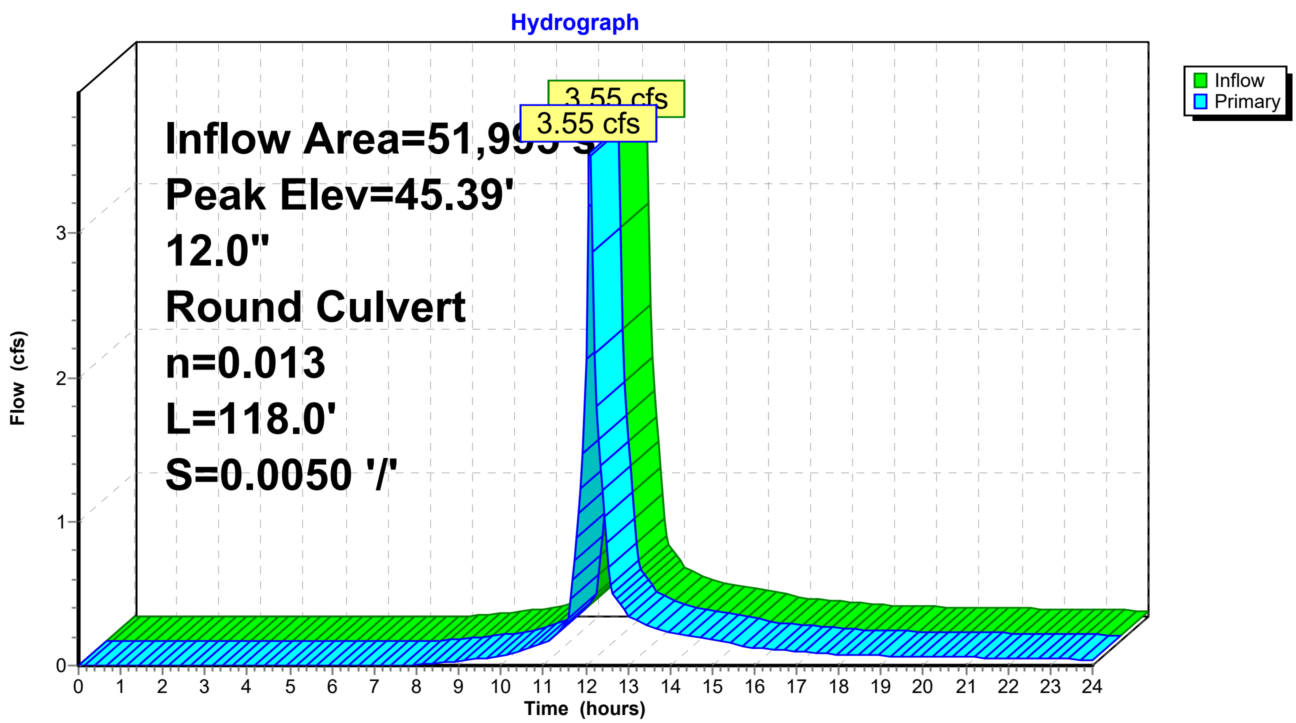
Inflow Area = 51,995 sf, 41.63% Impervious, Inflow Depth > 2.59" for 10-Year event
Inflow = 3.55 cfs @ 12.09 hrs, Volume= 11,211 cf
Outflow = 3.55 cfs @ 12.09 hrs, Volume= 11,211 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.55 cfs @ 12.09 hrs, Volume= 11,211 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.39' @ 12.09 hrs
Flood Elev= 48.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.18'	**12.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.18' / 42.59' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.44 cfs @ 12.09 hrs HW=45.31' TW=43.76' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 3.44 cfs @ 4.38 fps)

Pond 8.1: CB8.1



Stage-Area-Storage for Pond 8.1: CB8.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.18	**0**	45.30	0	47.42	0
43.22	0	45.34	0	47.46	0
43.26	0	45.38	0	47.50	0
43.30	0	45.42	0	47.54	0
43.34	0	45.46	0	47.58	0
43.38	0	45.50	0	47.62	0
43.42	0	45.54	0	47.66	0
43.46	0	45.58	0	47.70	0
43.50	0	45.62	0	47.74	0
43.54	0	45.66	0	47.78	0
43.58	0	45.70	0	47.82	0
43.62	0	45.74	0	47.86	0
43.66	0	45.78	0	47.90	0
43.70	0	45.82	0	47.94	0
43.74	0	45.86	0	47.98	0
43.78	0	45.90	0	48.02	0
43.82	0	45.94	0	48.06	0
43.86	0	45.98	0	48.10	0
43.90	0	46.02	0	48.14	0
43.94	0	46.06	0	48.18	0
43.98	0	46.10	0		
44.02	0	46.14	0		
44.06	0	46.18	0		
44.10	0	46.22	0		
44.14	0	46.26	0		
44.18	0	46.30	0		
44.22	0	46.34	0		
44.26	0	46.38	0		
44.30	0	46.42	0		
44.34	0	46.46	0		
44.38	0	46.50	0		
44.42	0	46.54	0		
44.46	0	46.58	0		
44.50	0	46.62	0		
44.54	0	46.66	0		
44.58	0	46.70	0		
44.62	0	46.74	0		
44.66	0	46.78	0		
44.70	0	46.82	0		
44.74	0	46.86	0		
44.78	0	46.90	0		
44.82	0	46.94	0		
44.86	0	46.98	0		
44.90	0	47.02	0		
44.94	0	47.06	0		
44.98	0	47.10	0		
45.02	0	47.14	0		
45.06	0	47.18	0		
45.10	0	47.22	0		
45.14	0	47.26	0		
45.18	0	47.30	0		
45.22	0	47.34	0		
45.26	0	47.38	0		

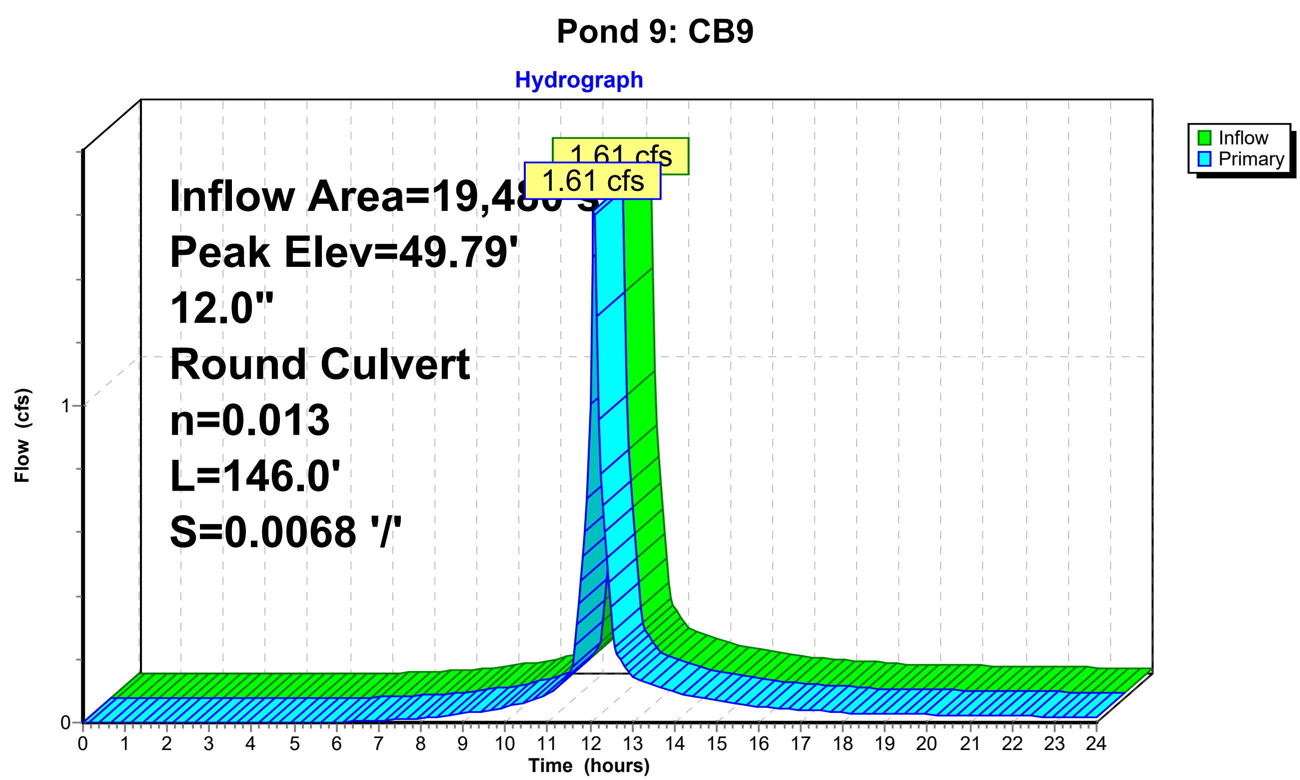
Summary for Pond 9: CB9

Inflow Area = 19,480 sf, 3.08% Impervious, Inflow Depth > 3.19" for 10-Year event
Inflow = 1.61 cfs @ 12.09 hrs, Volume= 5,185 cf
Outflow = 1.61 cfs @ 12.09 hrs, Volume= 5,185 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.61 cfs @ 12.09 hrs, Volume= 5,185 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 49.79' @ 12.13 hrs
Flood Elev= 50.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.30'	**12.0" Round Culvert** L= 146.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.30' / 47.30' S= 0.0068 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.19 cfs @ 12.09 hrs HW=49.63' TW=49.42' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.19 cfs @ 1.51 fps)



Stage-Area-Storage for Pond 9: CB9

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
48.30	**0**	49.36	0	50.42	0
48.32	0	49.38	0	50.44	0
48.34	0	49.40	0	50.46	0
48.36	0	49.42	0	50.48	0
48.38	0	49.44	0	50.50	0
48.40	0	49.46	0	50.52	0
48.42	0	49.48	0	50.54	0
48.44	0	49.50	0	50.56	0
48.46	0	49.52	0	50.58	0
48.48	0	49.54	0	50.60	0
48.50	0	49.56	0	50.62	0
48.52	0	49.58	0	50.64	0
48.54	0	49.60	0	50.66	0
48.56	0	49.62	0	50.68	0
48.58	0	49.64	0	50.70	0
48.60	0	49.66	0	50.72	0
48.62	0	49.68	0	50.74	0
48.64	0	49.70	0	50.76	0
48.66	0	49.72	0	50.78	0
48.68	0	49.74	0	50.80	0
48.70	0	49.76	0		
48.72	0	49.78	0		
48.74	0	49.80	0		
48.76	0	49.82	0		
48.78	0	49.84	0		
48.80	0	49.86	0		
48.82	0	49.88	0		
48.84	0	49.90	0		
48.86	0	49.92	0		
48.88	0	49.94	0		
48.90	0	49.96	0		
48.92	0	49.98	0		
48.94	0	50.00	0		
48.96	0	50.02	0		
48.98	0	50.04	0		
49.00	0	50.06	0		
49.02	0	50.08	0		
49.04	0	50.10	0		
49.06	0	50.12	0		
49.08	0	50.14	0		
49.10	0	50.16	0		
49.12	0	50.18	0		
49.14	0	50.20	0		
49.16	0	50.22	0		
49.18	0	50.24	0		
49.20	0	50.26	0		
49.22	0	50.28	0		
49.24	0	50.30	0		
49.26	0	50.32	0		
49.28	0	50.34	0		
49.30	0	50.36	0		
49.32	0	50.38	0		
49.34	0	50.40	0		

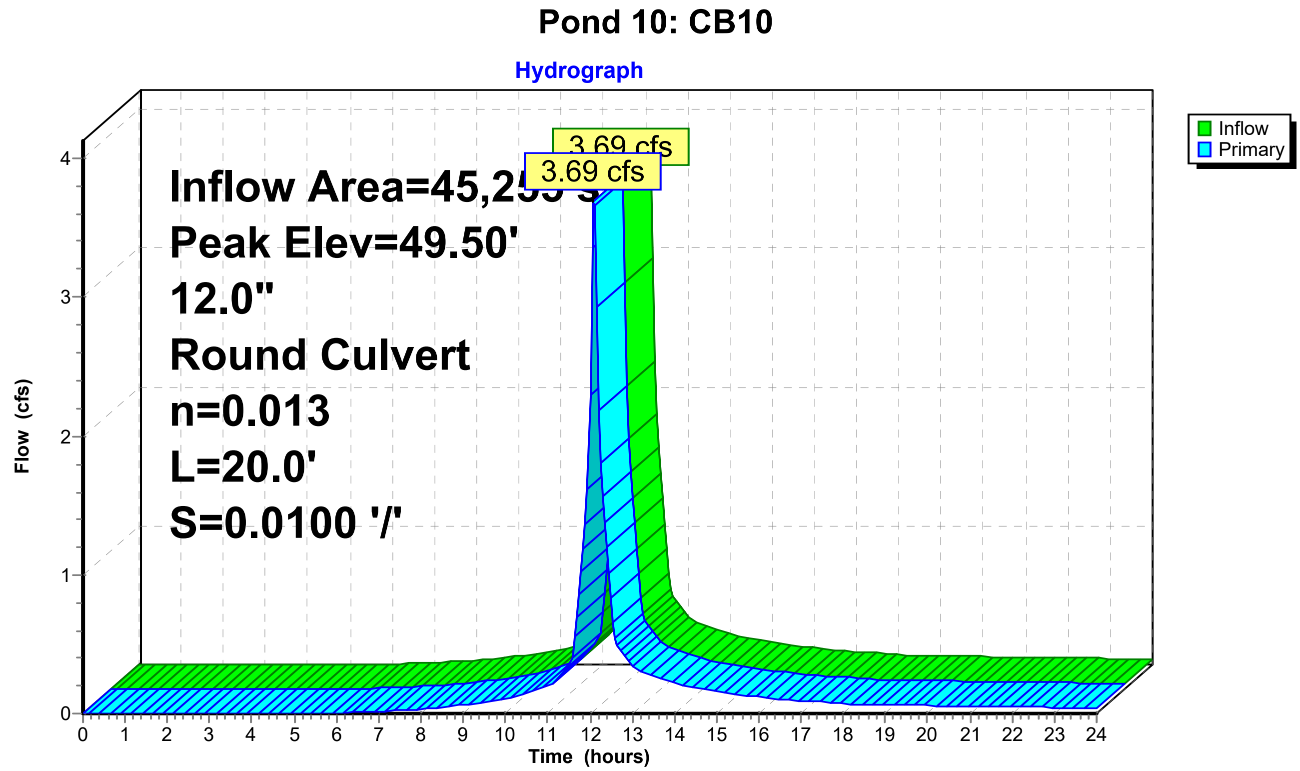
Summary for Pond 10: CB10

Inflow Area =	45,255 sf,	1.33% Impervious,	Inflow Depth > 3.14"	for 10-Year event
Inflow =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf	
Outflow =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf, Atten= 0%, Lag= 0.0 min	
Primary =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 49.50' @ 12.10 hrs
Flood Elev= 50.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.20'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.20' / 47.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.01 cfs @ 12.09 hrs HW=49.42' TW=48.79' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 3.01 cfs @ 3.83 fps)



Stage-Area-Storage for Pond 10: CB10

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.20	**0**	49.85	0
47.25	0	49.90	0
47.30	0	49.95	0
47.35	0	50.00	0
47.40	0	50.05	0
47.45	0	50.10	0
47.50	0	50.15	0
47.55	0	50.20	0
47.60	0	50.25	0
47.65	0	50.30	0
47.70	0	50.35	0
47.75	0	50.40	0
47.80	0	50.45	0
47.85	0	50.50	0
47.90	0		
47.95	0		
48.00	0		
48.05	0		
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		
49.25	0		
49.30	0		
49.35	0		
49.40	0		
49.45	0		
49.50	0		
49.55	0		
49.60	0		
49.65	0		
49.70	0		
49.75	0		
49.80	0		

Summary for Pond 104P: Inf Area 2

Inflow Area = 100,255 sf, 0.60% Impervious, Inflow Depth > 3.63" for 10-Year event
Inflow = 9.00 cfs @ 12.09 hrs, Volume= 30,322 cf
Outflow = 2.14 cfs @ 12.48 hrs, Volume= 30,345 cf, Atten= 76%, Lag= 23.6 min
Discarded = 2.06 cfs @ 12.48 hrs, Volume= 30,135 cf
Primary = 0.08 cfs @ 12.48 hrs, Volume= 210 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.90' @ 12.48 hrs Surf.Area= 4,886 sf Storage= 8,060 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.7 min (806.3 - 779.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	46.50'	4,360 cf	**44.25'W x 110.42'L x 3.50'H Field A** 17,101 cf Overall - 6,202 cf Embedded = 10,899 cf x 40.0% Voids
#2A	47.00'	6,202 cf	**ADS_StormTech SC-740 +Cap** x 135 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 135 Chambers in 9 Rows
		10,561 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 44.50'
#2	Primary	46.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.50' / 44.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	49.20'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	48.20'	**2.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=2.05 cfs @ 12.48 hrs HW=48.89' (Free Discharge)
└─**1=Exfiltration** (Controls 2.05 cfs)

Primary OutFlow Max=0.08 cfs @ 12.48 hrs HW=48.89' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Passes 0.08 cfs of 4.11 cfs potential flow)
  ├─**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)
  └─**4=Orifice/Grate** (Orifice Controls 0.08 cfs @ 3.76 fps)

Pond 104P: Inf Area 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTechSC-740 +Cap (ADS StormTech®SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

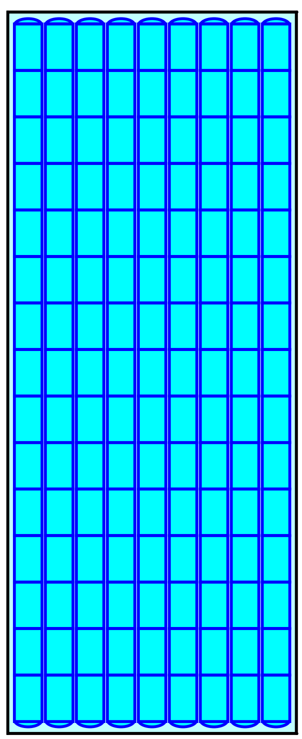
15 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 108.42' Row Length +12.0" End Stone x 2 = 110.42' Base Length
9 Rows x 51.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 44.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

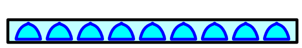
135 Chambers x 45.9 cf = 6,201.9 cf Chamber Storage

17,100.8 cf Field - 6,201.9 cf Chambers = 10,898.9 cf Stone x 40.0% Voids = 4,359.6 cf Stone Storage

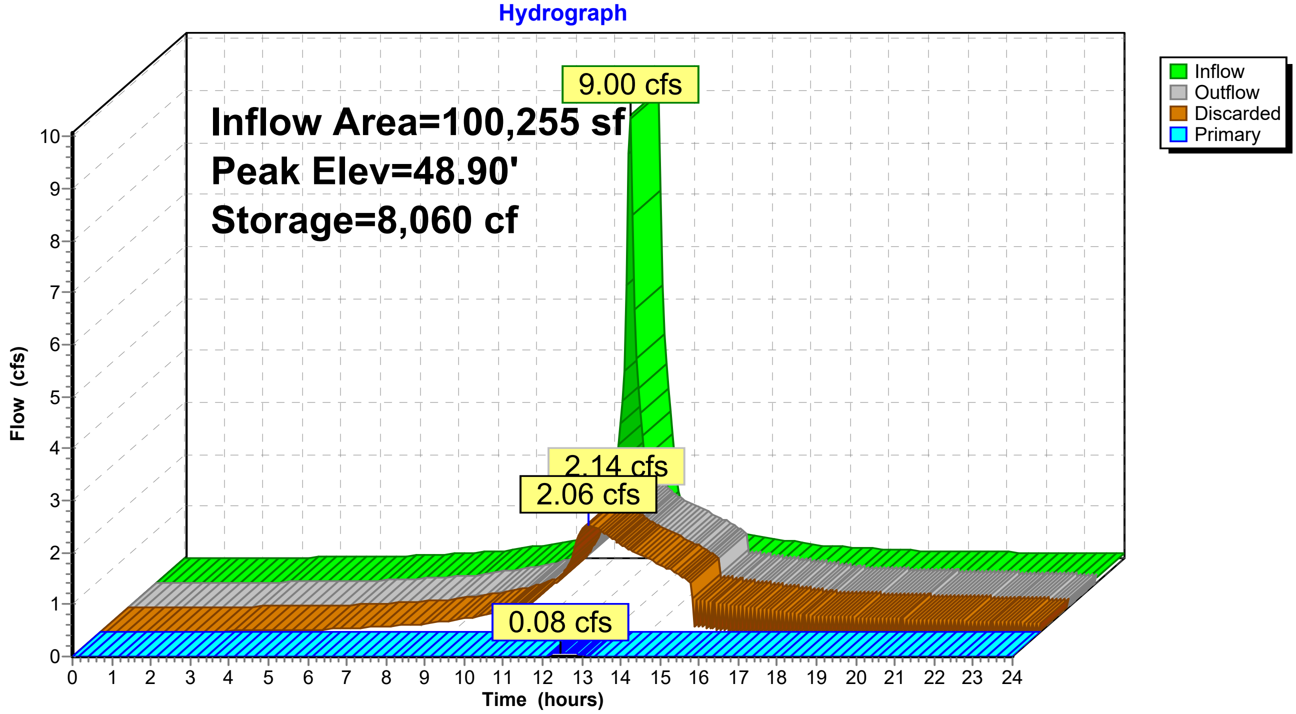
Chamber Storage + Stone Storage = 10,561.5 cf = 0.242 af
Overall Storage Efficiency = 61.8%
Overall System Size = 110.42' x 44.25' x 3.50'

135 Chambers
633.4 cy Field
403.7 cy Stone





Pond 104P: Inf Area 2



Stage-Area-Storage for Pond 104P: Inf Area 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
46.50	**4,886**	0	49.15	4,886	8,797
46.55	4,886	98	49.20	4,886	8,927
46.60	4,886	195	49.25	4,886	9,050
46.65	4,886	293	49.30	4,886	9,167
46.70	4,886	391	49.35	4,886	9,276
46.75	4,886	489	49.40	4,886	9,382
46.80	4,886	586	49.45	4,886	9,485
46.85	4,886	684	49.50	4,886	9,584
46.90	4,886	782	49.55	4,886	9,682
46.95	4,886	879	49.60	4,886	9,780
47.00	4,886	977	49.65	4,886	9,877
47.05	4,886	1,182	49.70	4,886	9,975
47.10	4,886	1,387	49.75	4,886	10,073
47.15	4,886	1,591	49.80	4,886	10,171
47.20	4,886	1,795	49.85	4,886	10,268
47.25	4,886	1,999	49.90	4,886	10,366
47.30	4,886	2,202	49.95	4,886	10,464
47.35	4,886	2,404	50.00	4,886	**10,561**
47.40	4,886	2,605			
47.45	4,886	2,805			
47.50	4,886	3,005			
47.55	4,886	3,204			
47.60	4,886	3,402			
47.65	4,886	3,599			
47.70	4,886	3,795			
47.75	4,886	3,990			
47.80	4,886	4,184			
47.85	4,886	4,376			
47.90	4,886	4,568			
47.95	4,886	4,759			
48.00	4,886	4,948			
48.05	4,886	5,136			
48.10	4,886	5,323			
48.15	4,886	5,509			
48.20	4,886	5,692			
48.25	4,886	5,875			
48.30	4,886	6,056			
48.35	4,886	6,235			
48.40	4,886	6,413			
48.45	4,886	6,588			
48.50	4,886	6,762			
48.55	4,886	6,935			
48.60	4,886	7,105			
48.65	4,886	7,273			
48.70	4,886	7,438			
48.75	4,886	7,601			
48.80	4,886	7,761			
48.85	4,886	7,919			
48.90	4,886	8,074			
48.95	4,886	8,226			
49.00	4,886	8,374			
49.05	4,886	8,519			
49.10	4,886	8,660			

Summary for Pond A: DMH 1

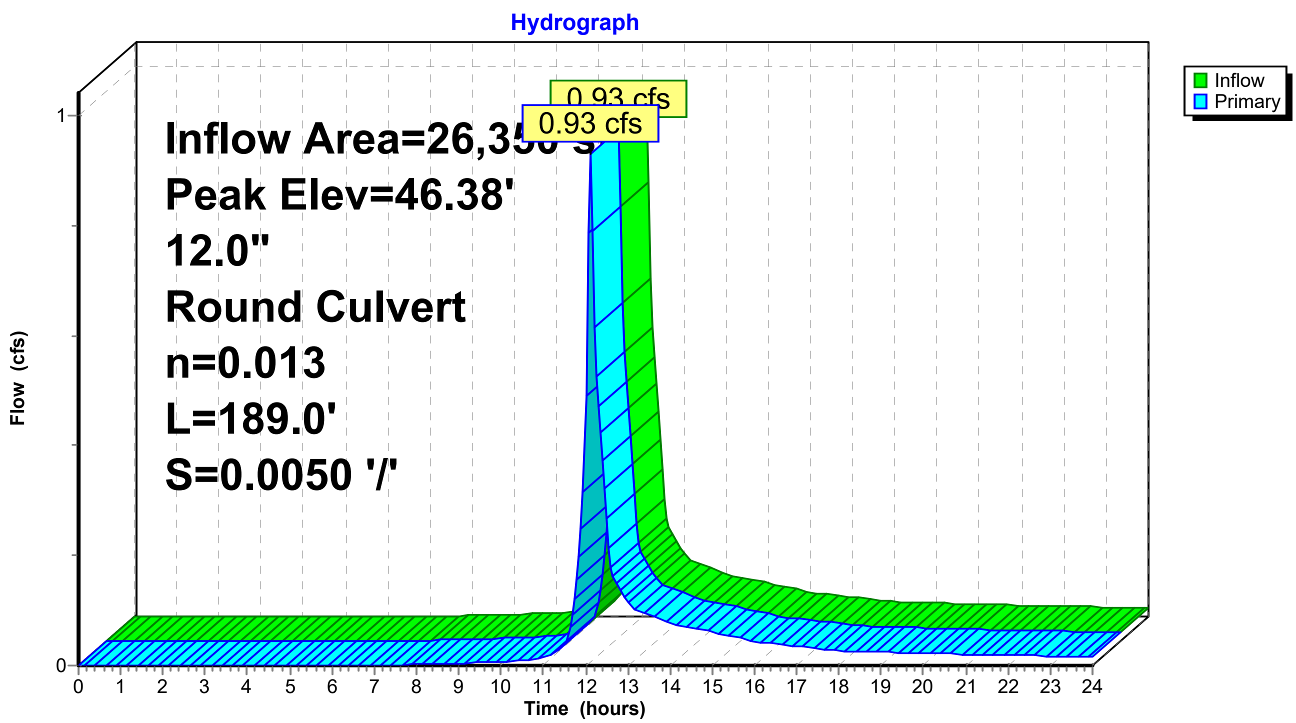
Inflow Area = 26,350 sf, 45.43% Impervious, Inflow Depth > 1.44" for 10-Year event
Inflow = 0.93 cfs @ 12.10 hrs, Volume= 3,164 cf
Outflow = 0.93 cfs @ 12.10 hrs, Volume= 3,164 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.10 hrs, Volume= 3,164 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.38' @ 12.10 hrs
Flood Elev= 51.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.60'	**12.0" Round Culvert** L= 189.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.60' / 44.66' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.10 hrs HW=46.38' TW=46.12' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 0.76 cfs @ 1.60 fps)

Pond A: DMH 1



Stage-Area-Storage for Pond A: DMH 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.60	**0**	47.72	0	49.84	0
45.64	0	47.76	0	49.88	0
45.68	0	47.80	0	49.92	0
45.72	0	47.84	0	49.96	0
45.76	0	47.88	0	50.00	0
45.80	0	47.92	0	50.04	0
45.84	0	47.96	0	50.08	0
45.88	0	48.00	0	50.12	0
45.92	0	48.04	0	50.16	0
45.96	0	48.08	0	50.20	0
46.00	0	48.12	0	50.24	0
46.04	0	48.16	0	50.28	0
46.08	0	48.20	0	50.32	0
46.12	0	48.24	0	50.36	0
46.16	0	48.28	0	50.40	0
46.20	0	48.32	0	50.44	0
46.24	0	48.36	0	50.48	0
46.28	0	48.40	0	50.52	0
46.32	0	48.44	0	50.56	0
46.36	0	48.48	0	50.60	0
46.40	0	48.52	0	50.64	0
46.44	0	48.56	0	50.68	0
46.48	0	48.60	0	50.72	0
46.52	0	48.64	0	50.76	0
46.56	0	48.68	0	50.80	0
46.60	0	48.72	0	50.84	0
46.64	0	48.76	0	50.88	0
46.68	0	48.80	0	50.92	0
46.72	0	48.84	0	50.96	0
46.76	0	48.88	0	51.00	0
46.80	0	48.92	0	51.04	0
46.84	0	48.96	0	51.08	0
46.88	0	49.00	0	51.12	0
46.92	0	49.04	0	51.16	0
46.96	0	49.08	0	51.20	0
47.00	0	49.12	0	51.24	0
47.04	0	49.16	0	51.28	0
47.08	0	49.20	0	51.32	0
47.12	0	49.24	0	51.36	0
47.16	0	49.28	0		
47.20	0	49.32	0		
47.24	0	49.36	0		
47.28	0	49.40	0		
47.32	0	49.44	0		
47.36	0	49.48	0		
47.40	0	49.52	0		
47.44	0	49.56	0		
47.48	0	49.60	0		
47.52	0	49.64	0		
47.56	0	49.68	0		
47.60	0	49.72	0		
47.64	0	49.76	0		
47.68	0	49.80	0		

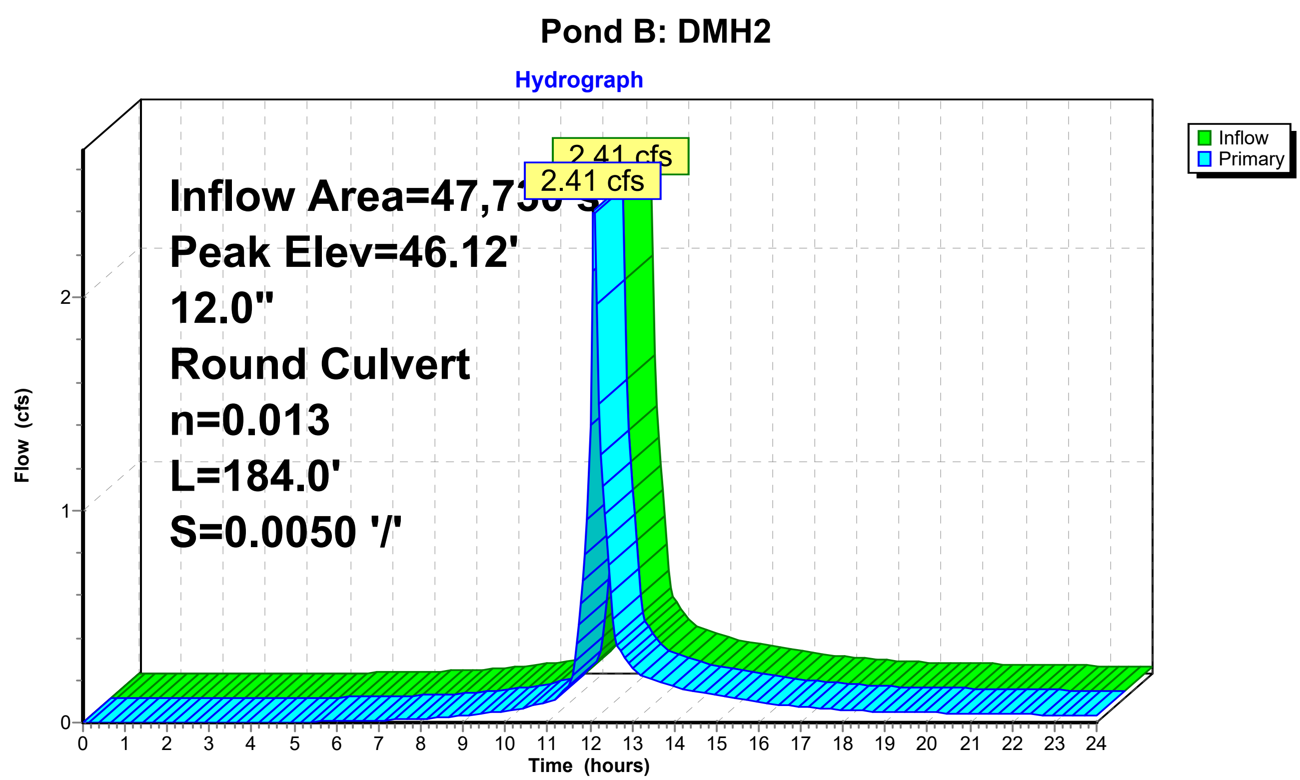
Summary for Pond B: DMH2

Inflow Area =	47,730 sf, 57.36% Impervious,	Inflow Depth > 2.03"	for 10-Year event	
Inflow =	2.41 cfs @	12.09 hrs, Volume=	8,092 cf	
Outflow =	2.41 cfs @	12.09 hrs, Volume=	8,092 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.41 cfs @	12.09 hrs, Volume=	8,092 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.12' @ 12.10 hrs
Flood Elev= 49.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.56'	**12.0" Round Culvert** L= 184.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.56' / 43.64' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=2.27 cfs @ 12.09 hrs HW=46.06' TW=45.12' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 2.27 cfs @ 2.89 fps)



Stage-Area-Storage for Pond B: DMH2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.56	**0**	47.21	0
44.61	0	47.26	0
44.66	0	47.31	0
44.71	0	47.36	0
44.76	0	47.41	0
44.81	0	47.46	0
44.86	0	47.51	0
44.91	0	47.56	0
44.96	0	47.61	0
45.01	0	47.66	0
45.06	0	47.71	0
45.11	0	47.76	0
45.16	0	47.81	0
45.21	0	47.86	0
45.26	0	47.91	0
45.31	0	47.96	0
45.36	0	48.01	0
45.41	0	48.06	0
45.46	0	48.11	0
45.51	0	48.16	0
45.56	0	48.21	0
45.61	0	48.26	0
45.66	0	48.31	0
45.71	0	48.36	0
45.76	0	48.41	0
45.81	0	48.46	0
45.86	0	48.51	0
45.91	0	48.56	0
45.96	0	48.61	0
46.01	0	48.66	0
46.06	0	48.71	0
46.11	0	48.76	0
46.16	0	48.81	0
46.21	0	48.86	0
46.26	0	48.91	0
46.31	0	48.96	0
46.36	0	49.01	0
46.41	0	49.06	0
46.46	0	49.11	0
46.51	0	49.16	0
46.56	0	49.21	0
46.61	0	49.26	0
46.66	0	49.31	0
46.71	0	49.36	0
46.76	0	49.41	0
46.81	0	49.46	0
46.86	0		
46.91	0		
46.96	0		
47.01	0		
47.06	0		
47.11	0		
47.16	0		

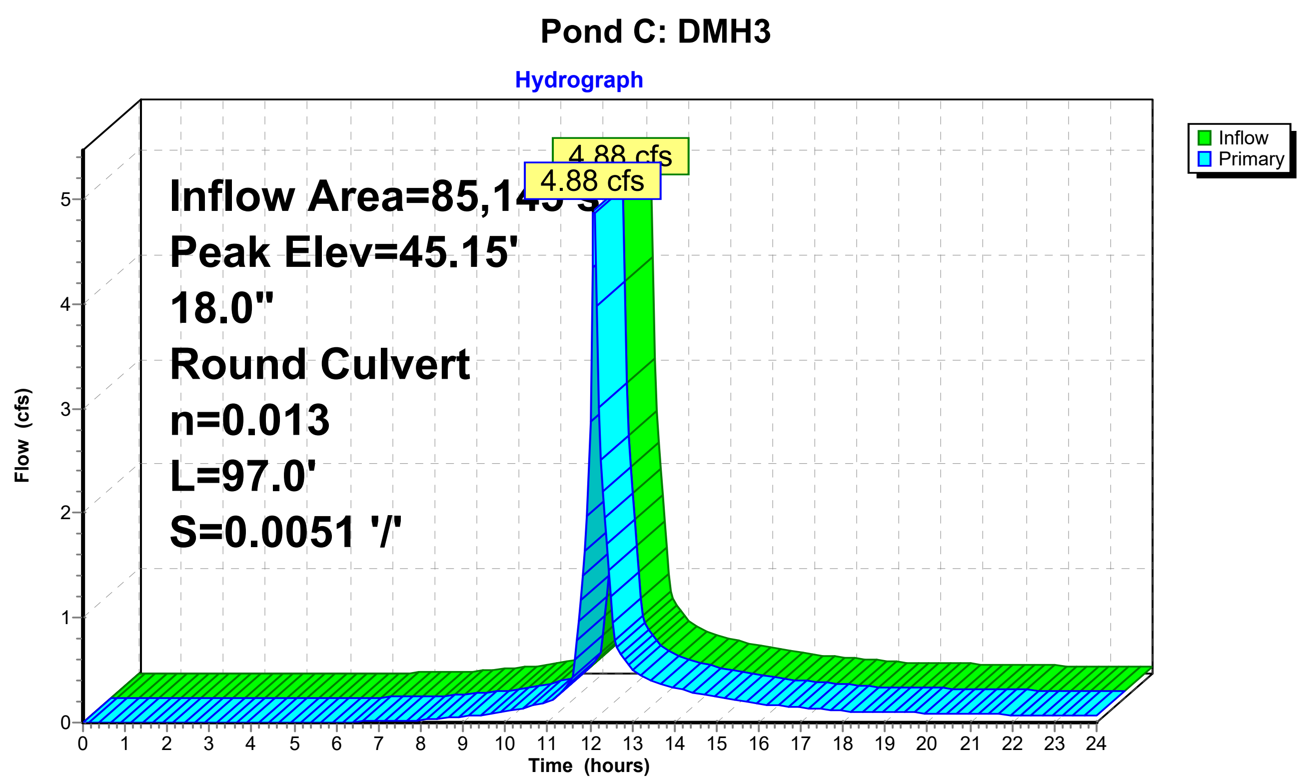
Summary for Pond C: DMH3

Inflow Area =	85,145 sf,	43.74% Impervious,	Inflow Depth > 2.25"	for 10-Year event
Inflow =	4.88 cfs @	12.09 hrs, Volume=	15,958 cf	
Outflow =	4.88 cfs @	12.09 hrs, Volume=	15,958 cf,	Atten= 0%, Lag= 0.0 min
Primary =	4.88 cfs @	12.09 hrs, Volume=	15,958 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 45.15' @ 12.10 hrs
Flood Elev= 48.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.54'	**18.0" Round Culvert** L= 97.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.54' / 43.05' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=4.49 cfs @ 12.09 hrs HW=45.12' TW=44.72' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 4.49 cfs @ 3.00 fps)



Stage-Area-Storage for Pond C: DMH3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.54	**0**	46.19	0
43.59	0	46.24	0
43.64	0	46.29	0
43.69	0	46.34	0
43.74	0	46.39	0
43.79	0	46.44	0
43.84	0	46.49	0
43.89	0	46.54	0
43.94	0	46.59	0
43.99	0	46.64	0
44.04	0	46.69	0
44.09	0	46.74	0
44.14	0	46.79	0
44.19	0	46.84	0
44.24	0	46.89	0
44.29	0	46.94	0
44.34	0	46.99	0
44.39	0	47.04	0
44.44	0	47.09	0
44.49	0	47.14	0
44.54	0	47.19	0
44.59	0	47.24	0
44.64	0	47.29	0
44.69	0	47.34	0
44.74	0	47.39	0
44.79	0	47.44	0
44.84	0	47.49	0
44.89	0	47.54	0
44.94	0	47.59	0
44.99	0	47.64	0
45.04	0	47.69	0
45.09	0	47.74	0
45.14	0	47.79	0
45.19	0	47.84	0
45.24	0	47.89	0
45.29	0	47.94	0
45.34	0	47.99	0
45.39	0	48.04	0
45.44	0	48.09	0
45.49	0	48.14	0
45.54	0		
45.59	0		
45.64	0		
45.69	0		
45.74	0		
45.79	0		
45.84	0		
45.89	0		
45.94	0		
45.99	0		
46.04	0		
46.09	0		
46.14	0		

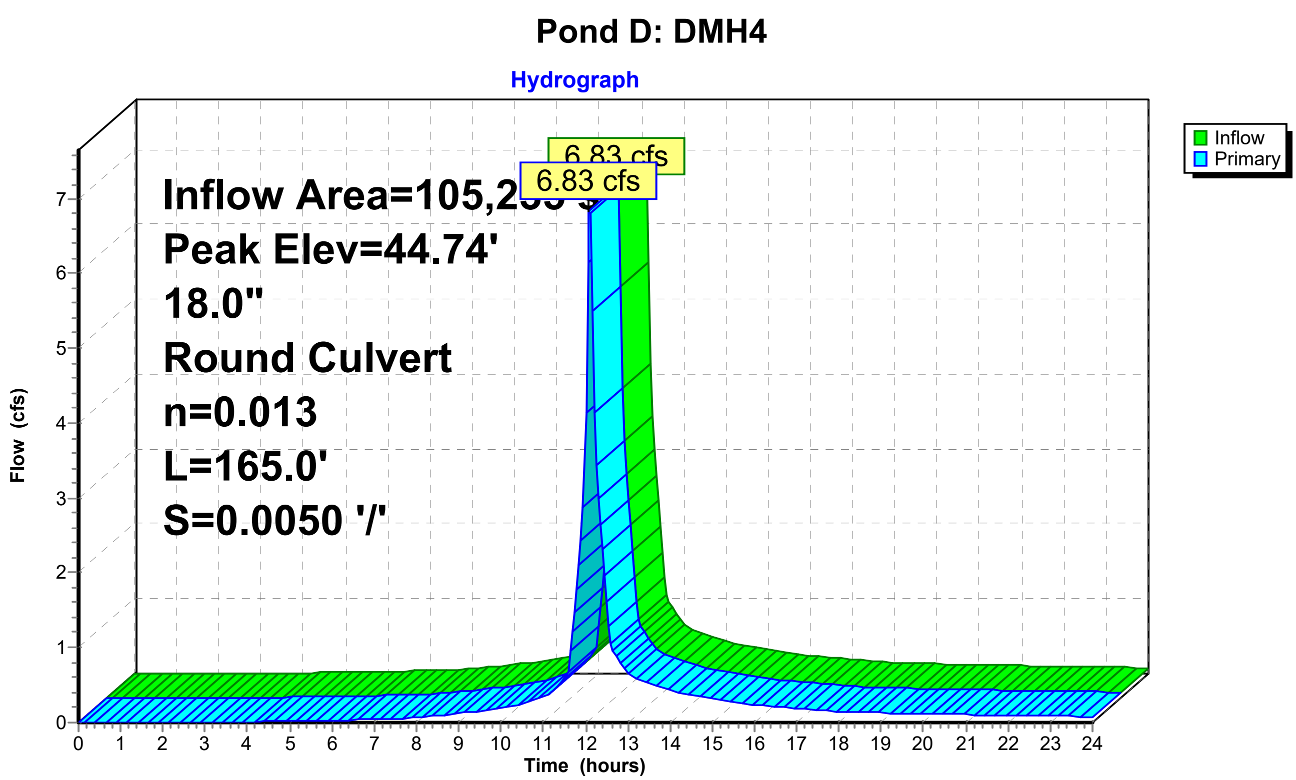
Summary for Pond D: DMH4

Inflow Area =	105,235 sf,	47.50% Impervious,	Inflow Depth > 2.60"	for 10-Year event
Inflow =	6.83 cfs @	12.09 hrs, Volume=	22,764 cf	
Outflow =	6.83 cfs @	12.09 hrs, Volume=	22,764 cf,	Atten= 0%, Lag= 0.0 min
Primary =	6.83 cfs @	12.09 hrs, Volume=	22,764 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 44.74' @ 12.10 hrs
Flood Elev= 48.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.95'	**18.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.95' / 42.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=6.57 cfs @ 12.09 hrs HW=44.71' TW=43.76' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 6.57 cfs @ 3.99 fps)



Stage-Area-Storage for Pond D: DMH4

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
42.95	**0**	45.07	0	47.19	0
42.99	0	45.11	0	47.23	0
43.03	0	45.15	0	47.27	0
43.07	0	45.19	0	47.31	0
43.11	0	45.23	0	47.35	0
43.15	0	45.27	0	47.39	0
43.19	0	45.31	0	47.43	0
43.23	0	45.35	0	47.47	0
43.27	0	45.39	0	47.51	0
43.31	0	45.43	0	47.55	0
43.35	0	45.47	0	47.59	0
43.39	0	45.51	0	47.63	0
43.43	0	45.55	0	47.67	0
43.47	0	45.59	0	47.71	0
43.51	0	45.63	0	47.75	0
43.55	0	45.67	0	47.79	0
43.59	0	45.71	0	47.83	0
43.63	0	45.75	0	47.87	0
43.67	0	45.79	0	47.91	0
43.71	0	45.83	0	47.95	0
43.75	0	45.87	0	47.99	0
43.79	0	45.91	0	48.03	0
43.83	0	45.95	0	48.07	0
43.87	0	45.99	0	48.11	0
43.91	0	46.03	0	48.15	0
43.95	0	46.07	0	48.19	0
43.99	0	46.11	0	48.23	0
44.03	0	46.15	0	48.27	0
44.07	0	46.19	0	48.31	0
44.11	0	46.23	0	48.35	0
44.15	0	46.27	0	48.39	0
44.19	0	46.31	0	48.43	0
44.23	0	46.35	0	48.47	0
44.27	0	46.39	0		
44.31	0	46.43	0		
44.35	0	46.47	0		
44.39	0	46.51	0		
44.43	0	46.55	0		
44.47	0	46.59	0		
44.51	0	46.63	0		
44.55	0	46.67	0		
44.59	0	46.71	0		
44.63	0	46.75	0		
44.67	0	46.79	0		
44.71	0	46.83	0		
44.75	0	46.87	0		
44.79	0	46.91	0		
44.83	0	46.95	0		
44.87	0	46.99	0		
44.91	0	47.03	0		
44.95	0	47.07	0		
44.99	0	47.11	0		
45.03	0	47.15	0		

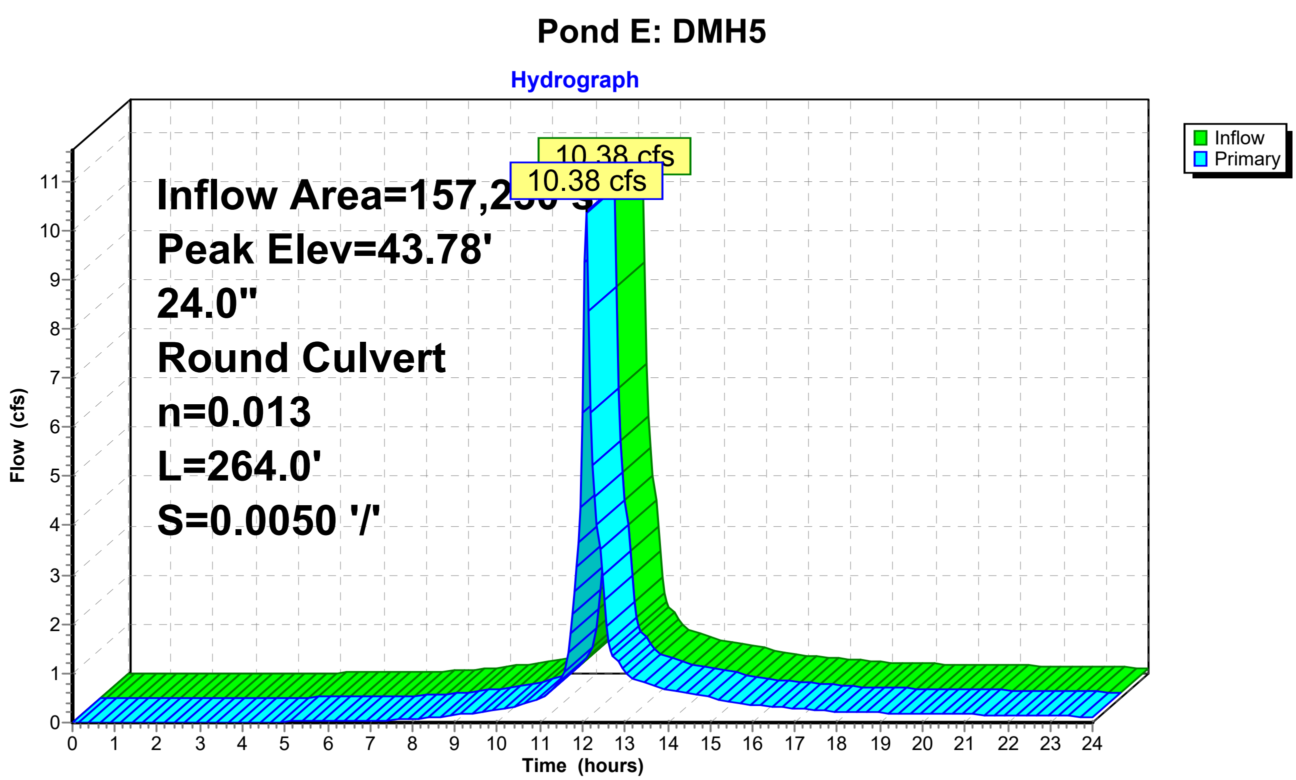
Summary for Pond E: DMH5

Inflow Area = 157,230 sf, 45.56% Impervious, Inflow Depth > 2.59" for 10-Year event
Inflow = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf
Outflow = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 43.78' @ 12.09 hrs
Flood Elev= 50.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.03'	**24.0" Round Culvert** L= 264.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.03' / 40.71' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.12 cfs @ 12.09 hrs HW=43.76' TW=42.30' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 10.12 cfs @ 4.70 fps)



Stage-Area-Storage for Pond E: DMH5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
42.03	**0**	47.33	0
42.13	0	47.43	0
42.23	0	47.53	0
42.33	0	47.63	0
42.43	0	47.73	0
42.53	0	47.83	0
42.63	0	47.93	0
42.73	0	48.03	0
42.83	0	48.13	0
42.93	0	48.23	0
43.03	0	48.33	0
43.13	0	48.43	0
43.23	0	48.53	0
43.33	0	48.63	0
43.43	0	48.73	0
43.53	0	48.83	0
43.63	0	48.93	0
43.73	0	49.03	0
43.83	0	49.13	0
43.93	0	49.23	0
44.03	0	49.33	0
44.13	0	49.43	0
44.23	0	49.53	0
44.33	0	49.63	0
44.43	0	49.73	0
44.53	0	49.83	0
44.63	0	49.93	0
44.73	0	50.03	0
44.83	0	50.13	0
44.93	0		
45.03	0		
45.13	0		
45.23	0		
45.33	0		
45.43	0		
45.53	0		
45.63	0		
45.73	0		
45.83	0		
45.93	0		
46.03	0		
46.13	0		
46.23	0		
46.33	0		
46.43	0		
46.53	0		
46.63	0		
46.73	0		
46.83	0		
46.93	0		
47.03	0		
47.13	0		
47.23	0		

Summary for Pond F: CDS

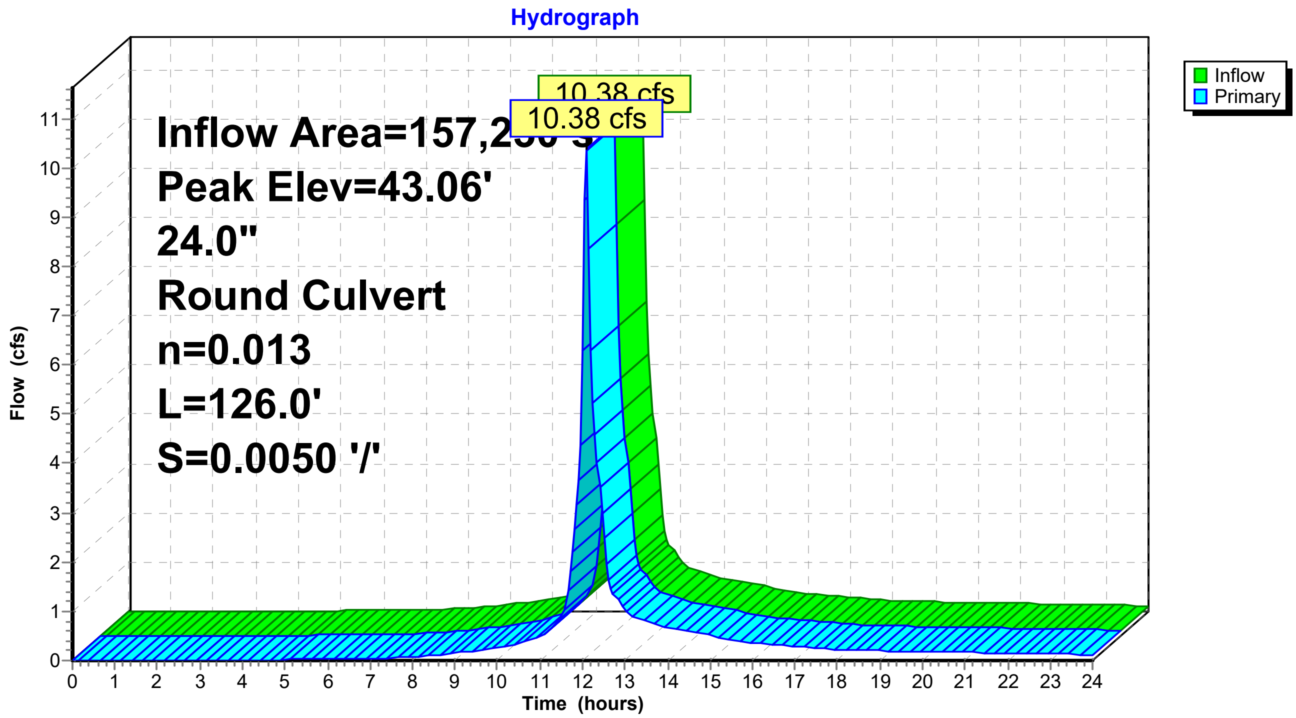
Inflow Area = 157,230 sf, 45.56% Impervious, Inflow Depth > 2.59" for 10-Year event
Inflow = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf
Outflow = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.38 cfs @ 12.09 hrs, Volume= 33,975 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 43.06' @ 12.52 hrs
Flood Elev= 49.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	40.61'	**24.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.61' / 39.98' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=10.32 cfs @ 12.09 hrs HW=42.30' TW=41.21' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 10.32 cfs @ 4.91 fps)

Pond F: CDS



Stage-Area-Storage for Pond F: CDS

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
40.61	**0**	45.91	0
40.71	0	46.01	0
40.81	0	46.11	0
40.91	0	46.21	0
41.01	0	46.31	0
41.11	0	46.41	0
41.21	0	46.51	0
41.31	0	46.61	0
41.41	0	46.71	0
41.51	0	46.81	0
41.61	0	46.91	0
41.71	0	47.01	0
41.81	0	47.11	0
41.91	0	47.21	0
42.01	0	47.31	0
42.11	0	47.41	0
42.21	0	47.51	0
42.31	0	47.61	0
42.41	0	47.71	0
42.51	0	47.81	0
42.61	0	47.91	0
42.71	0	48.01	0
42.81	0	48.11	0
42.91	0	48.21	0
43.01	0	48.31	0
43.11	0	48.41	0
43.21	0	48.51	0
43.31	0	48.61	0
43.41	0	48.71	0
43.51	0	48.81	0
43.61	0	48.91	0
43.71	0		
43.81	0		
43.91	0		
44.01	0		
44.11	0		
44.21	0		
44.31	0		
44.41	0		
44.51	0		
44.61	0		
44.71	0		
44.81	0		
44.91	0		
45.01	0		
45.11	0		
45.21	0		
45.31	0		
45.41	0		
45.51	0		
45.61	0		
45.71	0		
45.81	0		

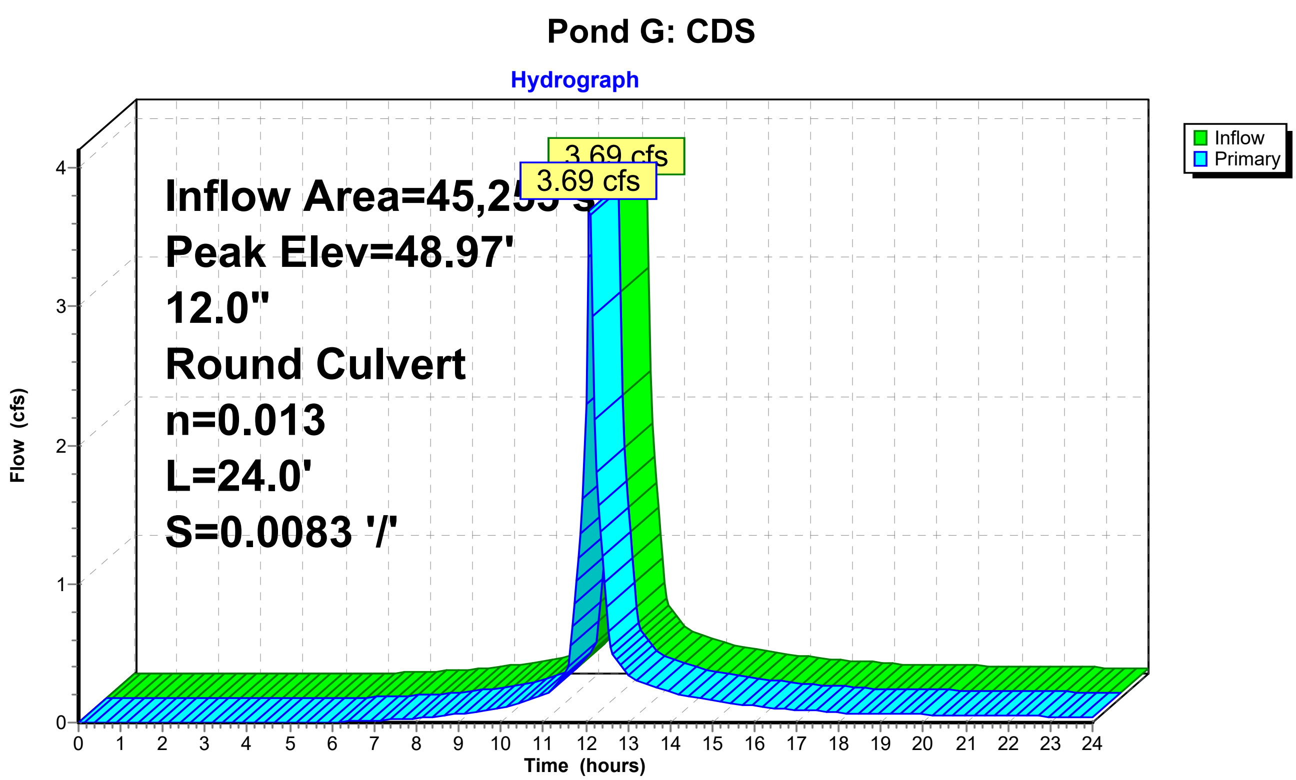
Summary for Pond G: CDS

Inflow Area =	45,255 sf,	1.33% Impervious,	Inflow Depth > 3.14"	for 10-Year event
Inflow =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf	
Outflow =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf,	Atten= 0%, Lag= 0.0 min
Primary =	3.69 cfs @	12.09 hrs, Volume=	11,836 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.97' @ 12.43 hrs
Flood Elev= 50.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.90'	**12.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.90' / 46.70' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.60 cfs @ 12.09 hrs HW=48.79' TW=47.88' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 3.60 cfs @ 4.59 fps)



Stage-Area-Storage for Pond G: CDS

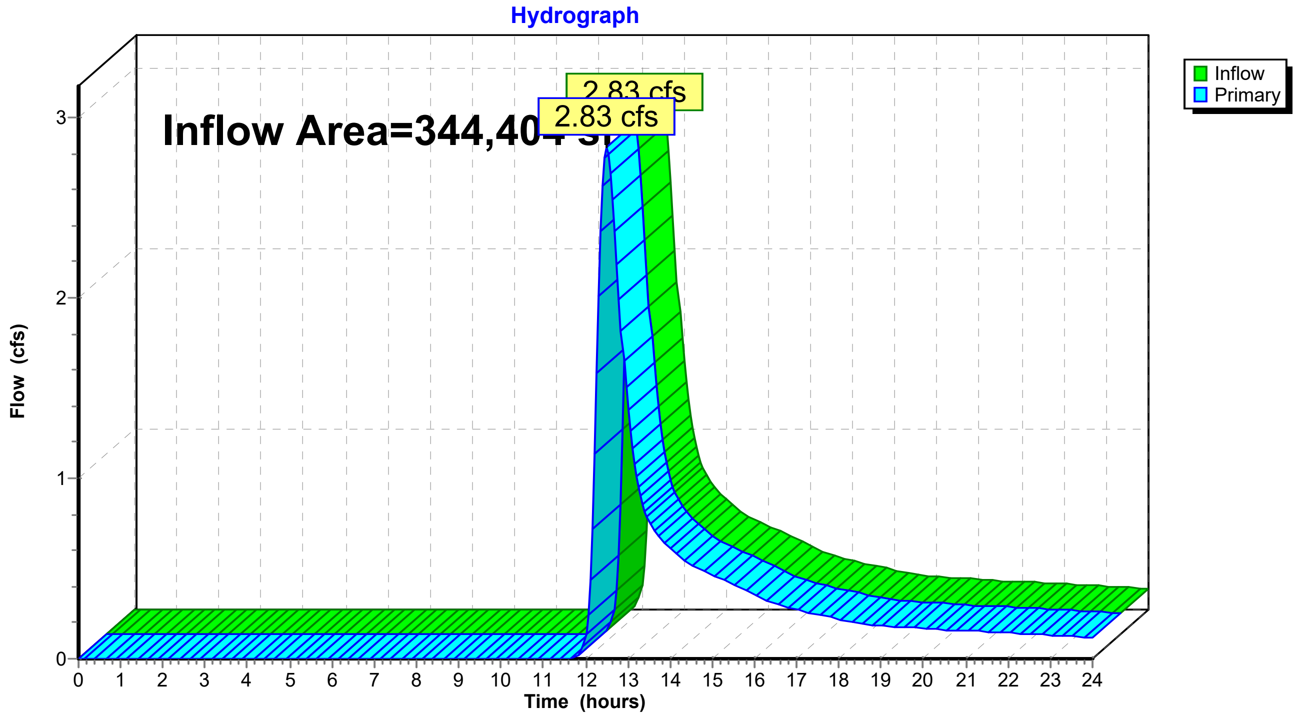
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
46.90	**0**	49.55	0
46.95	0	49.60	0
47.00	0	49.65	0
47.05	0	49.70	0
47.10	0	49.75	0
47.15	0	49.80	0
47.20	0	49.85	0
47.25	0	49.90	0
47.30	0	49.95	0
47.35	0	50.00	0
47.40	0	50.05	0
47.45	0	50.10	0
47.50	0	50.15	0
47.55	0	50.20	0
47.60	0	50.25	0
47.65	0	50.30	0
47.70	0	50.35	0
47.75	0	50.40	0
47.80	0	50.45	0
47.85	0	50.50	0
47.90	0	50.55	0
47.95	0	50.60	0
48.00	0	50.65	0
48.05	0	50.70	0
48.10	0		
48.15	0		
48.20	0		
48.25	0		
48.30	0		
48.35	0		
48.40	0		
48.45	0		
48.50	0		
48.55	0		
48.60	0		
48.65	0		
48.70	0		
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		
49.25	0		
49.30	0		
49.35	0		
49.40	0		
49.45	0		
49.50	0		

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,404 sf,	0.17% Impervious,	Inflow Depth > 0.64"	for 10-Year event
Inflow =	2.83 cfs @	12.50 hrs, Volume=	18,440 cf	
Primary =	2.83 cfs @	12.50 hrs, Volume=	18,440 cf, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 100L: Bordering Vegetated Wetland



Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points x 2
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Area 1S Runoff Area=5,035 sf 31.38% Impervious Runoff Depth>2.07"
Tc=6.0 min CN=58 Runoff=0.26 cfs 870 cf

Subcatchment 2S: Area 2S Runoff Area=2,730 sf 83.15% Impervious Runoff Depth>5.10"
Tc=6.0 min CN=88 Runoff=0.35 cfs 1,161 cf

Subcatchment 3.1S: Area 3.1S Runoff Area=6,480 sf 100.00% Impervious Runoff Depth>6.26"
Tc=6.0 min CN=98 Runoff=0.93 cfs 3,379 cf

Subcatchment 3S: Area 3S Runoff Area=18,585 sf 43.69% Impervious Runoff Depth>2.72"
Tc=6.0 min CN=65 Runoff=1.32 cfs 4,210 cf

Subcatchment 4S: Area 4S Runoff Area=6,150 sf 33.33% Impervious Runoff Depth>2.16"
Tc=6.0 min CN=59 Runoff=0.34 cfs 1,109 cf

Subcatchment 5S: Area 5S Runoff Area=15,230 sf 87.72% Impervious Runoff Depth>5.44"
Tc=6.0 min CN=91 Runoff=2.05 cfs 6,909 cf

Subcatchment 6S: Area 6S Runoff Area=6,675 sf 50.86% Impervious Runoff Depth>3.11"
Tc=6.0 min CN=69 Runoff=0.55 cfs 1,727 cf

Subcatchment 7S: Area 7S Runoff Area=30,740 sf 21.05% Impervious Runoff Depth>4.55"
Tc=6.0 min CN=83 Runoff=3.63 cfs 11,666 cf

Subcatchment 8S: Area 8S Runoff Area=5,625 sf 44.44% Impervious Runoff Depth>6.14"
Tc=6.0 min CN=97 Runoff=0.80 cfs 2,878 cf

Subcatchment 9S: Area 9S Runoff Area=14,465 sf 70.83% Impervious Runoff Depth>6.02"
Tc=6.0 min CN=96 Runoff=2.05 cfs 7,259 cf

Subcatchment 10S: Area 10S Runoff Area=13,830 sf 63.16% Impervious Runoff Depth>4.23"
Tc=6.0 min CN=80 Runoff=1.53 cfs 4,877 cf

Subcatchment 11S: Area 11S Runoff Area=38,165 sf 33.83% Impervious Runoff Depth>4.45"
Tc=6.0 min CN=82 Runoff=4.42 cfs 14,140 cf

Subcatchment 12S: Area 12S Runoff Area=19,480 sf 3.08% Impervious Runoff Depth>5.10"
Tc=6.0 min CN=88 Runoff=2.52 cfs 8,287 cf

Subcatchment 13S: Area 13S Runoff Area=25,775 sf 0.00% Impervious Runoff Depth>4.99"
Tc=6.0 min CN=87 Runoff=3.28 cfs 10,725 cf

Subcatchment 14S: Area 14S Runoff Area=55,000 sf 0.00% Impervious Runoff Depth>6.02"
Tc=6.0 min CN=96 Runoff=7.78 cfs 27,599 cf

Subcatchment 100S: Area 100S Runoff Area=244,149 sf 0.00% Impervious Runoff Depth>2.06"
Flow Length=805' Tc=30.0 min CN=58 Runoff=7.26 cfs 41,904 cf

Pond 1: CB1 Peak Elev=52.15' Inflow=0.26 cfs 870 cf
12.0" Round Culvert n=0.013 L=16.0' S=0.0100 '/' Outflow=0.26 cfs 870 cf

Pond 1.1: CB1.1 Peak Elev=52.25' Inflow=1.32 cfs 4,210 cf
12.0" Round Culvert n=0.013 L=88.0' S=0.0100 '/' Outflow=1.32 cfs 4,210 cf

Pond 1P: Cultec 180HD Peak Elev=48.78' Storage=666 cf Inflow=0.93 cfs 3,379 cf
Outflow=0.27 cfs 3,385 cf

Pond 2: CB2 Peak Elev=52.16' Inflow=0.35 cfs 1,161 cf
12.0" Round Culvert n=0.013 L=9.0' S=0.0100 '/' Outflow=0.35 cfs 1,161 cf

Pond 2P: Shea Leaching chambers Peak Elev=46.84' Storage=19,189 cf Inflow=17.28 cfs 56,806 cf
Outflow=3.47 cfs 56,804 cf

Pond 3: CB3 Peak Elev=51.10' Inflow=0.34 cfs 1,109 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.34 cfs 1,109 cf

Pond 4: CB4 Peak Elev=51.29' Inflow=2.05 cfs 6,909 cf
12.0" Round Culvert n=0.013 L=14.0' S=0.0100 '/' Outflow=2.05 cfs 6,909 cf

Pond 5: CB5 Peak Elev=49.50' Inflow=0.55 cfs 1,727 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=0.55 cfs 1,727 cf

Pond 5.1: CB5.1 Peak Elev=50.00' Inflow=1.53 cfs 4,877 cf
12.0" Round Culvert n=0.013 L=224.0' S=0.0050 '/' Outflow=1.53 cfs 4,877 cf

Pond 6: CB6 Peak Elev=50.05' Inflow=3.63 cfs 11,666 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=3.63 cfs 11,666 cf

Pond 7: CB7 Peak Elev=48.03' Inflow=0.80 cfs 2,878 cf
12.0" Round Culvert n=0.013 L=19.0' S=0.0100 '/' Outflow=0.80 cfs 2,878 cf

Pond 8: CB8 Peak Elev=48.21' Inflow=2.05 cfs 7,259 cf
12.0" Round Culvert n=0.013 L=11.0' S=0.0100 '/' Outflow=2.05 cfs 7,259 cf

Pond 8.1: CB8.1 Peak Elev=50.48' Inflow=5.95 cfs 19,017 cf
12.0" Round Culvert n=0.013 L=118.0' S=0.0050 '/' Outflow=5.95 cfs 19,017 cf

Pond 9: CB9 Peak Elev=53.82' Inflow=2.52 cfs 8,287 cf
12.0" Round Culvert n=0.013 L=146.0' S=0.0068 '/' Outflow=2.52 cfs 8,287 cf

Pond 10: CB10 Peak Elev=53.04' Inflow=5.79 cfs 19,012 cf
12.0" Round Culvert n=0.013 L=20.0' S=0.0100 '/' Outflow=5.79 cfs 19,012 cf

Pond 104P: Inf Area 2 Peak Elev=49.89' Storage=10,343 cf Inflow=13.57 cfs 46,612 cf
Discarded=2.52 cfs 41,199 cf Primary=5.22 cfs 5,423 cf Outflow=7.74 cfs 46,623 cf

Pond A: DMH 1 Peak Elev=51.62' Inflow=1.93 cfs 6,241 cf
12.0" Round Culvert n=0.013 L=189.0' S=0.0050 '/' Outflow=1.93 cfs 6,241 cf

Pond B: DMH2 Peak Elev=51.82' Inflow=4.31 cfs 14,259 cf
12.0" Round Culvert n=0.013 L=184.0' S=0.0050 '/' Outflow=4.31 cfs 14,259 cf

Pond C: DMH3 Peak Elev=48.99' Inflow=8.49 cfs 27,652 cf
18.0" Round Culvert n=0.013 L=97.0' S=0.0051 '/' Outflow=8.49 cfs 27,652 cf

Pond D: DMH4 Peak Elev=48.79' Inflow=11.33 cfs 37,789 cf
18.0" Round Culvert n=0.013 L=165.0' S=0.0050 '/' Outflow=11.33 cfs 37,789 cf

Pond E: DMH5 Peak Elev=46.98' Inflow=17.28 cfs 56,806 cf
24.0" Round Culvert n=0.013 L=264.0' S=0.0050 '/' Outflow=17.28 cfs 56,806 cf

Pond F: CDS Peak Elev=46.94' Inflow=17.28 cfs 56,806 cf
24.0" Round Culvert n=0.013 L=126.0' S=0.0050 '/' Outflow=17.28 cfs 56,806 cf

Pond G: CDS Peak Elev=51.39' Inflow=5.79 cfs 19,012 cf
12.0" Round Culvert n=0.013 L=24.0' S=0.0083 '/' Outflow=5.79 cfs 19,012 cf

Link 100L: Bordering Vegetated Wetland Inflow=10.58 cfs 47,327 cf
Primary=10.58 cfs 47,327 cf

Total Runoff Area = 508,114 sf Runoff Volume = 148,700 cf Average Runoff Depth = 3.51"
84.51% Pervious = 429,399 sf 15.49% Impervious = 78,715 sf

Summary for Subcatchment 1S: Area 1S

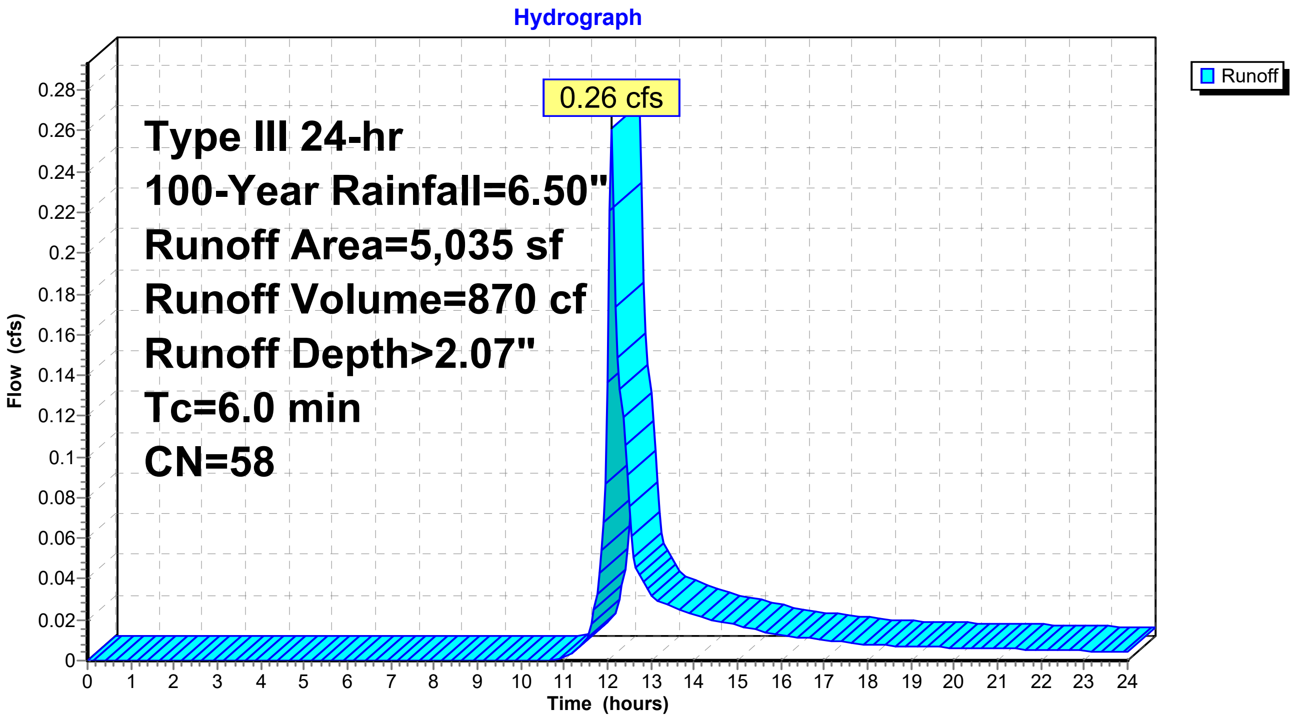
Runoff = 0.26 cfs @ 12.10 hrs, Volume= 870 cf, Depth> 2.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
1,580	98	Paved parking, HSG A
3,455	39	>75% Grass cover, Good, HSG A
5,035	58	Weighted Average
3,455		68.62% Pervious Area
1,580		31.38% Impervious Area

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

Subcatchment 1S: Area 1S



Summary for Subcatchment 2S: Area 2S

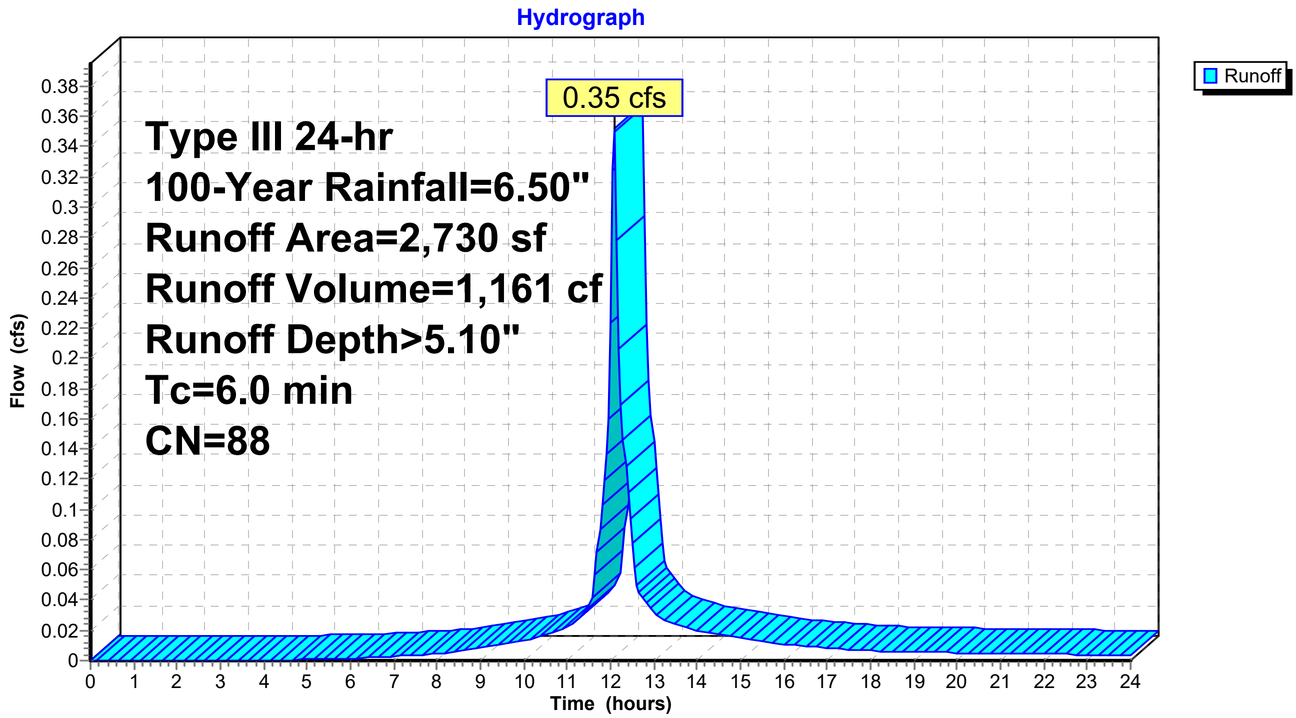
Runoff = 0.35 cfs @ 12.09 hrs, Volume= 1,161 cf, Depth> 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,270	98	Paved parking, HSG A
460	39	>75% Grass cover, Good, HSG A
2,730	88	Weighted Average
460		16.85% Pervious Area
2,270		83.15% Impervious Area

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

Subcatchment 2S: Area 2S



Summary for Subcatchment 3.1S: Area 3.1S

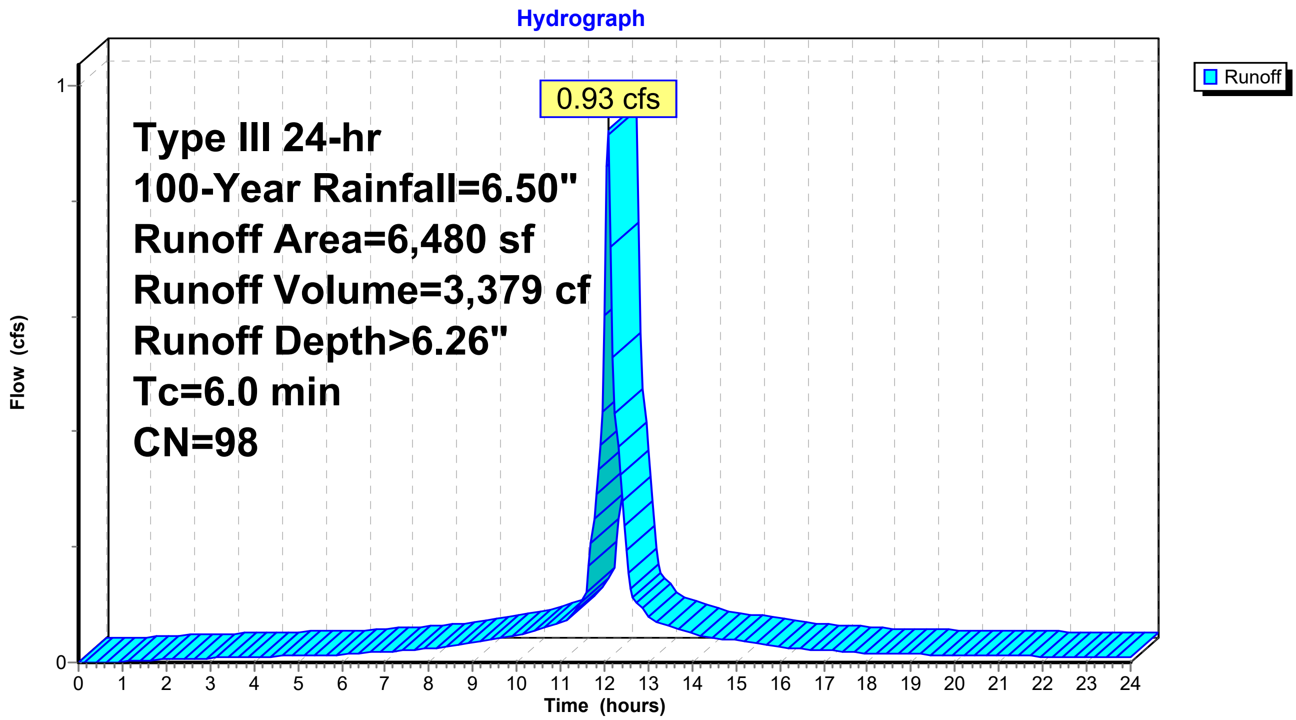
Runoff = 0.93 cfs @ 12.09 hrs, Volume= 3,379 cf, Depth> 6.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
6,480	98	Roofs, HSG A
6,480		100.00% Impervious Area

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

Subcatchment 3.1S: Area 3.1S



Summary for Subcatchment 3S: Area 3S

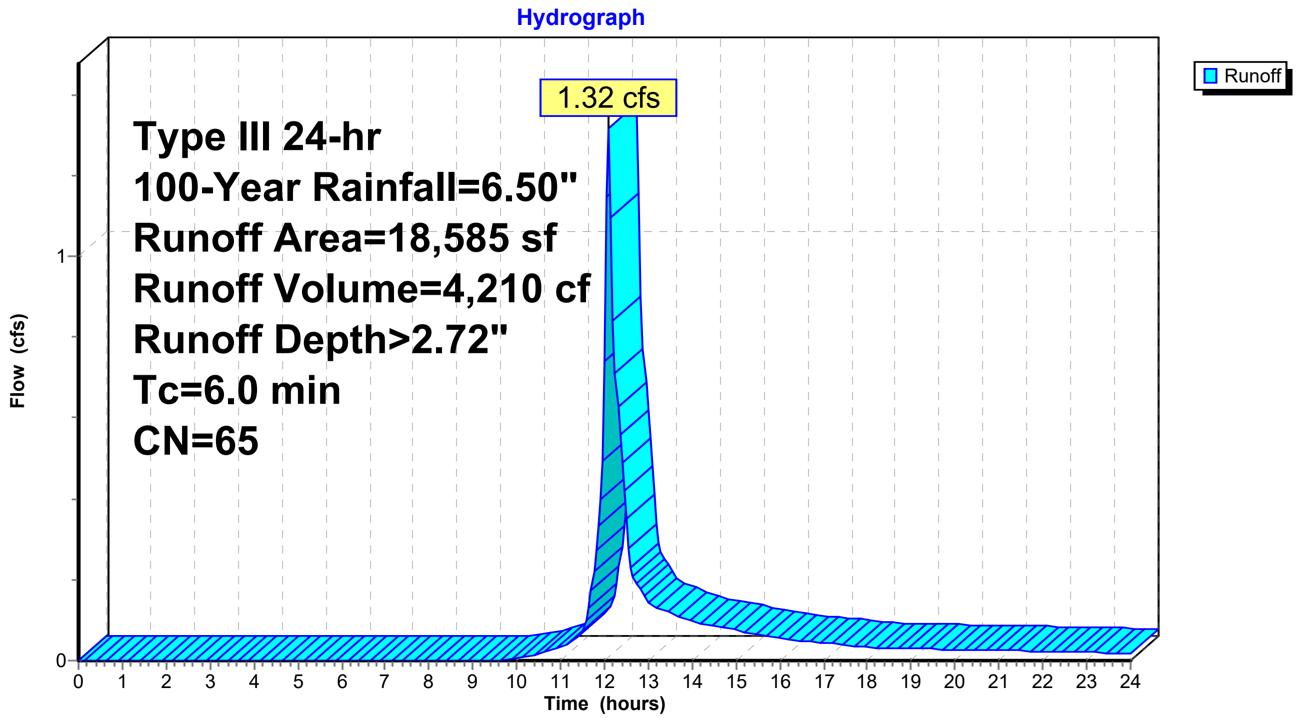
Runoff = 1.32 cfs @ 12.10 hrs, Volume= 4,210 cf, Depth> 2.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
8,120	98	Paved parking, HSG A
10,465	39	>75% Grass cover, Good, HSG A
18,585	65	Weighted Average
10,465		56.31% Pervious Area
8,120		43.69% Impervious Area

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

Subcatchment 3S: Area 3S



Summary for Subcatchment 4S: Area 4S

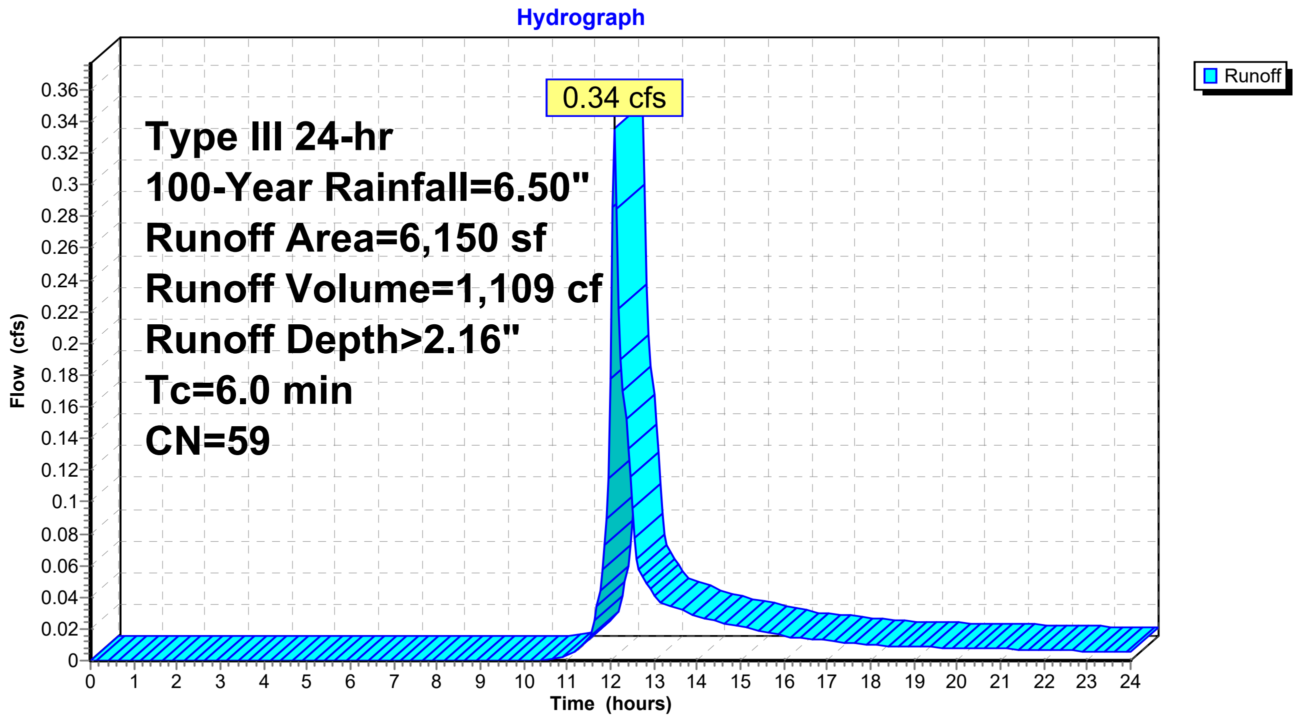
Runoff = 0.34 cfs @ 12.10 hrs, Volume= 1,109 cf, Depth> 2.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,050	98	Paved parking, HSG A
4,100	39	>75% Grass cover, Good, HSG A
6,150	59	Weighted Average
4,100		66.67% Pervious Area
2,050		33.33% Impervious Area

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

Subcatchment 4S: Area 4S



Summary for Subcatchment 5S: Area 5S

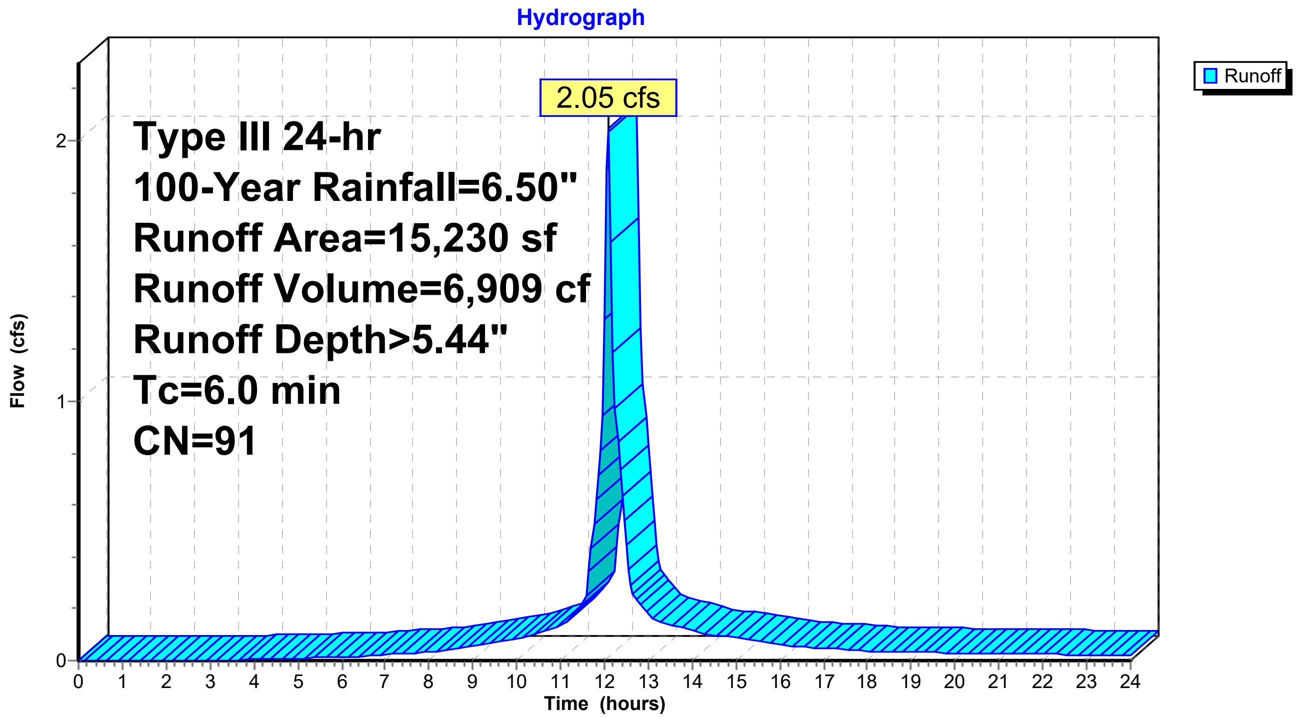
Runoff = 2.05 cfs @ 12.09 hrs, Volume= 6,909 cf, Depth> 5.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
13,360	98	Paved parking, HSG A
1,870	39	>75% Grass cover, Good, HSG A
15,230	91	Weighted Average
1,870		12.28% Pervious Area
13,360		87.72% Impervious Area

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

Subcatchment 5S: Area 5S



Summary for Subcatchment 6S: Area 6S

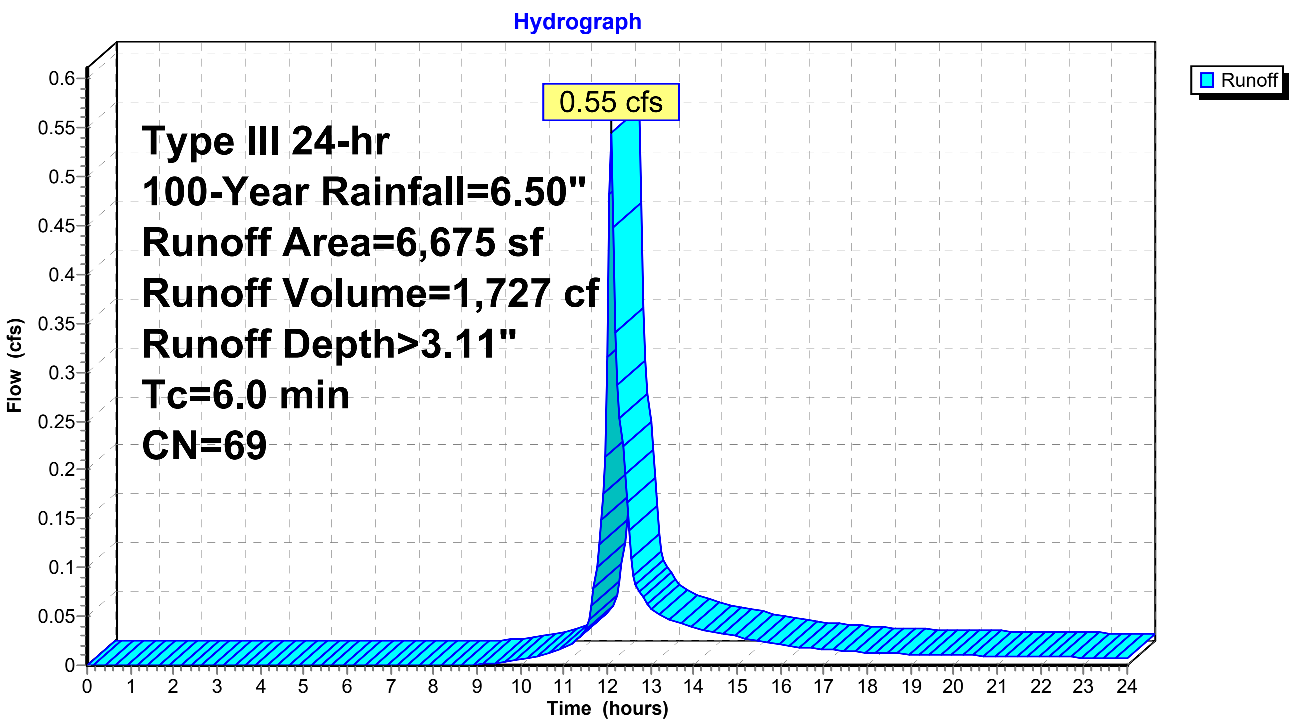
Runoff = 0.55 cfs @ 12.09 hrs, Volume= 1,727 cf, Depth> 3.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,395	98	Paved parking, HSG A
3,280	39	>75% Grass cover, Good, HSG A
6,675	69	Weighted Average
3,280		49.14% Pervious Area
3,395		50.86% Impervious Area

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

Subcatchment 6S: Area 6S



Summary for Subcatchment 7S: Area 7S

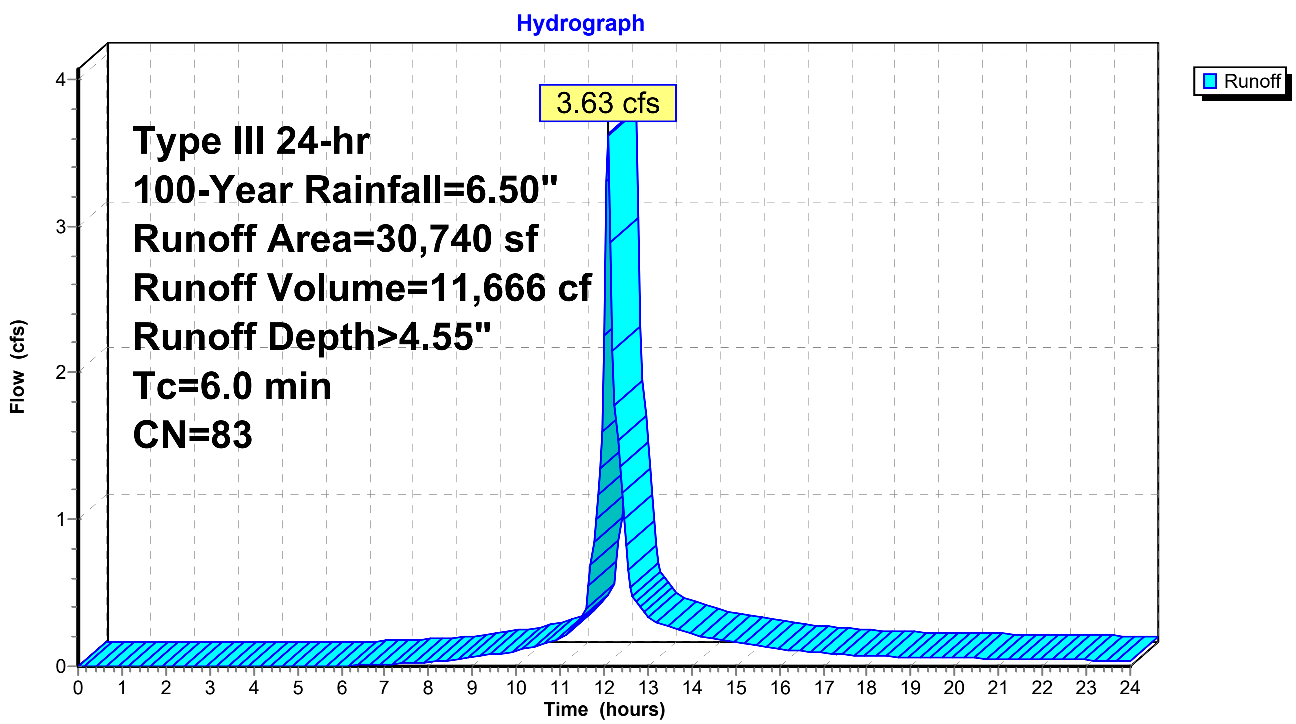
Runoff = 3.63 cfs @ 12.09 hrs, Volume= 11,666 cf, Depth> 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
6,470	98	Paved parking, HSG A
17,620	96	Gravel surface, HSG A
4,150	39	>75% Grass cover, Good, HSG A
2,500	30	Woods, Good, HSG A
30,740	83	Weighted Average
24,270		78.95% Pervious Area
6,470		21.05% Impervious Area

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

Subcatchment 7S: Area 7S



Summary for Subcatchment 8S: Area 8S

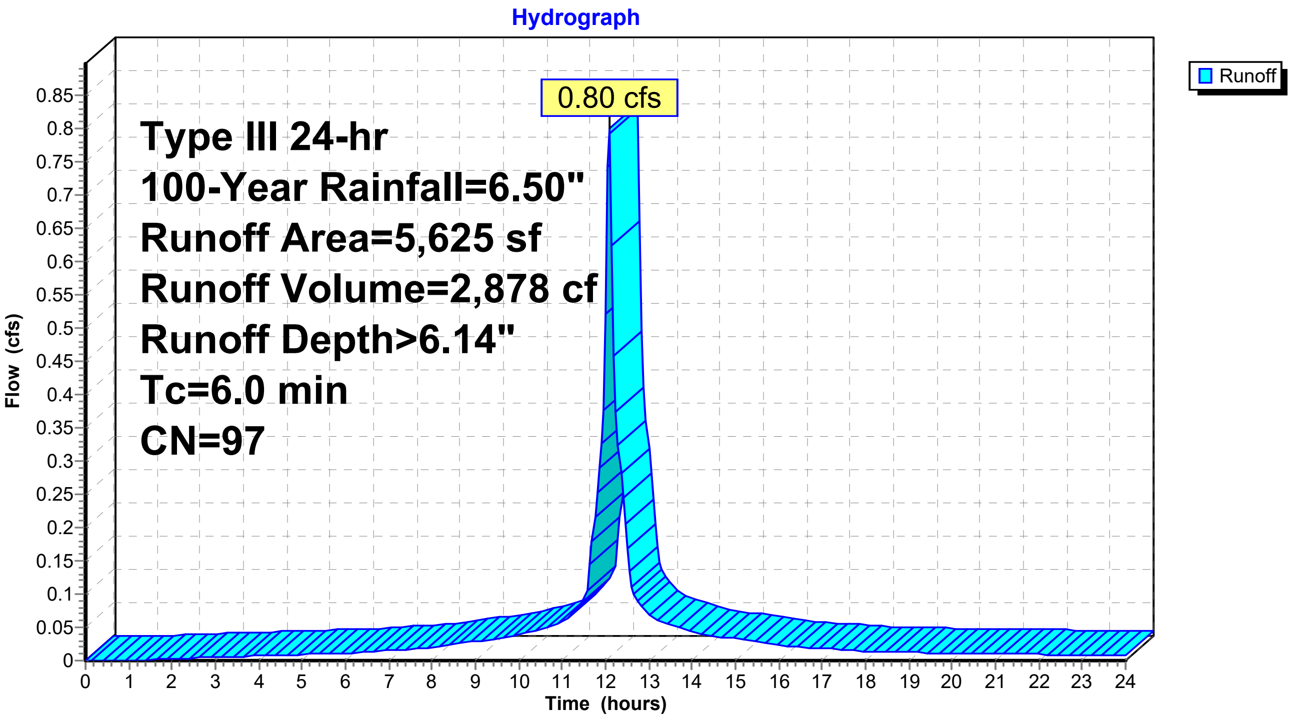
Runoff = 0.80 cfs @ 12.09 hrs, Volume= 2,878 cf, Depth> 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
2,500	98	Paved parking, HSG A
3,125	96	Gravel surface, HSG A
5,625	97	Weighted Average
3,125		55.56% Pervious Area
2,500		44.44% Impervious Area

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

Subcatchment 8S: Area 8S



Summary for Subcatchment 9S: Area 9S

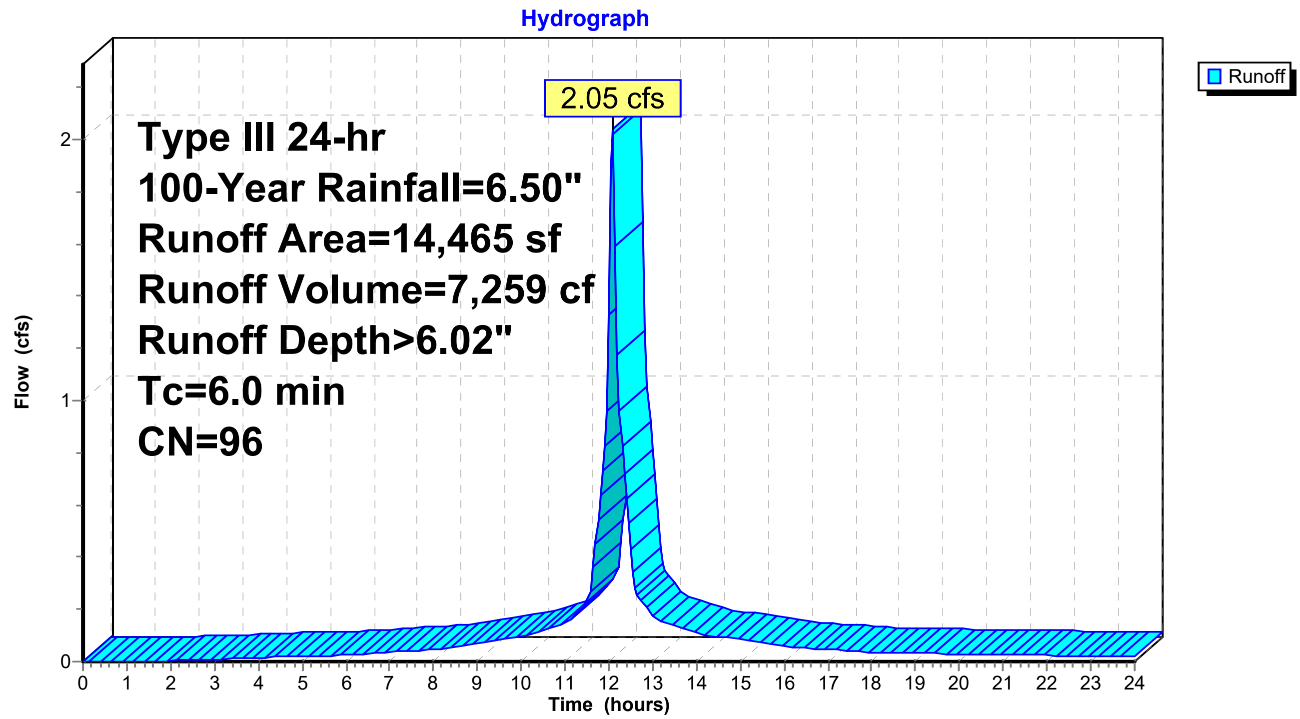
Runoff = 2.05 cfs @ 12.09 hrs, Volume= 7,259 cf, Depth> 6.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
4,965	98	Paved parking, HSG A
3,820	96	Gravel surface, HSG A
400	39	>75% Grass cover, Good, HSG A
14,465	96	Weighted Average
4,220		29.17% Pervious Area
10,245		70.83% Impervious Area

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

Subcatchment 9S: Area 9S



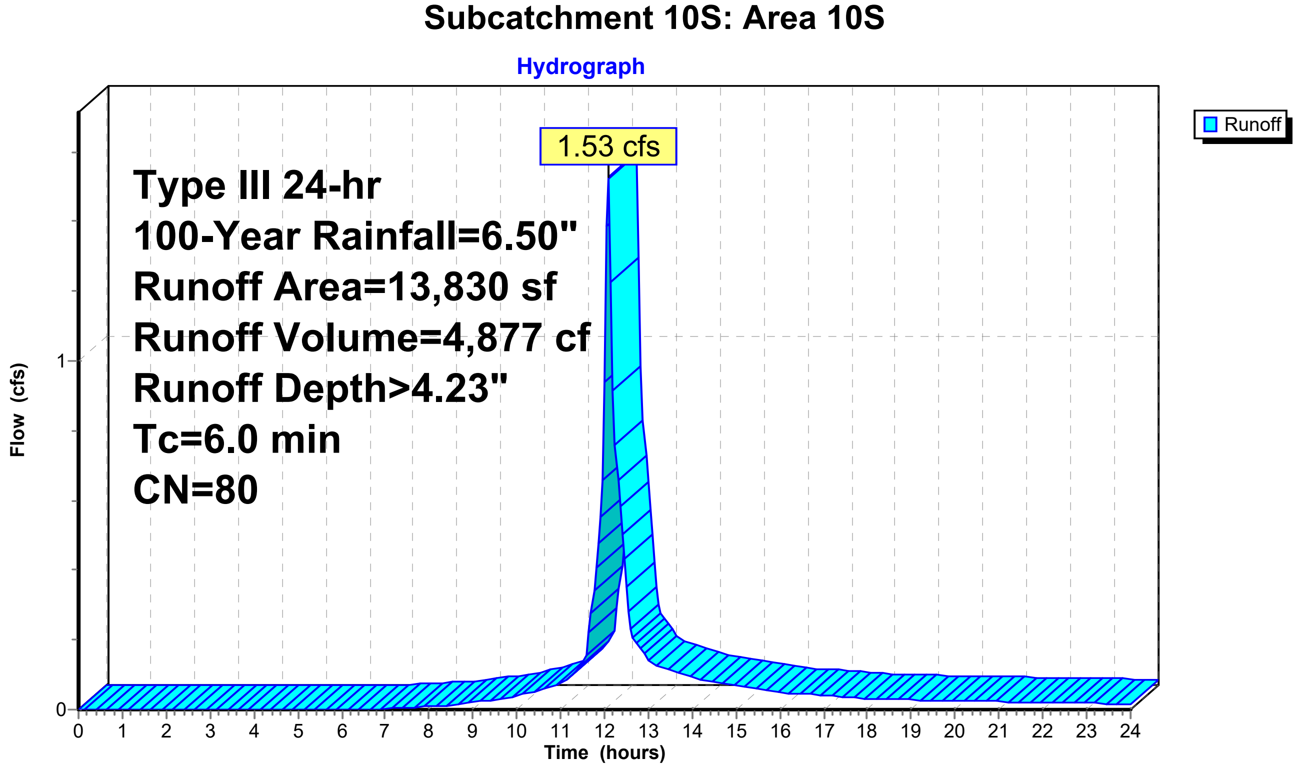
Summary for Subcatchment 10S: Area 10S

Runoff = 1.53 cfs @ 12.09 hrs, Volume= 4,877 cf, 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 III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
8,735	98	Paved parking, HSG A
1,325	96	Gravel surface, HSG A
870	39	>75% Grass cover, Good, HSG A
2,900	30	Woods, Good, HSG A
13,830	80	Weighted Average
5,095		36.84% Pervious Area
8,735		63.16% Impervious Area

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



Summary for Subcatchment 11S: Area 11S

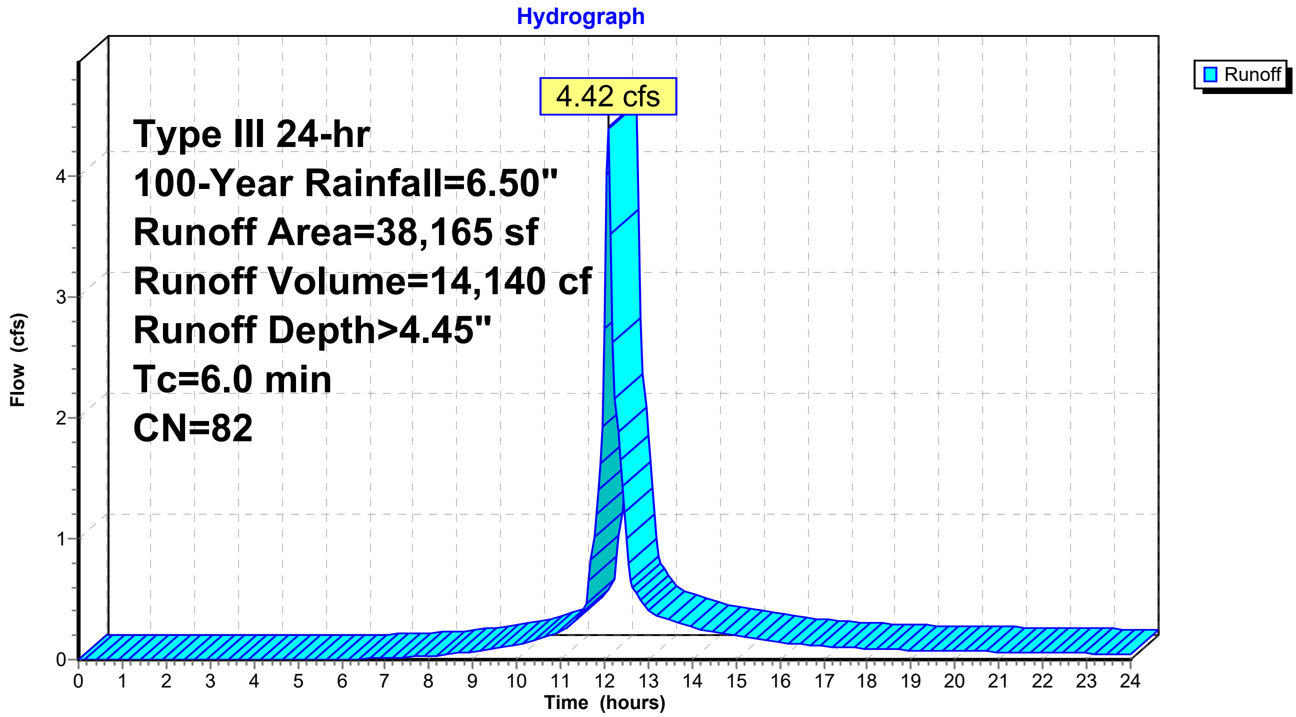
Runoff = 4.42 cfs @ 12.09 hrs, Volume= 14,140 cf, Depth> 4.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
5,280	98	Roofs, HSG A
7,630	98	Paved parking, HSG A
16,190	96	Gravel surface, HSG A
3,165	39	>75% Grass cover, Good, HSG A
5,900	30	Woods, Good, HSG A
38,165	82	Weighted Average
25,255		66.17% Pervious Area
12,910		33.83% Impervious Area

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

Subcatchment 11S: Area 11S



Summary for Subcatchment 12S: Area 12S

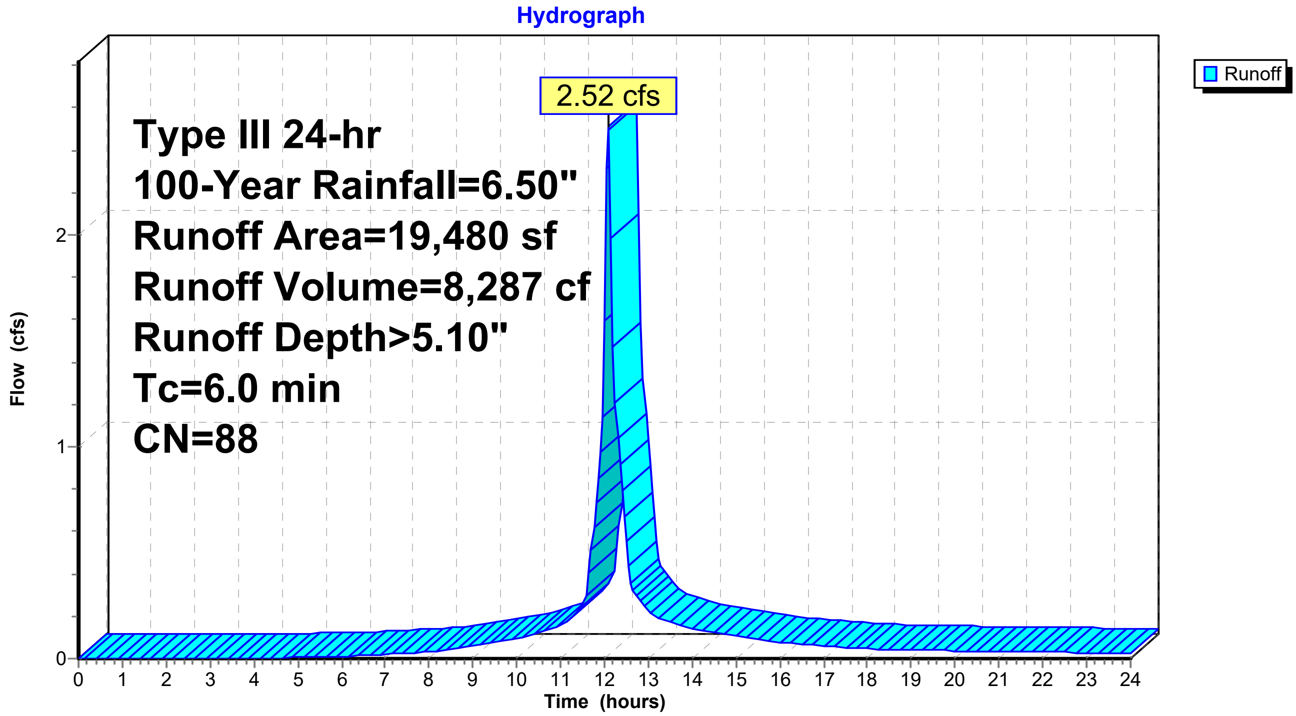
Runoff = 2.52 cfs @ 12.09 hrs, Volume= 8,287 cf, Depth> 5.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
15,960	96	Gravel surface, HSG A
2,920	39	>75% Grass cover, Good, HSG A
600	98	Paved parking, HSG A
19,480	88	Weighted Average
18,880		96.92% Pervious Area
600		3.08% Impervious Area

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

Subcatchment 12S: Area 12S



Summary for Subcatchment 13S: Area 13S

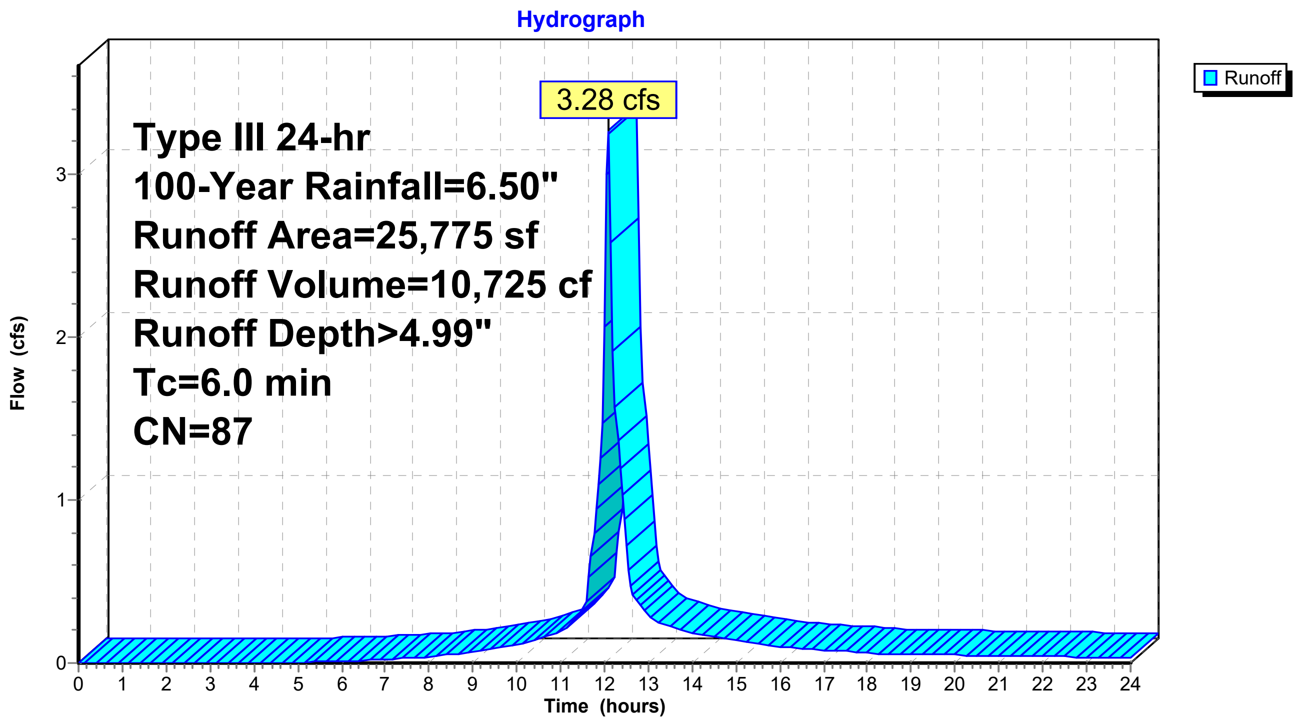
Runoff = 3.28 cfs @ 12.09 hrs, Volume= 10,725 cf, Depth> 4.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
22,400	96	Gravel surface, HSG A
3,375	30	Woods, Good, HSG A
25,775	87	Weighted Average
25,775		100.00% Pervious Area

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

Subcatchment 13S: Area 13S



Summary for Subcatchment 14S: Area 14S

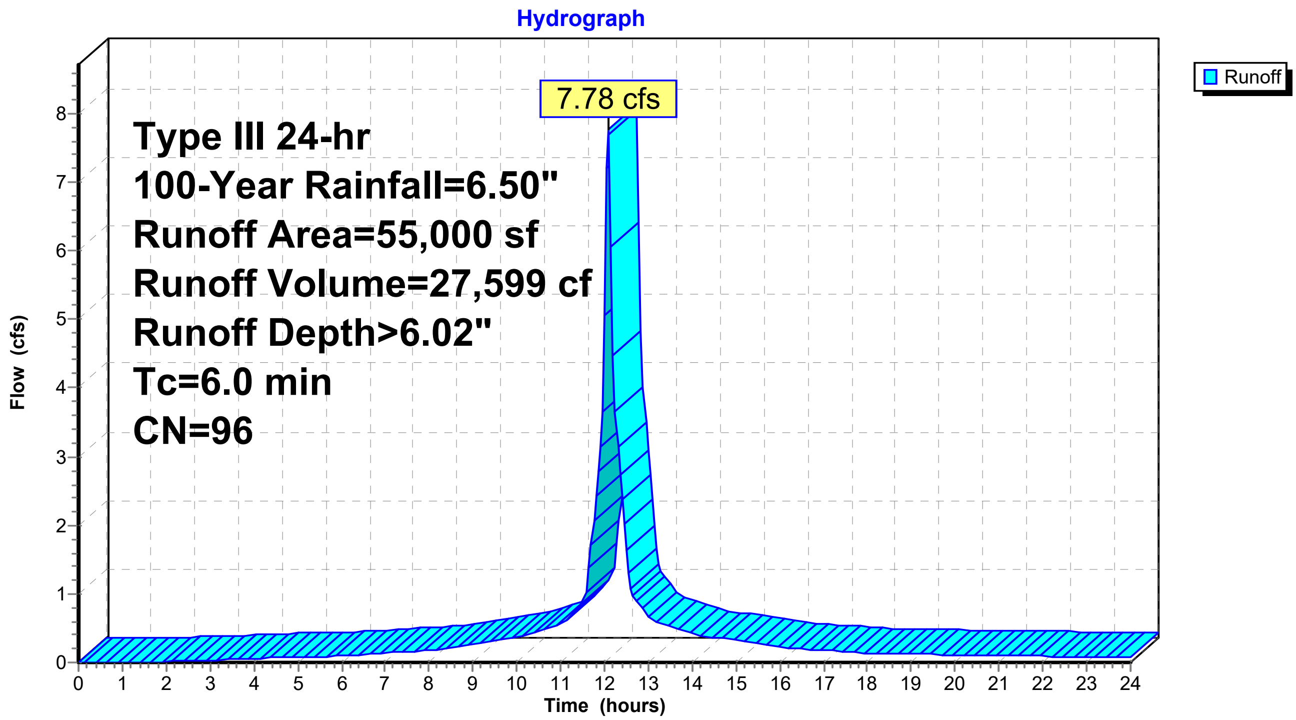
Runoff = 7.78 cfs @ 12.09 hrs, Volume= 27,599 cf, Depth> 6.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
55,000	96	Gravel surface, HSG A
55,000		100.00% Pervious Area

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

Subcatchment 14S: Area 14S



Summary for Subcatchment 100S: Area 100S

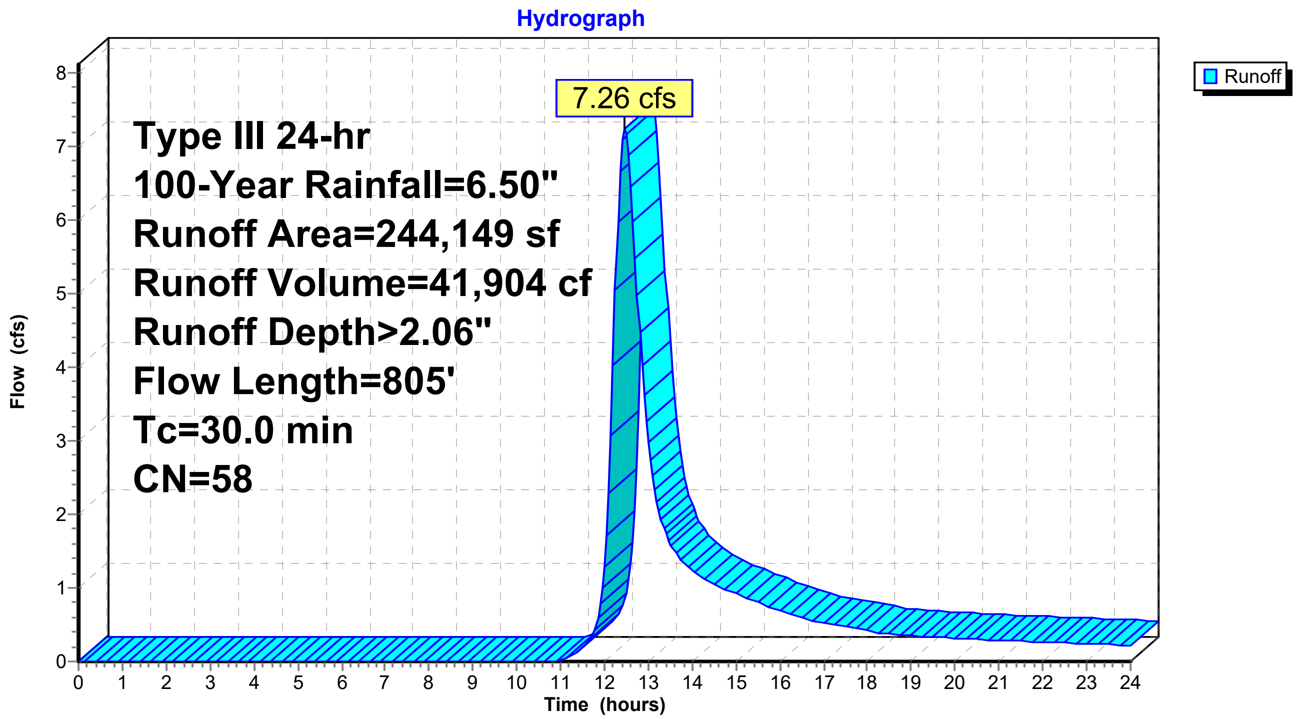
Runoff = 7.26 cfs @ 12.46 hrs, Volume= 41,904 cf, Depth> 2.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 100-Year Rainfall=6.50"

Area (sf)	CN	Description
3,705	96	Gravel surface, HSG A
32,069	30	Brush, Good, HSG A
43,315	30	Woods, Good, HSG A
165,060	70	Woods, Good, HSG C
244,149	58	Weighted Average
244,149		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	50	0.0080	0.05		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.10"
5.2	291	0.0350	0.94		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
6.7	464	0.0530	1.15		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
30.0	805	Total			

Subcatchment 100S: Area 100S



Summary for Pond 1: CB1

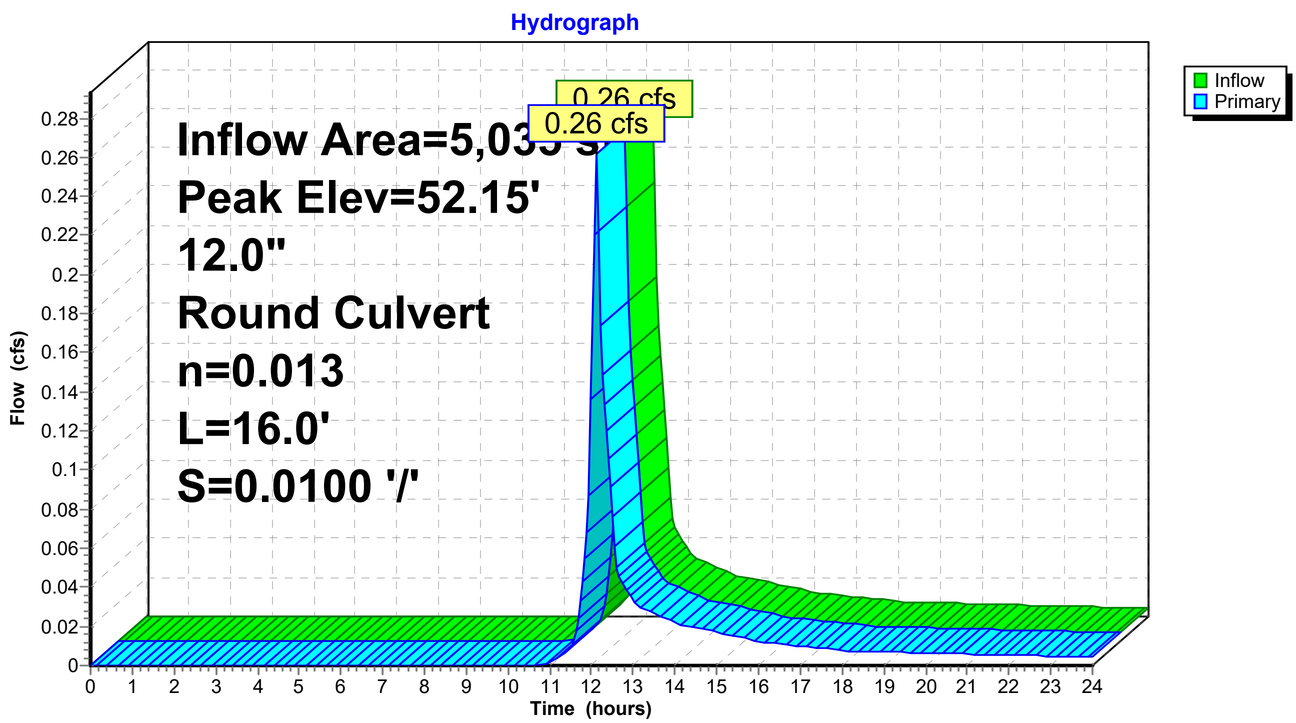
Inflow Area =	5,035 sf,	31.38% Impervious,	Inflow Depth > 2.07"	for 100-Year event	
Inflow =	0.26 cfs @	12.10 hrs,	Volume=	870 cf	
Outflow =	0.26 cfs @	12.10 hrs,	Volume=	870 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.26 cfs @	12.10 hrs,	Volume=	870 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 52.15' @ 12.18 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 16.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.30' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=49.20' TW=51.24' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 1: CB1



Stage-Area-Storage for Pond 1: CB1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0	50.91	0
48.31	0	50.96	0
48.36	0	51.01	0
48.41	0	51.06	0
48.46	0	51.11	0
48.51	0	51.16	0
48.56	0	51.21	0
48.61	0	51.26	0
48.66	0	51.31	0
48.71	0	51.36	0
48.76	0	51.41	0
48.81	0	51.46	0
48.86	0	51.51	0
48.91	0	51.56	0
48.96	0	51.61	0
49.01	0	51.66	0
49.06	0	51.71	0
49.11	0	51.76	0
49.16	0	51.81	0
49.21	0	51.86	0
49.26	0	51.91	0
49.31	0	51.96	0
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

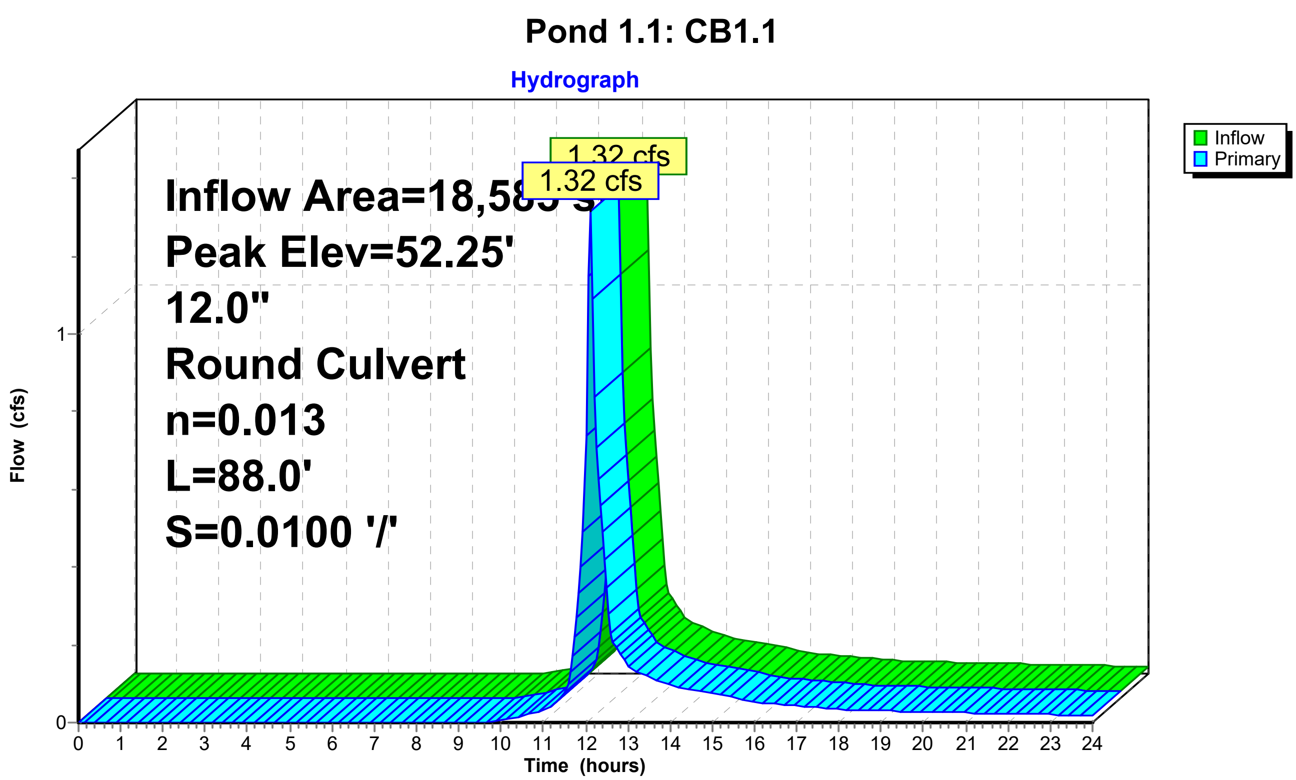
Summary for Pond 1.1: CB1.1

Inflow Area =	18,585 sf,	43.69% Impervious,	Inflow Depth > 2.72"	for 100-Year event
Inflow =	1.32 cfs @	12.10 hrs, Volume=	4,210 cf	
Outflow =	1.32 cfs @	12.10 hrs, Volume=	4,210 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.32 cfs @	12.10 hrs, Volume=	4,210 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 52.25' @ 12.18 hrs
Flood Elev= 49.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.60'	**12.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.60' / 45.72' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=49.21' TW=51.04' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 1.1: CB1.1

Elevation (feet)	Storage (cubic-feet)
46.60	**0**
46.64	0
46.68	0
46.72	0
46.76	0
46.80	0
46.84	0
46.88	0
46.92	0
46.96	0
47.00	0
47.04	0
47.08	0
47.12	0
47.16	0
47.20	0
47.24	0
47.28	0
47.32	0
47.36	0
47.40	0
47.44	0
47.48	0
47.52	0
47.56	0
47.60	0
47.64	0
47.68	0
47.72	0
47.76	0
47.80	0
47.84	0
47.88	0
47.92	0
47.96	0
48.00	0
48.04	0
48.08	0
48.12	0
48.16	0
48.20	0
48.24	0
48.28	0
48.32	0
48.36	0
48.40	0
48.44	0
48.48	0
48.52	0
48.56	0
48.60	0
48.64	0
48.68	0
48.72	0
48.76	0
48.80	0
48.84	0
48.88	0
48.92	0
48.96	0
49.00	0
49.04	0
49.08	0
49.12	0
49.16	0
49.20	0
49.24	0
49.28	0
49.32	0
49.36	0
49.40	0
49.44	0
49.48	0
49.52	0
49.56	0
49.60	0
49.64	0
49.68	0
49.72	0
49.76	0
49.80	0
49.84	0
49.88	0
49.92	0
49.96	0
50.00	0
50.04	0
50.08	0
50.12	0
50.16	0
50.20	0
50.24	0
50.28	0
50.32	0
50.36	0
50.40	0
50.44	0
50.48	0
50.52	0
50.56	0
50.60	0
50.64	0
50.68	0
50.72	0
50.76	0
50.80	0
50.84	0
50.88	0
50.92	0
50.96	0
51.00	0
51.04	0
51.08	0
51.12	0
51.16	0
51.20	0
51.24	0
51.28	0
51.32	0
51.36	0
51.40	0
51.44	0
51.48	0
51.52	0
51.56	0
51.60	0
51.64	0
51.68	0
51.72	0
51.76	0
51.80	0
51.84	0
51.88	0
51.92	0
51.96	0
52.00	0
52.04	0
52.08	0

Summary for Pond 1P: Cultec 180HD

Inflow Area = 6,480 sf,100.00% Impervious, Inflow Depth > 6.26" for 100-Year event
Inflow = 0.93 cfs @ 12.09 hrs, Volume= 3,379 cf
Outflow = 0.27 cfs @ 12.41 hrs, Volume= 3,385 cf, Atten= 71%, Lag= 19.7 min
Discarded = 0.27 cfs @ 12.41 hrs, Volume= 3,385 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.78' @ 12.41 hrs Surf.Area= 830 sf Storage= 666 cf
Flood Elev= 49.44' Surf.Area= 830 sf Storage= 889 cf

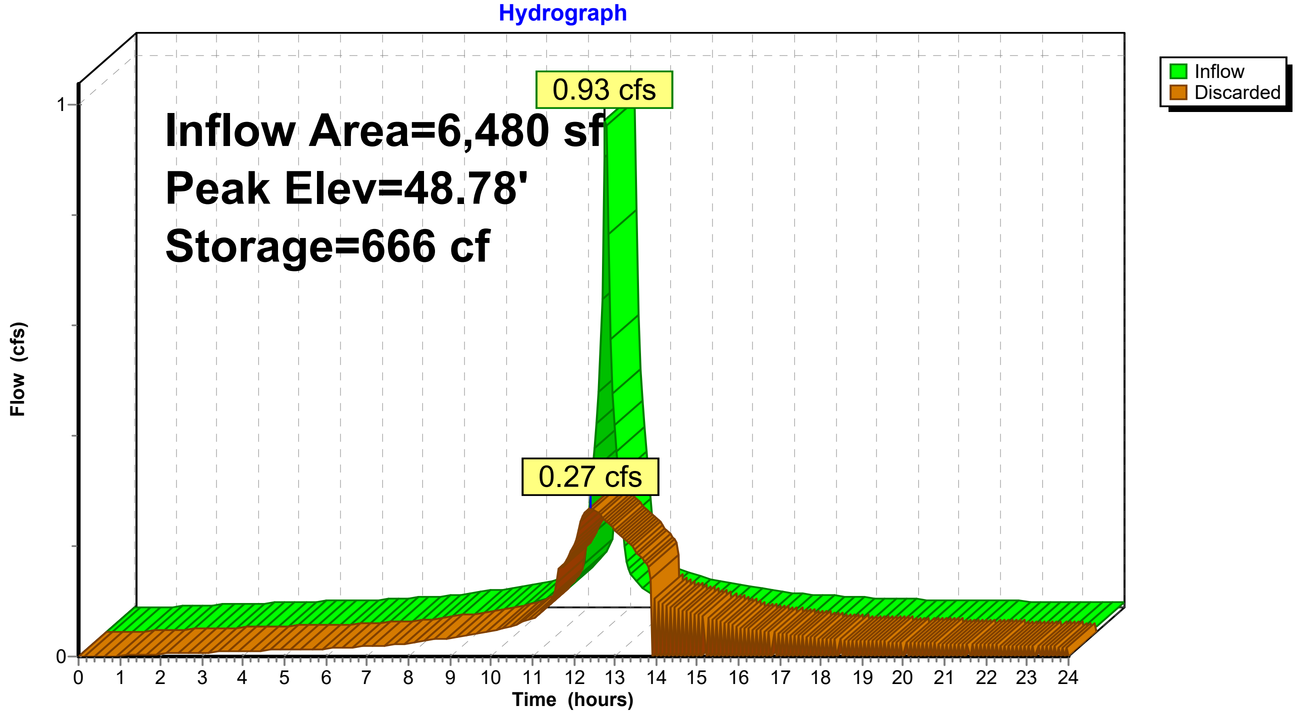
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 13.1 min (756.6 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1	47.90'	354 cf	**Cultec C-100HD** x 25 Inside #2 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 5 rows
#2	47.40'	758 cf	**21.00'W x 39.50'L x 2.71'H Prismatoid** 2,248 cf Overall - 354 cf Embedded = 1,894 cf x 40.0% Voids
		1,111 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	47.40'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 45.40'

Discarded OutFlow Max=0.27 cfs @ 12.41 hrs HW=48.78' (Free Discharge)
└─**1=Exfiltration** (Controls 0.27 cfs)

Pond 1P: Cultec 180HD



Stage-Area-Storage for Pond 1P: Cultec 180HD

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
47.40	**830**	0	50.05	830	1,091
47.45	830	17	50.10	830	**1,108**
47.50	830	33			
47.55	830	50			
47.60	830	66			
47.65	830	83			
47.70	830	100			
47.75	830	116			
47.80	830	133			
47.85	830	149			
47.90	830	166			
47.95	830	198			
48.00	830	229			
48.05	830	260			
48.10	830	290			
48.15	830	321			
48.20	830	351			
48.25	830	381			
48.30	830	411			
48.35	830	440			
48.40	830	469			
48.45	830	498			
48.50	830	526			
48.55	830	553			
48.60	830	580			
48.65	830	605			
48.70	830	630			
48.75	830	653			
48.80	830	674			
48.85	830	693			
48.90	830	710			
48.95	830	727			
49.00	830	743			
49.05	830	760			
49.10	830	776			
49.15	830	793			
49.20	830	809			
49.25	830	826			
49.30	830	843			
49.35	830	859			
49.40	830	876			
49.45	830	892			
49.50	830	909			
49.55	830	926			
49.60	830	942			
49.65	830	959			
49.70	830	975			
49.75	830	992			
49.80	830	1,009			
49.85	830	1,025			
49.90	830	1,042			
49.95	830	1,058			
50.00	830	1,075			

Summary for Pond 2: CB2

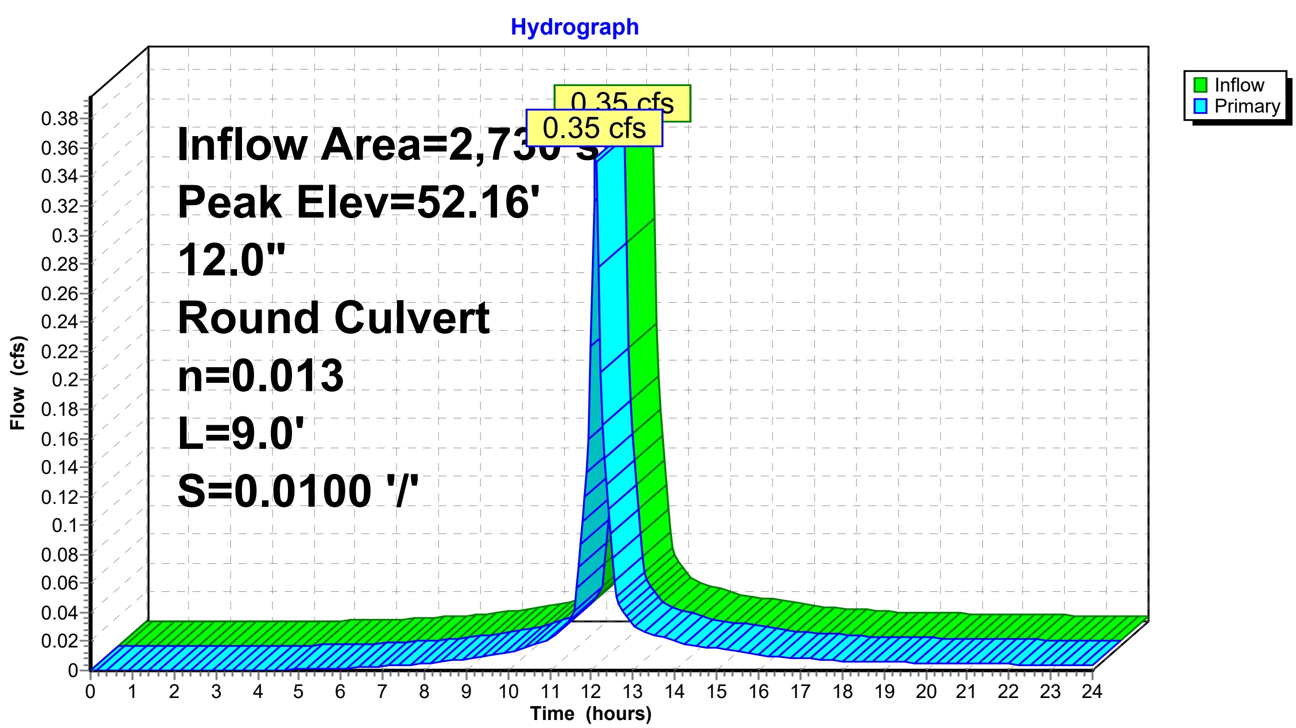
Inflow Area =	2,730 sf,	83.15% Impervious,	Inflow Depth > 5.10"	for 100-Year event	
Inflow =	0.35 cfs @	12.09 hrs,	Volume=	1,161 cf	
Outflow =	0.35 cfs @	12.09 hrs,	Volume=	1,161 cf,	Atten= 0%, Lag= 0.0 min
Primary =	0.35 cfs @	12.09 hrs,	Volume=	1,161 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 52.16' @ 12.18 hrs
Flood Elev= 50.86'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.46'	**12.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.46' / 47.37' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=48.85' TW=50.58' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 2: CB2



Stage-Area-Storage for Pond 2: CB2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.46	**0**	50.11	0
47.51	0	50.16	0
47.56	0	50.21	0
47.61	0	50.26	0
47.66	0	50.31	0
47.71	0	50.36	0
47.76	0	50.41	0
47.81	0	50.46	0
47.86	0	50.51	0
47.91	0	50.56	0
47.96	0	50.61	0
48.01	0	50.66	0
48.06	0	50.71	0
48.11	0	50.76	0
48.16	0	50.81	0
48.21	0	50.86	0
48.26	0	50.91	0
48.31	0	50.96	0
48.36	0	51.01	0
48.41	0	51.06	0
48.46	0	51.11	0
48.51	0	51.16	0
48.56	0	51.21	0
48.61	0	51.26	0
48.66	0	51.31	0
48.71	0	51.36	0
48.76	0	51.41	0
48.81	0	51.46	0
48.86	0	51.51	0
48.91	0	51.56	0
48.96	0	51.61	0
49.01	0	51.66	0
49.06	0	51.71	0
49.11	0	51.76	0
49.16	0	51.81	0
49.21	0	51.86	0
49.26	0	51.91	0
49.31	0	51.96	0
49.36	0		
49.41	0		
49.46	0		
49.51	0		
49.56	0		
49.61	0		
49.66	0		
49.71	0		
49.76	0		
49.81	0		
49.86	0		
49.91	0		
49.96	0		
50.01	0		
50.06	0		

Summary for Pond 2P: Shea Leaching chambers

Inflow Area = 157,230 sf, 45.56% Impervious, Inflow Depth > 4.34" for 100-Year event
Inflow = 17.28 cfs @ 12.09 hrs, Volume= 56,806 cf
Outflow = 3.47 cfs @ 12.53 hrs, Volume= 56,804 cf, Atten= 80%, Lag= 26.3 min
Discarded = 3.47 cfs @ 12.53 hrs, Volume= 56,804 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.84' @ 12.53 hrs Surf.Area= 3,225 sf Storage= 19,189 cf
Flood Elev= 47.17' Surf.Area= 3,225 sf Storage= 19,298 cf

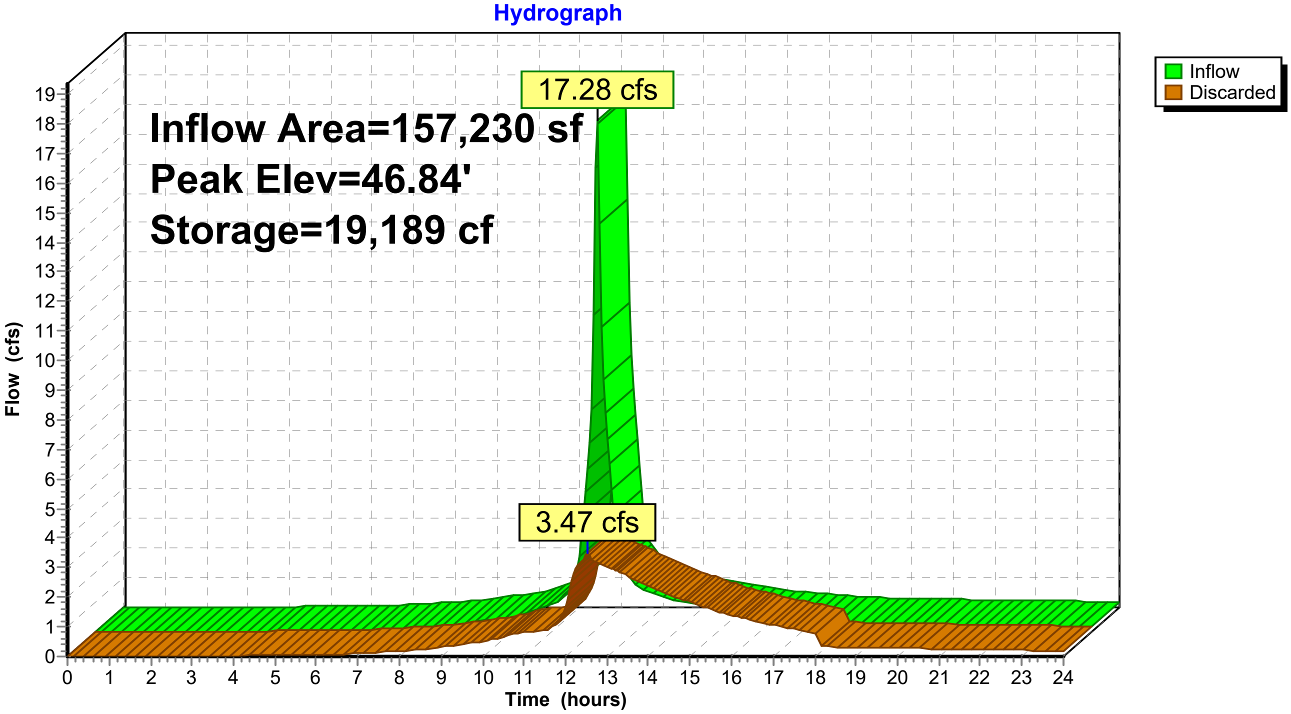
Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.0 min (855.3 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	39.25'	18,032 cf	**96.0" W x 84.0" H Box Pipe Storage** x 23 Inside #2 L= 14.0' 23,184 cf Overall - 6.0" Wall Thickness = 18,032 cf
#2	38.75'	1,266 cf	**43.00'W x 75.00'L x 8.17'H Prismatoid** 26,348 cf Overall - 23,184 cf Embedded = 3,164 cf x 40.0% Voids
		19,298 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	38.75'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 37.00'

Discarded OutFlow Max=3.46 cfs @ 12.53 hrs HW=46.81' (Free Discharge)
└─**1=Exfiltration** (Controls 3.46 cfs)

Pond 2P: Shea Leaching chambers



Stage-Area-Storage for Pond 2P: Shea Leaching chambers

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
38.75	**3,225**	0	44.05	3,225	13,058
38.85	3,225	13	44.15	3,225	13,329
38.95	3,225	26	44.25	3,225	13,599
39.05	3,225	39	44.35	3,225	13,870
39.15	3,225	52	44.45	3,225	14,141
39.25	3,225	65	44.55	3,225	14,411
39.35	3,225	336	44.65	3,225	14,682
39.45	3,225	607	44.75	3,225	14,953
39.55	3,225	877	44.85	3,225	15,223
39.65	3,225	1,148	44.95	3,225	15,494
39.75	3,225	1,419	45.05	3,225	15,765
39.85	3,225	1,689	45.15	3,225	16,036
39.95	3,225	1,960	45.25	3,225	16,306
40.05	3,225	2,231	45.35	3,225	16,577
40.15	3,225	2,502	45.45	3,225	16,848
40.25	3,225	2,772	45.55	3,225	17,118
40.35	3,225	3,043	45.65	3,225	17,389
40.45	3,225	3,314	45.75	3,225	17,660
40.55	3,225	3,584	45.85	3,225	17,930
40.65	3,225	3,855	45.95	3,225	18,201
40.75	3,225	4,126	46.05	3,225	18,472
40.85	3,225	4,396	46.15	3,225	18,742
40.95	3,225	4,667	46.25	3,225	19,013
41.05	3,225	4,938	46.35	3,225	19,026
41.15	3,225	5,208	46.45	3,225	19,039
41.25	3,225	5,479	46.55	3,225	19,052
41.35	3,225	5,750	46.65	3,225	19,065
41.45	3,225	6,020	46.75	3,225	19,078
41.55	3,225	6,291	46.85	3,225	**19,207**
41.65	3,225	6,562	46.95	3,225	**19,298**
41.75	3,225	6,832	47.05	3,225	19,298
41.85	3,225	7,103	47.15	3,225	19,298
41.95	3,225	7,374			
42.05	3,225	7,644			
42.15	3,225	7,915			
42.25	3,225	8,186			
42.35	3,225	8,456			
42.45	3,225	8,727			
42.55	3,225	8,998			
42.65	3,225	9,269			
42.75	3,225	9,539			
42.85	3,225	9,810			
42.95	3,225	10,081			
43.05	3,225	10,351			
43.15	3,225	10,622			
43.25	3,225	10,893			
43.35	3,225	11,163			
43.45	3,225	11,434			
43.55	3,225	11,705			
43.65	3,225	11,975			
43.75	3,225	12,246			
43.85	3,225	12,517			
43.95	3,225	12,787			

Summary for Pond 3: CB3

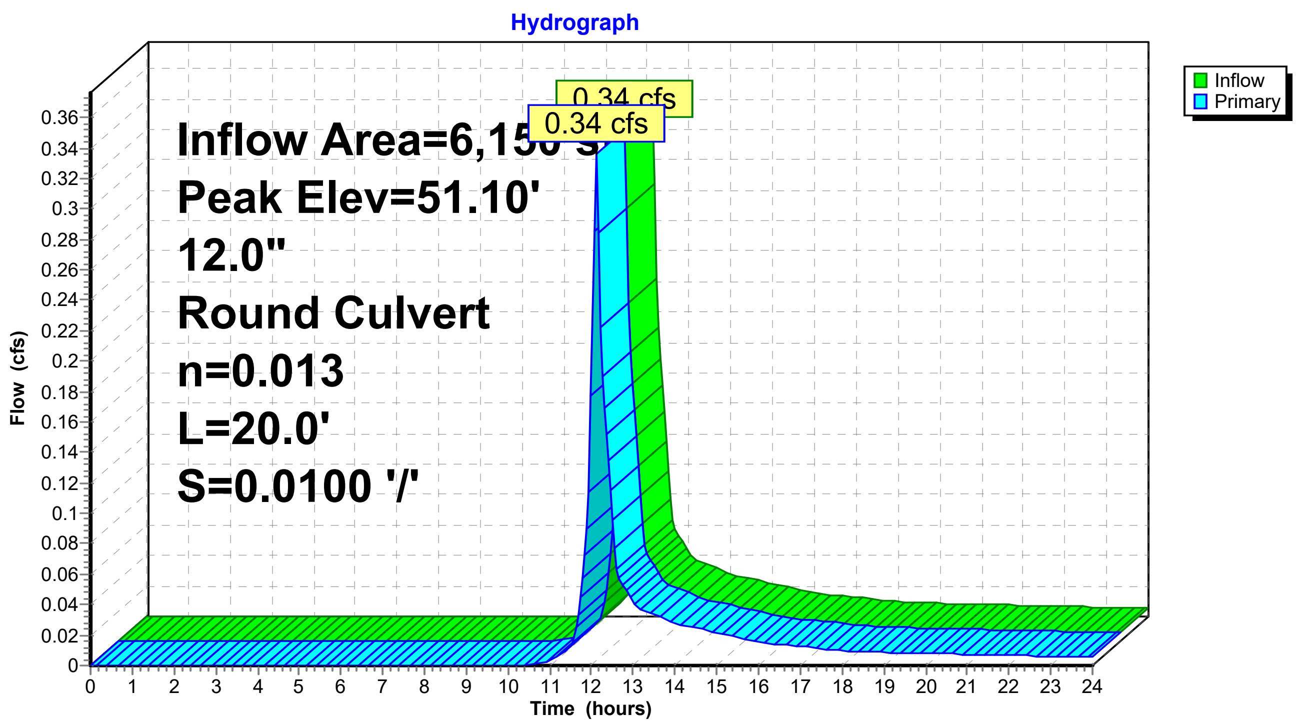
Inflow Area = 6,150 sf, 33.33% Impervious, Inflow Depth > 2.16" for 100-Year event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 1,109 cf
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 1,109 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.10 hrs, Volume= 1,109 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 51.10' @ 12.14 hrs
Flood Elev= 49.15'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.75'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.75' / 45.55' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=50.54' TW=51.28' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 3: CB3



Stage-Area-Storage for Pond 3: CB3

Elevation (feet)	Storage (cubic-feet)
45.75	**0**
45.79	0
45.83	0
45.87	0
45.91	0
45.95	0
45.99	0
46.03	0
46.07	0
46.11	0
46.15	0
46.19	0
46.23	0
46.27	0
46.31	0
46.35	0
46.39	0
46.43	0
46.47	0
46.51	0
46.55	0
46.59	0
46.63	0
46.67	0
46.71	0
46.75	0
46.79	0
46.83	0
46.87	0
46.91	0
46.95	0
46.99	0
47.03	0
47.07	0
47.11	0
47.15	0
47.19	0
47.23	0
47.27	0
47.31	0
47.35	0
47.39	0
47.43	0
47.47	0
47.51	0
47.55	0
47.59	0
47.63	0
47.67	0
47.71	0
47.75	0
47.79	0
47.83	0
47.87	0
47.91	0
47.95	0
47.99	0
48.03	0
48.07	0
48.11	0
48.15	0
48.19	0
48.23	0
48.27	0
48.31	0
48.35	0
48.39	0
48.43	0
48.47	0
48.51	0
48.55	0
48.59	0
48.63	0
48.67	0
48.71	0
48.75	0
48.79	0
48.83	0
48.87	0
48.91	0
48.95	0
48.99	0
49.03	0
49.07	0
49.11	0
49.15	0
49.19	0
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49.27	0
49.31	0
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50.75	0
50.79	0
50.83	0
50.87	0
50.91	0
50.95	0
50.99	0
51.03	0
51.07	0
51.11	0
51.15	0
51.19	0
51.23	0
51.27	0
51.31	0
51.35	0
51.39	0
51.43	0
51.47	0
51.51	0
51.55	0
51.59	0
51.63	0
51.67	0

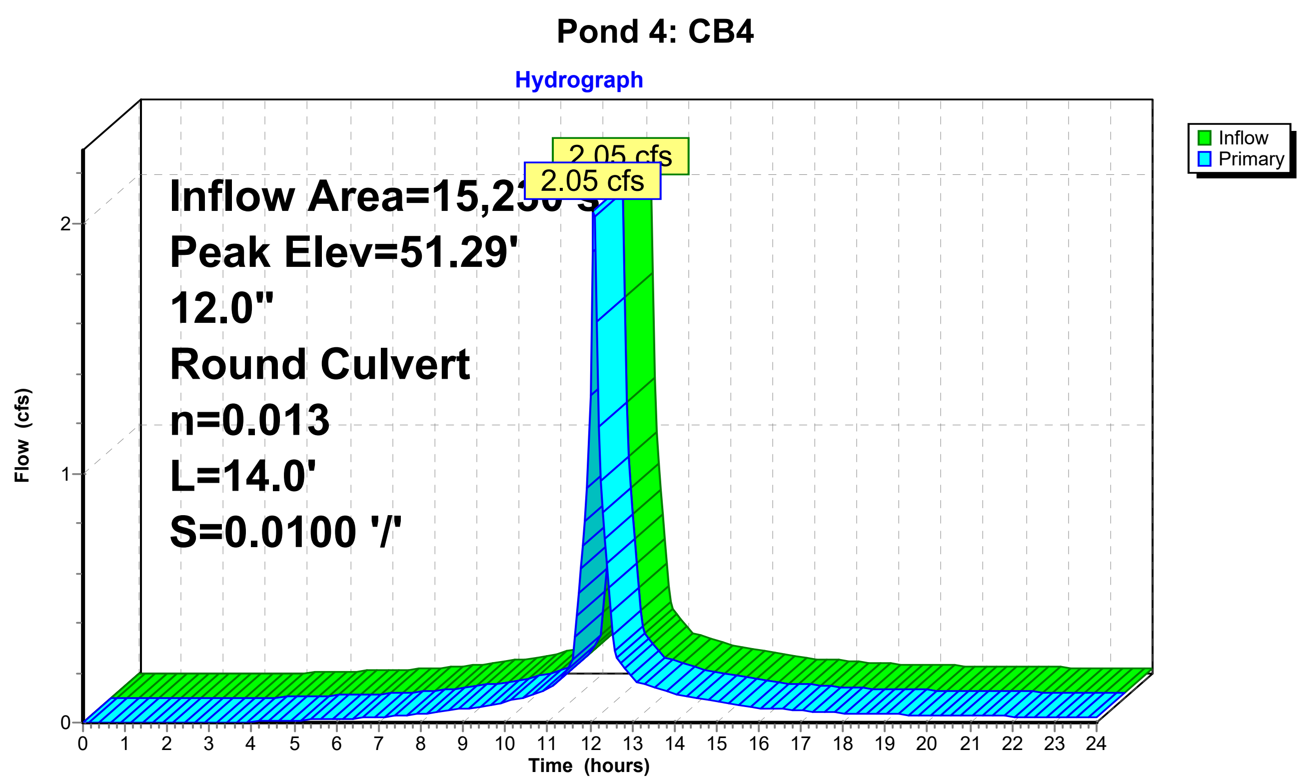
Summary for Pond 4: CB4

Inflow Area =	15,230 sf,	87.72% Impervious,	Inflow Depth > 5.44"	for 100-Year event	
Inflow =	2.05 cfs @	12.09 hrs,	Volume=	6,909 cf	
Outflow =	2.05 cfs @	12.09 hrs,	Volume=	6,909 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.05 cfs @	12.09 hrs,	Volume=	6,909 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 51.29' @ 12.14 hrs
Flood Elev= 49.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.76'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.76' / 45.62' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=50.16' TW=50.59' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 4: CB4

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.76	**0**	47.88	0	50.00	0
45.80	0	47.92	0	50.04	0
45.84	0	47.96	0	50.08	0
45.88	0	48.00	0	50.12	0
45.92	0	48.04	0	50.16	0
45.96	0	48.08	0	50.20	0
46.00	0	48.12	0	50.24	0
46.04	0	48.16	0	50.28	0
46.08	0	48.20	0	50.32	0
46.12	0	48.24	0	50.36	0
46.16	0	48.28	0	50.40	0
46.20	0	48.32	0	50.44	0
46.24	0	48.36	0	50.48	0
46.28	0	48.40	0	50.52	0
46.32	0	48.44	0	50.56	0
46.36	0	48.48	0	50.60	0
46.40	0	48.52	0	50.64	0
46.44	0	48.56	0	50.68	0
46.48	0	48.60	0	50.72	0
46.52	0	48.64	0	50.76	0
46.56	0	48.68	0	50.80	0
46.60	0	48.72	0	50.84	0
46.64	0	48.76	0	50.88	0
46.68	0	48.80	0	50.92	0
46.72	0	48.84	0	50.96	0
46.76	0	48.88	0	51.00	0
46.80	0	48.92	0	51.04	0
46.84	0	48.96	0	51.08	0
46.88	0	49.00	0	51.12	0
46.92	0	49.04	0	51.16	0
46.96	0	49.08	0	51.20	0
47.00	0	49.12	0	51.24	0
47.04	0	49.16	0	51.28	0
47.08	0	49.20	0	51.32	0
47.12	0	49.24	0	51.36	0
47.16	0	49.28	0	51.40	0
47.20	0	49.32	0	51.44	0
47.24	0	49.36	0	51.48	0
47.28	0	49.40	0	51.52	0
47.32	0	49.44	0	51.56	0
47.36	0	49.48	0	51.60	0
47.40	0	49.52	0	51.64	0
47.44	0	49.56	0	51.68	0
47.48	0	49.60	0	51.72	0
47.52	0	49.64	0	51.76	0
47.56	0	49.68	0	51.80	0
47.60	0	49.72	0		
47.64	0	49.76	0		
47.68	0	49.80	0		
47.72	0	49.84	0		
47.76	0	49.88	0		
47.80	0	49.92	0		
47.84	0	49.96	0		

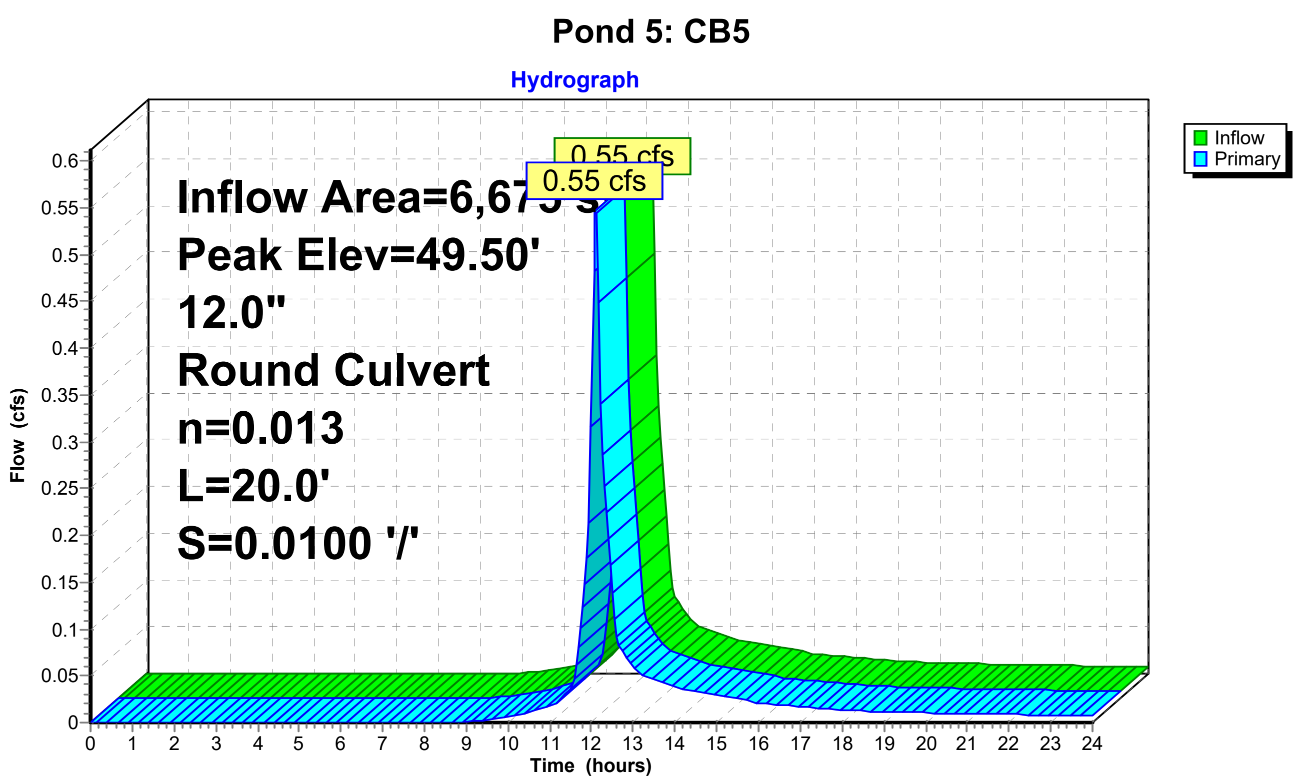
Summary for Pond 5: CB5

Inflow Area = 6,675 sf, 50.86% Impervious, Inflow Depth > 3.11" for 100-Year event
Inflow = 0.55 cfs @ 12.09 hrs, Volume= 1,727 cf
Outflow = 0.55 cfs @ 12.09 hrs, Volume= 1,727 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.55 cfs @ 12.09 hrs, Volume= 1,727 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 49.50' @ 12.16 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 44.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=47.69' TW=48.66' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 5: CB5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	46.52	0	48.64	0
44.44	0	46.56	0	48.68	0
44.48	0	46.60	0	48.72	0
44.52	0	46.64	0	48.76	0
44.56	0	46.68	0	48.80	0
44.60	0	46.72	0	48.84	0
44.64	0	46.76	0	48.88	0
44.68	0	46.80	0	48.92	0
44.72	0	46.84	0	48.96	0
44.76	0	46.88	0	49.00	0
44.80	0	46.92	0	49.04	0
44.84	0	46.96	0	49.08	0
44.88	0	47.00	0	49.12	0
44.92	0	47.04	0	49.16	0
44.96	0	47.08	0	49.20	0
45.00	0	47.12	0	49.24	0
45.04	0	47.16	0	49.28	0
45.08	0	47.20	0	49.32	0
45.12	0	47.24	0	49.36	0
45.16	0	47.28	0	49.40	0
45.20	0	47.32	0	49.44	0
45.24	0	47.36	0	49.48	0
45.28	0	47.40	0		
45.32	0	47.44	0		
45.36	0	47.48	0		
45.40	0	47.52	0		
45.44	0	47.56	0		
45.48	0	47.60	0		
45.52	0	47.64	0		
45.56	0	47.68	0		
45.60	0	47.72	0		
45.64	0	47.76	0		
45.68	0	47.80	0		
45.72	0	47.84	0		
45.76	0	47.88	0		
45.80	0	47.92	0		
45.84	0	47.96	0		
45.88	0	48.00	0		
45.92	0	48.04	0		
45.96	0	48.08	0		
46.00	0	48.12	0		
46.04	0	48.16	0		
46.08	0	48.20	0		
46.12	0	48.24	0		
46.16	0	48.28	0		
46.20	0	48.32	0		
46.24	0	48.36	0		
46.28	0	48.40	0		
46.32	0	48.44	0		
46.36	0	48.48	0		
46.40	0	48.52	0		
46.44	0	48.56	0		
46.48	0	48.60	0		

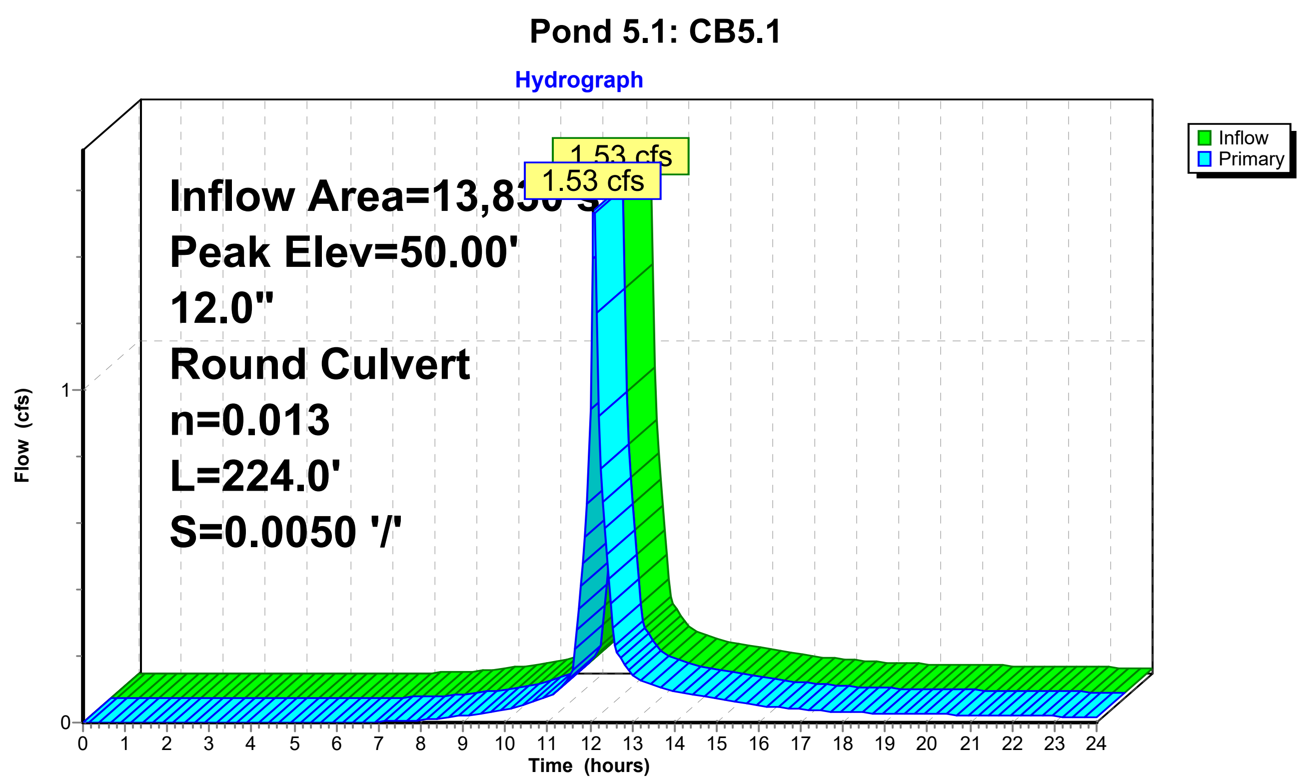
Summary for Pond 5.1: CB5.1

Inflow Area =	13,830 sf,	63.16% Impervious,	Inflow Depth > 4.23"	for 100-Year event	
Inflow =	1.53 cfs @	12.09 hrs,	Volume=	4,877 cf	
Outflow =	1.53 cfs @	12.09 hrs,	Volume=	4,877 cf,	Atten= 0%, Lag= 0.0 min
Primary =	1.53 cfs @	12.09 hrs,	Volume=	4,877 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 50.00' @ 12.11 hrs
Flood Elev= 47.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.40'	**12.0" Round Culvert** L= 224.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.40' / 43.28' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=49.56' TW=50.02' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 5.1: CB5.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.40	**0**	49.70	0
44.50	0	49.80	0
44.60	0	49.90	0
44.70	0	50.00	0
44.80	0	50.10	0
44.90	0	50.20	0
45.00	0	50.30	0
45.10	0	50.40	0
45.20	0	50.50	0
45.30	0	50.60	0
45.40	0	50.70	0
45.50	0		
45.60	0		
45.70	0		
45.80	0		
45.90	0		
46.00	0		
46.10	0		
46.20	0		
46.30	0		
46.40	0		
46.50	0		
46.60	0		
46.70	0		
46.80	0		
46.90	0		
47.00	0		
47.10	0		
47.20	0		
47.30	0		
47.40	0		
47.50	0		
47.60	0		
47.70	0		
47.80	0		
47.90	0		
48.00	0		
48.10	0		
48.20	0		
48.30	0		
48.40	0		
48.50	0		
48.60	0		
48.70	0		
48.80	0		
48.90	0		
49.00	0		
49.10	0		
49.20	0		
49.30	0		
49.40	0		
49.50	0		
49.60	0		

Summary for Pond 6: CB6

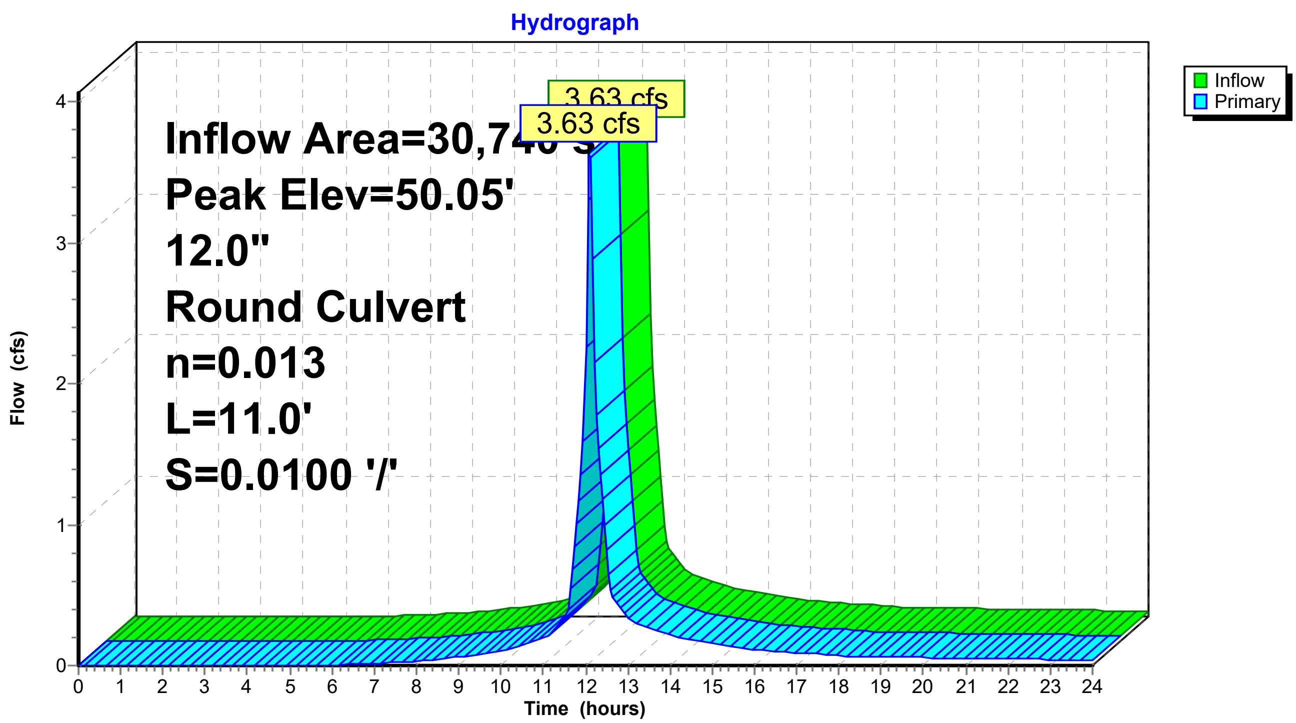
Inflow Area = 30,740 sf, 21.05% Impervious, Inflow Depth > 4.55" for 100-Year event
Inflow = 3.63 cfs @ 12.09 hrs, Volume= 11,666 cf
Outflow = 3.63 cfs @ 12.09 hrs, Volume= 11,666 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.63 cfs @ 12.09 hrs, Volume= 11,666 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 50.05' @ 12.15 hrs
Flood Elev= 47.79'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.39'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.39' / 44.28' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=48.34' TW=48.49' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)

Pond 6: CB6



Stage-Area-Storage for Pond 6: CB6

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.39	**0**	46.51	0	48.63	0
44.43	0	46.55	0	48.67	0
44.47	0	46.59	0	48.71	0
44.51	0	46.63	0	48.75	0
44.55	0	46.67	0	48.79	0
44.59	0	46.71	0	48.83	0
44.63	0	46.75	0	48.87	0
44.67	0	46.79	0	48.91	0
44.71	0	46.83	0	48.95	0
44.75	0	46.87	0	48.99	0
44.79	0	46.91	0	49.03	0
44.83	0	46.95	0	49.07	0
44.87	0	46.99	0	49.11	0
44.91	0	47.03	0	49.15	0
44.95	0	47.07	0	49.19	0
44.99	0	47.11	0	49.23	0
45.03	0	47.15	0	49.27	0
45.07	0	47.19	0	49.31	0
45.11	0	47.23	0	49.35	0
45.15	0	47.27	0	49.39	0
45.19	0	47.31	0	49.43	0
45.23	0	47.35	0	49.47	0
45.27	0	47.39	0	49.51	0
45.31	0	47.43	0	49.55	0
45.35	0	47.47	0	49.59	0
45.39	0	47.51	0	49.63	0
45.43	0	47.55	0	49.67	0
45.47	0	47.59	0	49.71	0
45.51	0	47.63	0	49.75	0
45.55	0	47.67	0	49.79	0
45.59	0	47.71	0	49.83	0
45.63	0	47.75	0	49.87	0
45.67	0	47.79	0	49.91	0
45.71	0	47.83	0	49.95	0
45.75	0	47.87	0	49.99	0
45.79	0	47.91	0	50.03	0
45.83	0	47.95	0	50.07	0
45.87	0	47.99	0		
45.91	0	48.03	0		
45.95	0	48.07	0		
45.99	0	48.11	0		
46.03	0	48.15	0		
46.07	0	48.19	0		
46.11	0	48.23	0		
46.15	0	48.27	0		
46.19	0	48.31	0		
46.23	0	48.35	0		
46.27	0	48.39	0		
46.31	0	48.43	0		
46.35	0	48.47	0		
46.39	0	48.51	0		
46.43	0	48.55	0		
46.47	0	48.59	0		

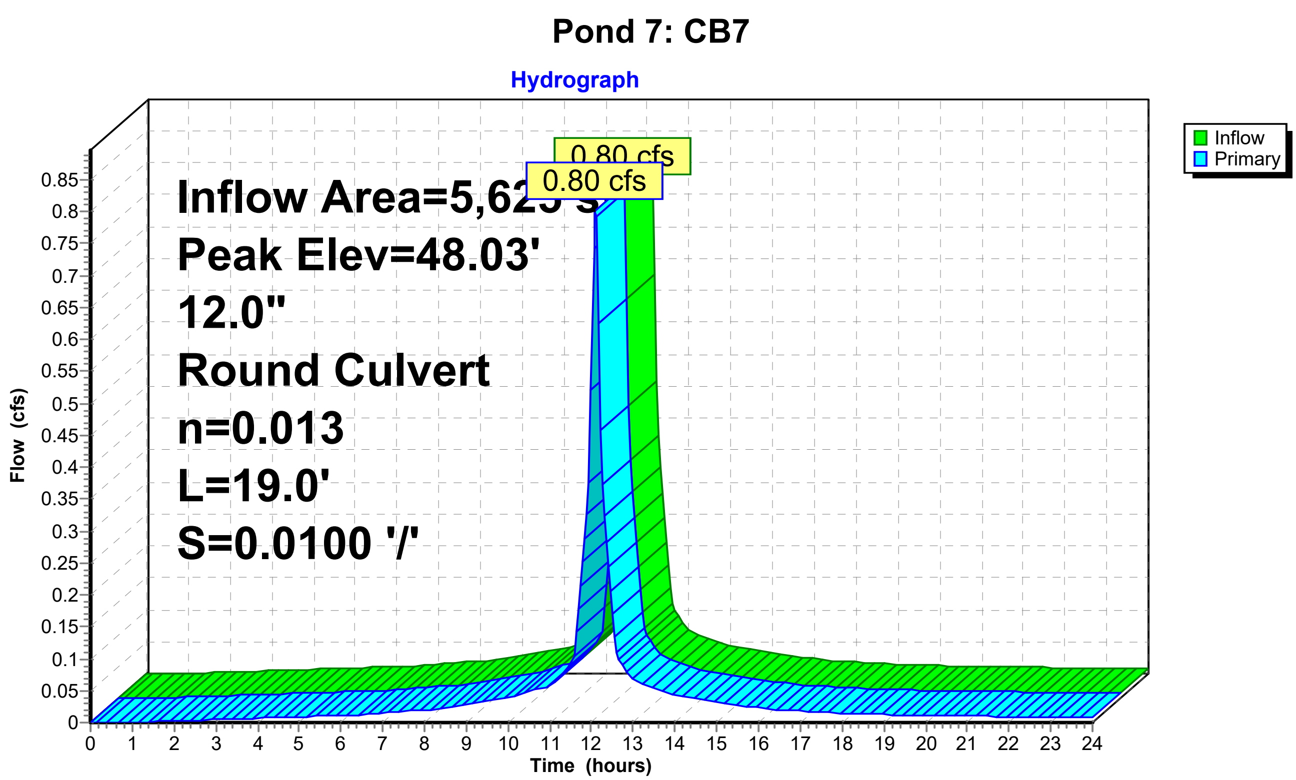
Summary for Pond 7: CB7

Inflow Area = 5,625 sf, 44.44% Impervious, Inflow Depth > 6.14" for 100-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 2,878 cf
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 2,878 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 2,878 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.03' @ 12.13 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 19.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.69' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=47.32' TW=48.17' (Dynamic Tailwater)
└─**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 7: CB7

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.88	**0**	47.53	0
44.93	0	47.58	0
44.98	0	47.63	0
45.03	0	47.68	0
45.08	0	47.73	0
45.13	0	47.78	0
45.18	0	47.83	0
45.23	0	47.88	0
45.28	0	47.93	0
45.33	0	47.98	0
45.38	0	48.03	0
45.43	0	48.08	0
45.48	0	48.13	0
45.53	0	48.18	0
45.58	0	48.23	0
45.63	0	48.28	0
45.68	0	48.33	0
45.73	0	48.38	0
45.78	0	48.43	0
45.83	0	48.48	0
45.88	0	48.53	0
45.93	0	48.58	0
45.98	0	48.63	0
46.03	0	48.68	0
46.08	0	48.73	0
46.13	0		
46.18	0		
46.23	0		
46.28	0		
46.33	0		
46.38	0		
46.43	0		
46.48	0		
46.53	0		
46.58	0		
46.63	0		
46.68	0		
46.73	0		
46.78	0		
46.83	0		
46.88	0		
46.93	0		
46.98	0		
47.03	0		
47.08	0		
47.13	0		
47.18	0		
47.23	0		
47.28	0		
47.33	0		
47.38	0		
47.43	0		
47.48	0		

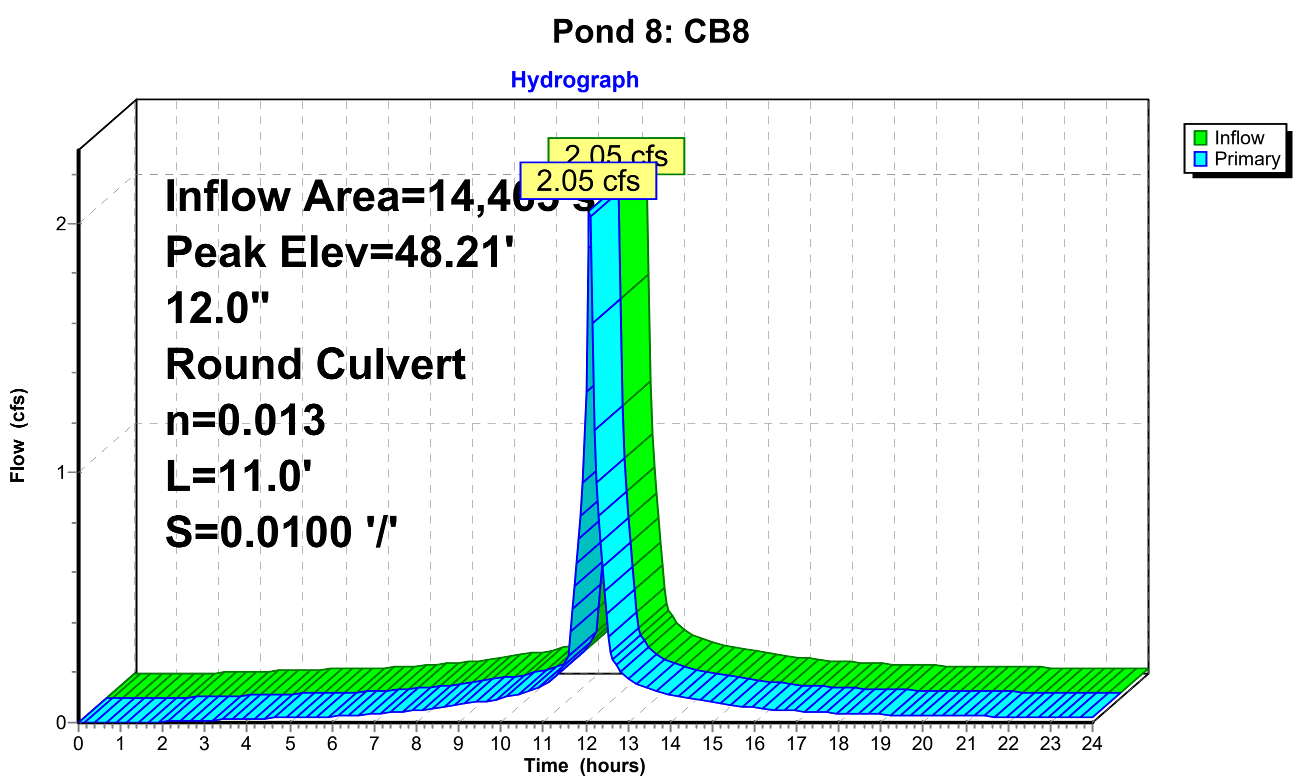
Summary for Pond 8: CB8

Inflow Area =	14,465 sf, 70.83% Impervious,	Inflow Depth > 6.02"	for 100-Year event
Inflow =	2.05 cfs @ 12.09 hrs,	Volume=	7,259 cf
Outflow =	2.05 cfs @ 12.09 hrs,	Volume=	7,259 cf, Atten= 0%, Lag= 0.0 min
Primary =	2.05 cfs @ 12.09 hrs,	Volume=	7,259 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.21' @ 12.13 hrs
Flood Elev= 48.28'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.88'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.88' / 44.77' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.09 hrs HW=47.55' TW=48.18' (Dynamic Tailwater)
↑—**1=Culvert** (Controls 0.00 cfs)



Stage-Area-Storage for Pond 8: CB8

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.88	**0**	47.53	0
44.93	0	47.58	0
44.98	0	47.63	0
45.03	0	47.68	0
45.08	0	47.73	0
45.13	0	47.78	0
45.18	0	47.83	0
45.23	0	47.88	0
45.28	0	47.93	0
45.33	0	47.98	0
45.38	0	48.03	0
45.43	0	48.08	0
45.48	0	48.13	0
45.53	0	48.18	0
45.58	0	48.23	0
45.63	0	48.28	0
45.68	0	48.33	0
45.73	0	48.38	0
45.78	0	48.43	0
45.83	0	48.48	0
45.88	0	48.53	0
45.93	0	48.58	0
45.98	0	48.63	0
46.03	0	48.68	0
46.08	0	48.73	0
46.13	0	48.78	0
46.18	0	48.83	0
46.23	0	48.88	0
46.28	0		
46.33	0		
46.38	0		
46.43	0		
46.48	0		
46.53	0		
46.58	0		
46.63	0		
46.68	0		
46.73	0		
46.78	0		
46.83	0		
46.88	0		
46.93	0		
46.98	0		
47.03	0		
47.08	0		
47.13	0		
47.18	0		
47.23	0		
47.28	0		
47.33	0		
47.38	0		
47.43	0		
47.48	0		

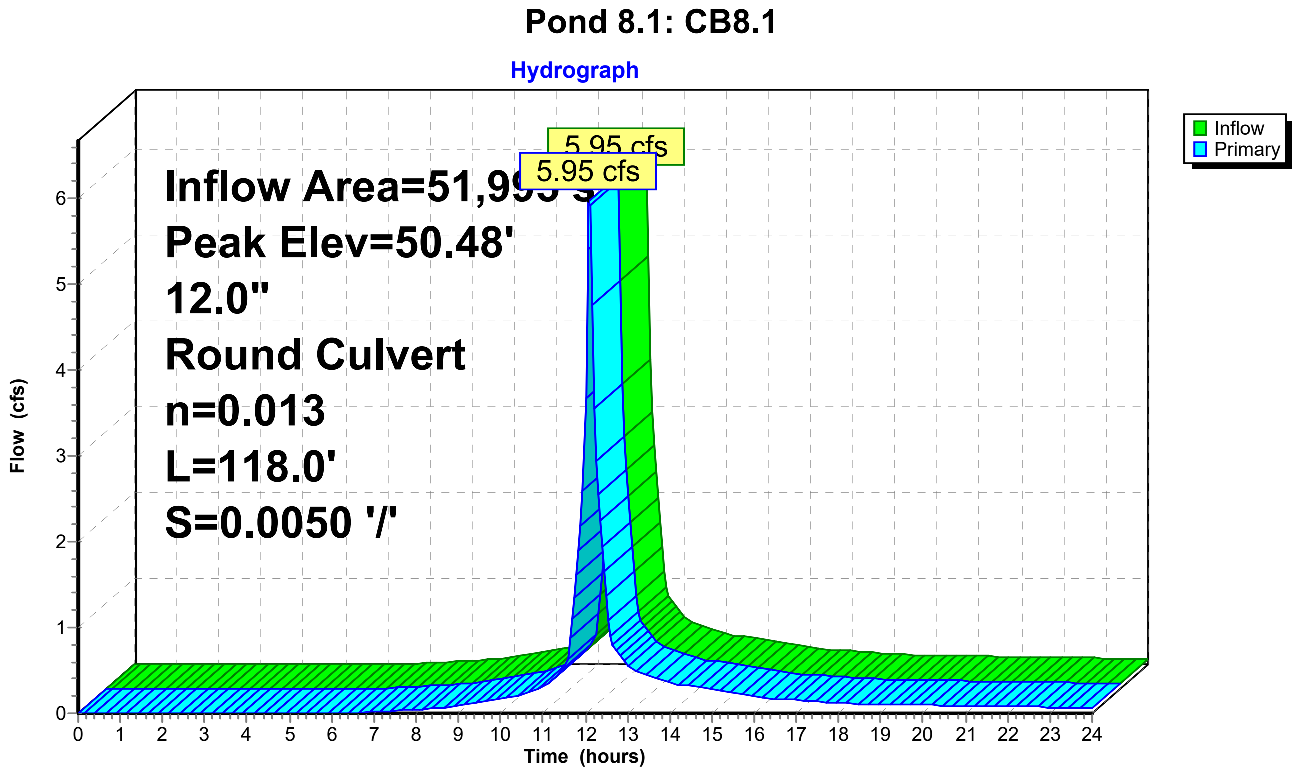
Summary for Pond 8.1: CB8.1

Inflow Area =	51,995 sf,	41.63% Impervious,	Inflow Depth > 4.39"	for 100-Year event	
Inflow =	5.95 cfs @	12.09 hrs,	Volume=	19,017 cf	
Outflow =	5.95 cfs @	12.09 hrs,	Volume=	19,017 cf,	Atten= 0%, Lag= 0.0 min
Primary =	5.95 cfs @	12.09 hrs,	Volume=	19,017 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 50.48' @ 12.11 hrs
Flood Elev= 48.20'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.18'	**12.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.18' / 42.59' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.64 cfs @ 12.09 hrs HW=50.00' TW=45.84' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 5.64 cfs @ 7.17 fps)



Stage-Area-Storage for Pond 8.1: CB8.1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.18	**0**	48.48	0
43.28	0	48.58	0
43.38	0	48.68	0
43.48	0	48.78	0
43.58	0	48.88	0
43.68	0	48.98	0
43.78	0	49.08	0
43.88	0	49.18	0
43.98	0	49.28	0
44.08	0	49.38	0
44.18	0	49.48	0
44.28	0	49.58	0
44.38	0	49.68	0
44.48	0	49.78	0
44.58	0	49.88	0
44.68	0	49.98	0
44.78	0	50.08	0
44.88	0	50.18	0
44.98	0	50.28	0
45.08	0	50.38	0
45.18	0		
45.28	0		
45.38	0		
45.48	0		
45.58	0		
45.68	0		
45.78	0		
45.88	0		
45.98	0		
46.08	0		
46.18	0		
46.28	0		
46.38	0		
46.48	0		
46.58	0		
46.68	0		
46.78	0		
46.88	0		
46.98	0		
47.08	0		
47.18	0		
47.28	0		
47.38	0		
47.48	0		
47.58	0		
47.68	0		
47.78	0		
47.88	0		
47.98	0		
48.08	0		
48.18	0		
48.28	0		
48.38	0		

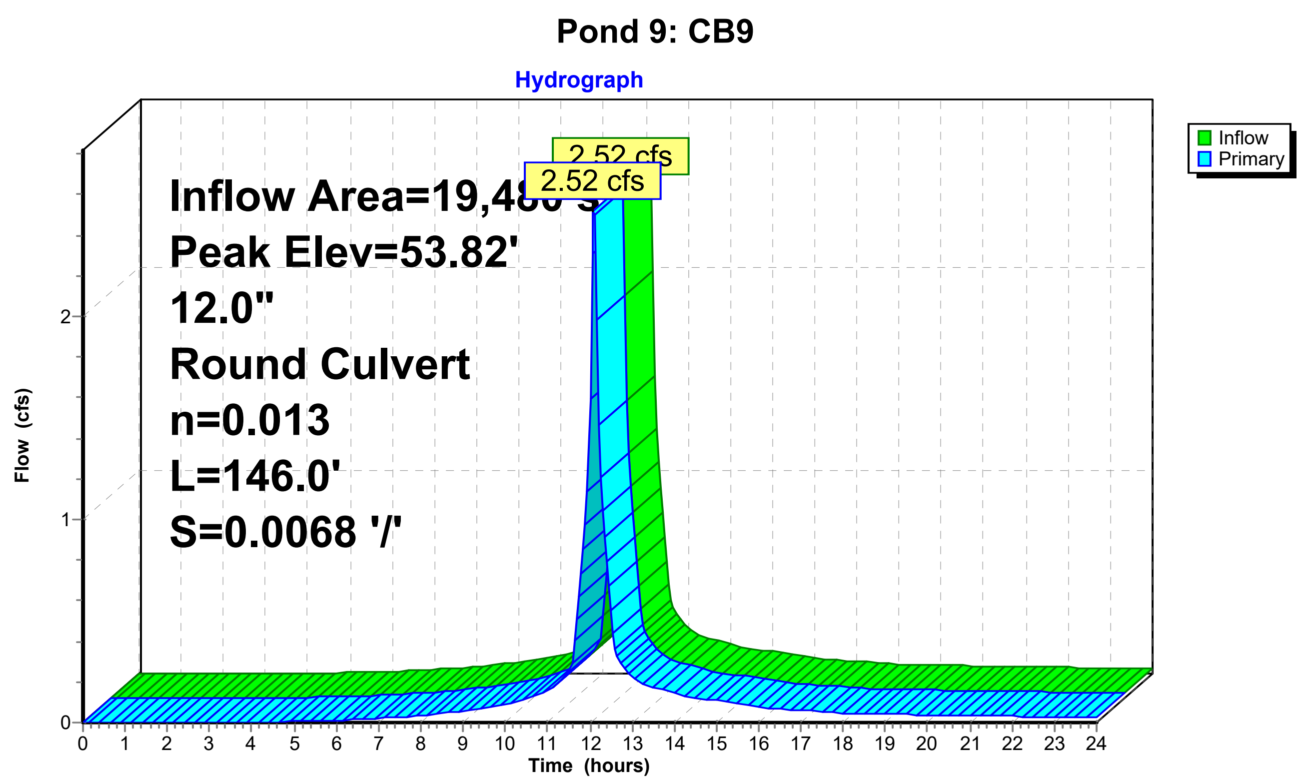
Summary for Pond 9: CB9

Inflow Area =	19,480 sf,	3.08% Impervious,	Inflow Depth > 5.10"	for 100-Year event	
Inflow =	2.52 cfs @	12.09 hrs,	Volume=	8,287 cf	
Outflow =	2.52 cfs @	12.09 hrs,	Volume=	8,287 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.52 cfs @	12.09 hrs,	Volume=	8,287 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 53.82' @ 12.12 hrs
Flood Elev= 50.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	48.30'	**12.0" Round Culvert** L= 146.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 48.30' / 47.30' S= 0.0068 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.66 cfs @ 12.09 hrs HW=53.21' TW=52.79' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.66 cfs @ 2.12 fps)



Stage-Area-Storage for Pond 9: CB9

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
48.30	**0**	50.42	0	52.54	0
48.34	0	50.46	0	52.58	0
48.38	0	50.50	0	52.62	0
48.42	0	50.54	0	52.66	0
48.46	0	50.58	0	52.70	0
48.50	0	50.62	0	52.74	0
48.54	0	50.66	0	52.78	0
48.58	0	50.70	0	52.82	0
48.62	0	50.74	0	52.86	0
48.66	0	50.78	0	52.90	0
48.70	0	50.82	0	52.94	0
48.74	0	50.86	0	52.98	0
48.78	0	50.90	0	53.02	0
48.82	0	50.94	0	53.06	0
48.86	0	50.98	0	53.10	0
48.90	0	51.02	0	53.14	0
48.94	0	51.06	0	53.18	0
48.98	0	51.10	0	53.22	0
49.02	0	51.14	0	53.26	0
49.06	0	51.18	0	53.30	0
49.10	0	51.22	0	53.34	0
49.14	0	51.26	0	53.38	0
49.18	0	51.30	0	53.42	0
49.22	0	51.34	0	53.46	0
49.26	0	51.38	0	53.50	0
49.30	0	51.42	0	53.54	0
49.34	0	51.46	0	53.58	0
49.38	0	51.50	0	53.62	0
49.42	0	51.54	0	53.66	0
49.46	0	51.58	0	53.70	0
49.50	0	51.62	0		
49.54	0	51.66	0		
49.58	0	51.70	0		
49.62	0	51.74	0		
49.66	0	51.78	0		
49.70	0	51.82	0		
49.74	0	51.86	0		
49.78	0	51.90	0		
49.82	0	51.94	0		
49.86	0	51.98	0		
49.90	0	52.02	0		
49.94	0	52.06	0		
49.98	0	52.10	0		
50.02	0	52.14	0		
50.06	0	52.18	0		
50.10	0	52.22	0		
50.14	0	52.26	0		
50.18	0	52.30	0		
50.22	0	52.34	0		
50.26	0	52.38	0		
50.30	0	52.42	0		
50.34	0	52.46	0		
50.38	0	52.50	0		

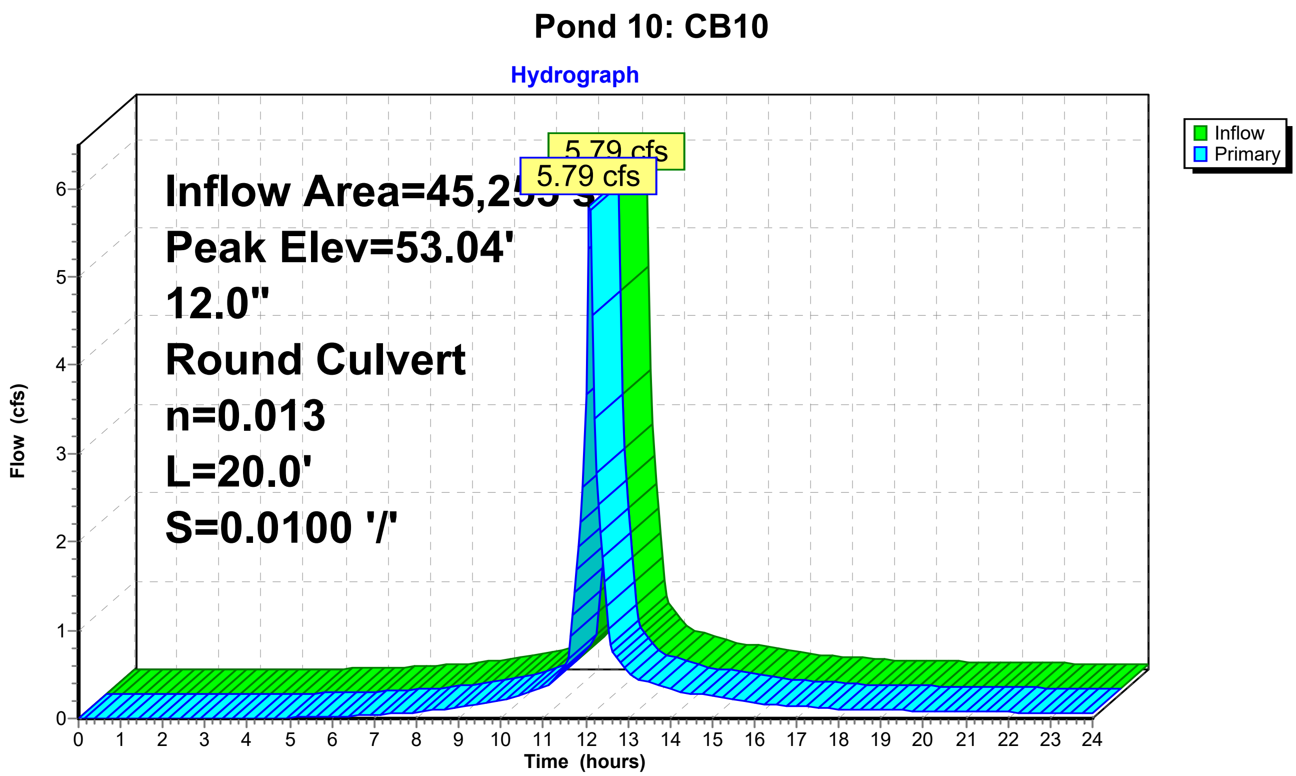
Summary for Pond 10: CB10

Inflow Area =	45,255 sf,	1.33% Impervious,	Inflow Depth > 5.04"	for 100-Year event	
Inflow =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf	
Outflow =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf,	Atten= 0%, Lag= 0.0 min
Primary =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 53.04' @ 12.10 hrs
Flood Elev= 50.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	47.20'	**12.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 47.20' / 47.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=4.88 cfs @ 12.09 hrs HW=52.79' TW=51.12' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.88 cfs @ 6.21 fps)



Stage-Area-Storage for Pond 10: CB10

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
47.20	**0**	49.32	0	51.44	0
47.24	0	49.36	0	51.48	0
47.28	0	49.40	0	51.52	0
47.32	0	49.44	0	51.56	0
47.36	0	49.48	0	51.60	0
47.40	0	49.52	0	51.64	0
47.44	0	49.56	0	51.68	0
47.48	0	49.60	0	51.72	0
47.52	0	49.64	0	51.76	0
47.56	0	49.68	0	51.80	0
47.60	0	49.72	0	51.84	0
47.64	0	49.76	0	51.88	0
47.68	0	49.80	0	51.92	0
47.72	0	49.84	0	51.96	0
47.76	0	49.88	0	52.00	0
47.80	0	49.92	0	52.04	0
47.84	0	49.96	0	52.08	0
47.88	0	50.00	0	52.12	0
47.92	0	50.04	0	52.16	0
47.96	0	50.08	0	52.20	0
48.00	0	50.12	0	52.24	0
48.04	0	50.16	0	52.28	0
48.08	0	50.20	0	52.32	0
48.12	0	50.24	0	52.36	0
48.16	0	50.28	0	52.40	0
48.20	0	50.32	0	52.44	0
48.24	0	50.36	0	52.48	0
48.28	0	50.40	0	52.52	0
48.32	0	50.44	0	52.56	0
48.36	0	50.48	0	52.60	0
48.40	0	50.52	0	52.64	0
48.44	0	50.56	0	52.68	0
48.48	0	50.60	0	52.72	0
48.52	0	50.64	0	52.76	0
48.56	0	50.68	0	52.80	0
48.60	0	50.72	0	52.84	0
48.64	0	50.76	0	52.88	0
48.68	0	50.80	0	52.92	0
48.72	0	50.84	0	52.96	0
48.76	0	50.88	0	53.00	0
48.80	0	50.92	0	53.04	0
48.84	0	50.96	0		
48.88	0	51.00	0		
48.92	0	51.04	0		
48.96	0	51.08	0		
49.00	0	51.12	0		
49.04	0	51.16	0		
49.08	0	51.20	0		
49.12	0	51.24	0		
49.16	0	51.28	0		
49.20	0	51.32	0		
49.24	0	51.36	0		
49.28	0	51.40	0		

Summary for Pond 104P: Inf Area 2

Inflow Area = 100,255 sf, 0.60% Impervious, Inflow Depth > 5.58" for 100-Year event
Inflow = 13.57 cfs @ 12.09 hrs, Volume= 46,612 cf
Outflow = 7.74 cfs @ 12.22 hrs, Volume= 46,623 cf, Atten= 43%, Lag= 8.2 min
Discarded = 2.52 cfs @ 12.22 hrs, Volume= 41,199 cf
Primary = 5.22 cfs @ 12.22 hrs, Volume= 5,423 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 49.89' @ 12.22 hrs Surf.Area= 4,886 sf Storage= 10,343 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.1 min (796.0 - 769.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	46.50'	4,360 cf	**44.25'W x 110.42'L x 3.50'H Field A** 17,101 cf Overall - 6,202 cf Embedded = 10,899 cf x 40.0% Voids
#2A	47.00'	6,202 cf	**ADS_StormTech SC-740 +Cap** x 135 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 135 Chambers in 9 Rows
		10,561 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	46.50'	**8.270 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 44.50'
#2	Primary	46.50'	**12.0" Round Culvert** L= 50.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 46.50' / 44.00' S= 0.0500 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	49.20'	**4.0' long x 0.5' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 Coef. (English) 2.80 2.92 3.08 3.30 3.32
#4	Device 2	48.20'	**2.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=2.51 cfs @ 12.22 hrs HW=49.86' (Free Discharge)
└─**1=Exfiltration** (Controls 2.51 cfs)

Primary OutFlow Max=5.04 cfs @ 12.22 hrs HW=49.85' TW=0.00' (Dynamic Tailwater)
└─**2=Culvert** (Inlet Controls 5.04 cfs @ 6.42 fps)
  ├─**3=Broad-Crested Rectangular Weir** (Passes < 6.64 cfs potential flow)
  └─**4=Orifice/Grate** (Passes < 0.13 cfs potential flow)

Pond 104P: Inf Area 2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

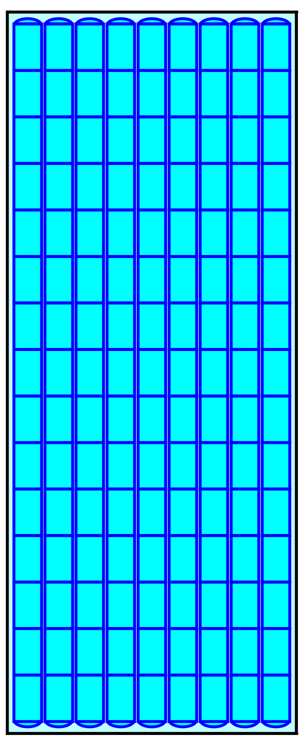
15 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 108.42' Row Length +12.0" End Stone x 2 = 110.42' Base Length
9 Rows x 51.0" Wide + 6.0" Spacing x 8 + 12.0" Side Stone x 2 = 44.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

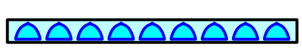
135 Chambers x 45.9 cf = 6,201.9 cf Chamber Storage

17,100.8 cf Field - 6,201.9 cf Chambers = 10,898.9 cf Stone x 40.0% Voids = 4,359.6 cf Stone Storage

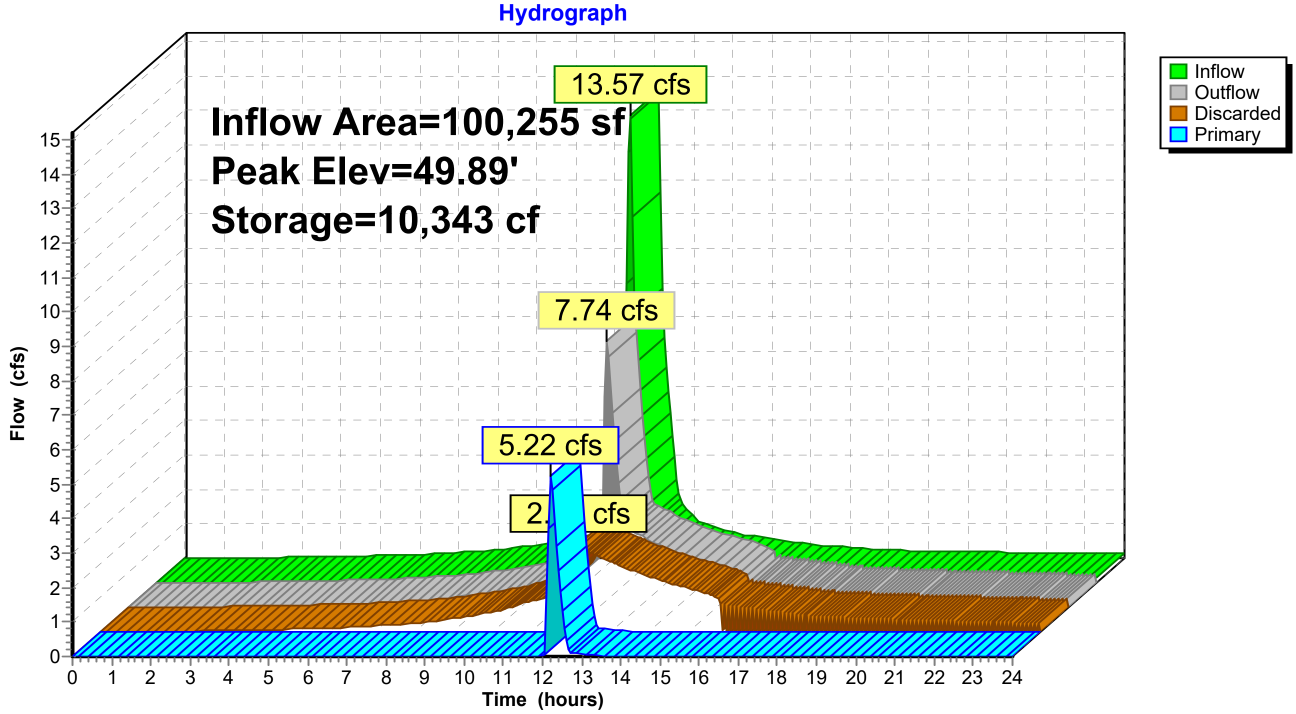
Chamber Storage + Stone Storage = 10,561.5 cf = 0.242 af
Overall Storage Efficiency = 61.8%
Overall System Size = 110.42' x 44.25' x 3.50'

135 Chambers
633.4 cy Field
403.7 cy Stone





Pond 104P: Inf Area 2



Stage-Area-Storage for Pond 104P: Inf Area 2

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
46.50	**4,886**	0	49.15	4,886	8,797
46.55	4,886	98	49.20	4,886	8,927
46.60	4,886	195	49.25	4,886	9,050
46.65	4,886	293	49.30	4,886	9,167
46.70	4,886	391	49.35	4,886	9,276
46.75	4,886	489	49.40	4,886	9,382
46.80	4,886	586	49.45	4,886	9,485
46.85	4,886	684	49.50	4,886	9,584
46.90	4,886	782	49.55	4,886	9,682
46.95	4,886	879	49.60	4,886	9,780
47.00	4,886	977	49.65	4,886	9,877
47.05	4,886	1,182	49.70	4,886	9,975
47.10	4,886	1,387	49.75	4,886	10,073
47.15	4,886	1,591	49.80	4,886	10,171
47.20	4,886	1,795	49.85	4,886	10,268
47.25	4,886	1,999	49.90	4,886	10,366
47.30	4,886	2,202	49.95	4,886	10,464
47.35	4,886	2,404	50.00	4,886	**10,561**
47.40	4,886	2,605			
47.45	4,886	2,805			
47.50	4,886	3,005			
47.55	4,886	3,204			
47.60	4,886	3,402			
47.65	4,886	3,599			
47.70	4,886	3,795			
47.75	4,886	3,990			
47.80	4,886	4,184			
47.85	4,886	4,376			
47.90	4,886	4,568			
47.95	4,886	4,759			
48.00	4,886	4,948			
48.05	4,886	5,136			
48.10	4,886	5,323			
48.15	4,886	5,509			
48.20	4,886	5,692			
48.25	4,886	5,875			
48.30	4,886	6,056			
48.35	4,886	6,235			
48.40	4,886	6,413			
48.45	4,886	6,588			
48.50	4,886	6,762			
48.55	4,886	6,935			
48.60	4,886	7,105			
48.65	4,886	7,273			
48.70	4,886	7,438			
48.75	4,886	7,601			
48.80	4,886	7,761			
48.85	4,886	7,919			
48.90	4,886	8,074			
48.95	4,886	8,226			
49.00	4,886	8,374			
49.05	4,886	8,519			
49.10	4,886	8,660			

Summary for Pond A: DMH 1

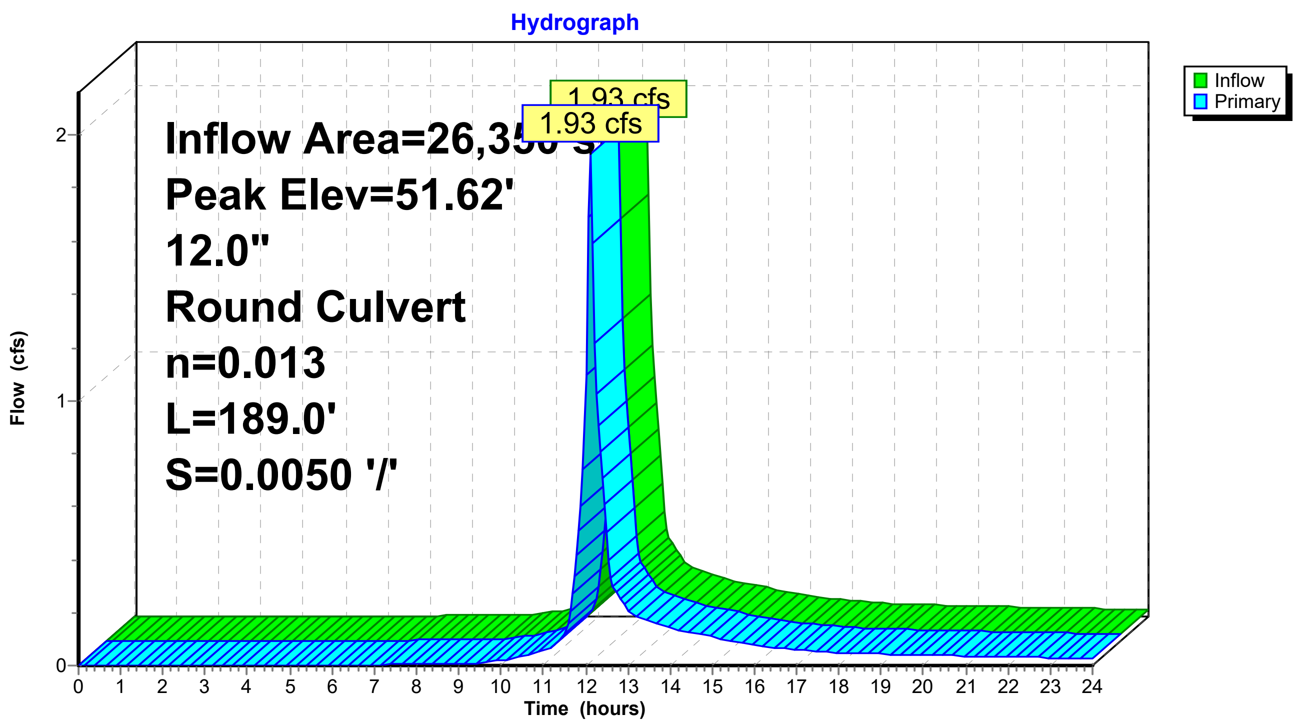
Inflow Area = 26,350 sf, 45.43% Impervious, Inflow Depth > 2.84" for 100-Year event
Inflow = 1.93 cfs @ 12.10 hrs, Volume= 6,241 cf
Outflow = 1.93 cfs @ 12.10 hrs, Volume= 6,241 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.10 hrs, Volume= 6,241 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 51.62' @ 12.13 hrs
Flood Elev= 51.37'

Device	Routing	Invert	Outlet Devices
#1	Primary	45.60'	**12.0" Round Culvert** L= 189.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 45.60' / 44.66' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.00 cfs @ 12.10 hrs HW=50.99' TW=51.04' (Dynamic Tailwater)
1=Culvert (Controls 0.00 cfs)

Pond A: DMH 1



Stage-Area-Storage for Pond A: DMH 1

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
45.60	**0**	50.90	0
45.70	0	51.00	0
45.80	0	51.10	0
45.90	0	51.20	0
46.00	0	51.30	0
46.10	0	51.40	0
46.20	0	51.50	0
46.30	0	51.60	0
46.40	0	51.70	0
46.50	0	51.80	0
46.60	0	51.90	0
46.70	0	52.00	0
46.80	0		
46.90	0		
47.00	0		
47.10	0		
47.20	0		
47.30	0		
47.40	0		
47.50	0		
47.60	0		
47.70	0		
47.80	0		
47.90	0		
48.00	0		
48.10	0		
48.20	0		
48.30	0		
48.40	0		
48.50	0		
48.60	0		
48.70	0		
48.80	0		
48.90	0		
49.00	0		
49.10	0		
49.20	0		
49.30	0		
49.40	0		
49.50	0		
49.60	0		
49.70	0		
49.80	0		
49.90	0		
50.00	0		
50.10	0		
50.20	0		
50.30	0		
50.40	0		
50.50	0		
50.60	0		
50.70	0		
50.80	0		

Summary for Pond B: DMH2

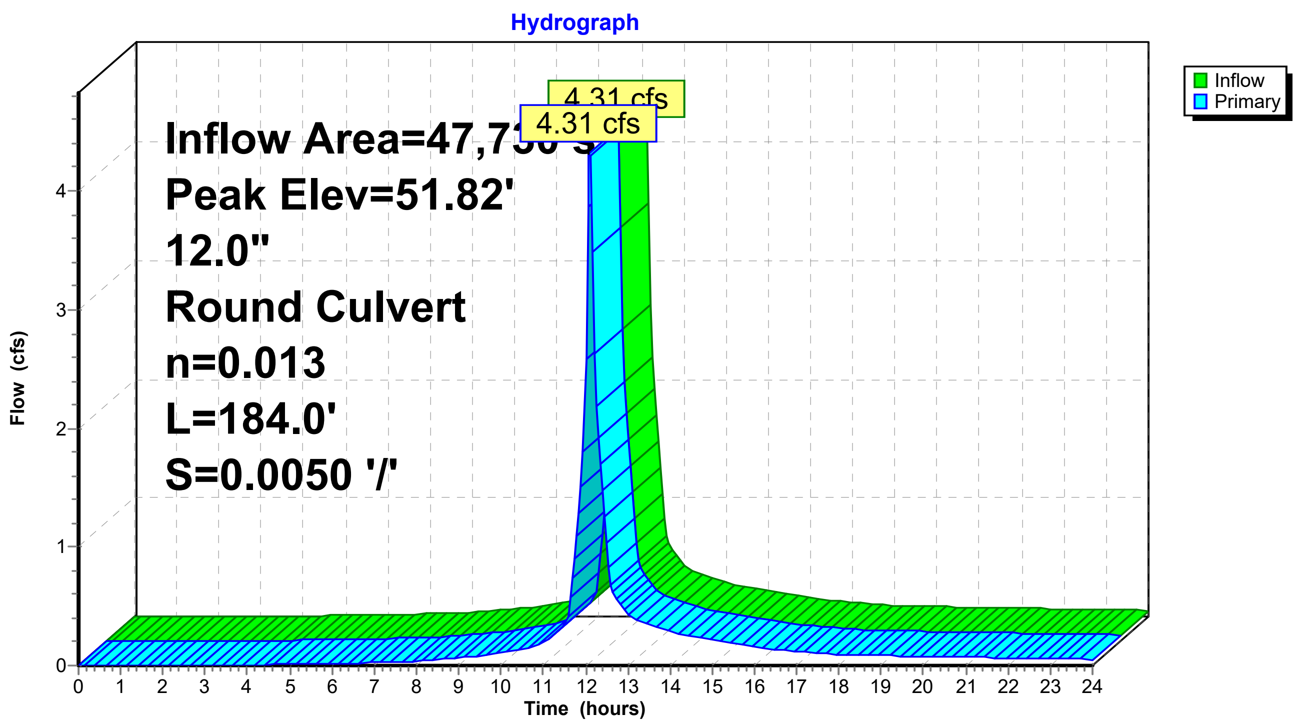
Inflow Area =	47,730 sf,	57.36% Impervious,	Inflow Depth > 3.58"	for 100-Year event	
Inflow =	4.31 cfs @	12.09 hrs,	Volume=	14,259 cf	
Outflow =	4.31 cfs @	12.09 hrs,	Volume=	14,259 cf,	Atten= 0%, Lag= 0.0 min
Primary =	4.31 cfs @	12.09 hrs,	Volume=	14,259 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 51.82' @ 12.13 hrs
Flood Elev= 49.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	44.56'	**12.0" Round Culvert** L= 184.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 44.56' / 43.64' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.53 cfs @ 12.09 hrs HW=50.85' TW=48.58' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 3.53 cfs @ 4.49 fps)

Pond B: DMH2



Stage-Area-Storage for Pond B: DMH2

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
44.56	**0**	49.86	0
44.66	0	49.96	0
44.76	0	50.06	0
44.86	0	50.16	0
44.96	0	50.26	0
45.06	0	50.36	0
45.16	0	50.46	0
45.26	0	50.56	0
45.36	0	50.66	0
45.46	0	50.76	0
45.56	0	50.86	0
45.66	0	50.96	0
45.76	0	51.06	0
45.86	0	51.16	0
45.96	0	51.26	0
46.06	0	51.36	0
46.16	0	51.46	0
46.26	0	51.56	0
46.36	0	51.66	0
46.46	0		
46.56	0		
46.66	0		
46.76	0		
46.86	0		
46.96	0		
47.06	0		
47.16	0		
47.26	0		
47.36	0		
47.46	0		
47.56	0		
47.66	0		
47.76	0		
47.86	0		
47.96	0		
48.06	0		
48.16	0		
48.26	0		
48.36	0		
48.46	0		
48.56	0		
48.66	0		
48.76	0		
48.86	0		
48.96	0		
49.06	0		
49.16	0		
49.26	0		
49.36	0		
49.46	0		
49.56	0		
49.66	0		
49.76	0		

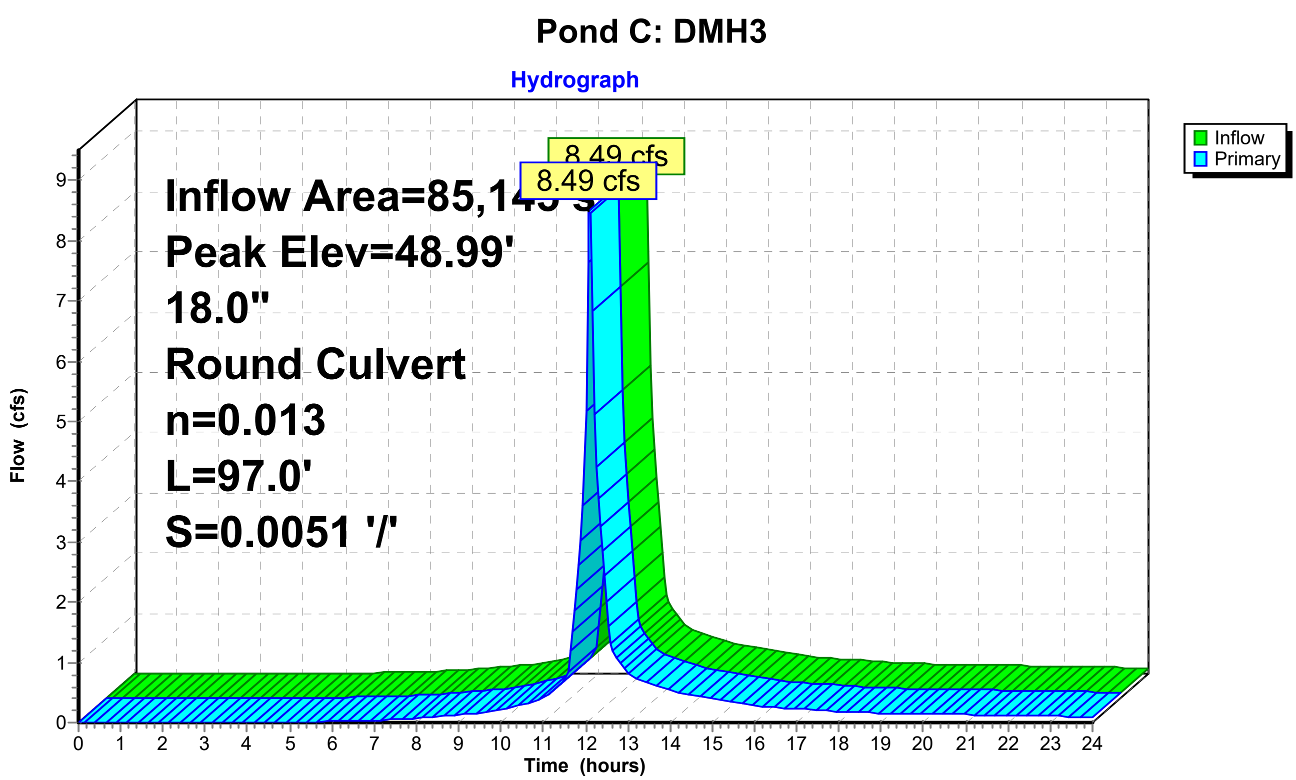
Summary for Pond C: DMH3

Inflow Area = 85,145 sf, 43.74% Impervious, Inflow Depth > 3.90" for 100-Year event
Inflow = 8.49 cfs @ 12.09 hrs, Volume= 27,652 cf
Outflow = 8.49 cfs @ 12.09 hrs, Volume= 27,652 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.49 cfs @ 12.09 hrs, Volume= 27,652 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.99' @ 12.12 hrs
Flood Elev= 48.17'

Device	Routing	Invert	Outlet Devices
#1	Primary	43.54'	**18.0" Round Culvert** L= 97.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 43.54' / 43.05' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.33 cfs @ 12.09 hrs HW=48.55' TW=48.37' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 3.33 cfs @ 1.88 fps)



Stage-Area-Storage for Pond C: DMH3

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
43.54	**0**	45.66	0	47.78	0
43.58	0	45.70	0	47.82	0
43.62	0	45.74	0	47.86	0
43.66	0	45.78	0	47.90	0
43.70	0	45.82	0	47.94	0
43.74	0	45.86	0	47.98	0
43.78	0	45.90	0	48.02	0
43.82	0	45.94	0	48.06	0
43.86	0	45.98	0	48.10	0
43.90	0	46.02	0	48.14	0
43.94	0	46.06	0	48.18	0
43.98	0	46.10	0	48.22	0
44.02	0	46.14	0	48.26	0
44.06	0	46.18	0	48.30	0
44.10	0	46.22	0	48.34	0
44.14	0	46.26	0	48.38	0
44.18	0	46.30	0	48.42	0
44.22	0	46.34	0	48.46	0
44.26	0	46.38	0	48.50	0
44.30	0	46.42	0	48.54	0
44.34	0	46.46	0	48.58	0
44.38	0	46.50	0	48.62	0
44.42	0	46.54	0	48.66	0
44.46	0	46.58	0	48.70	0
44.50	0	46.62	0	48.74	0
44.54	0	46.66	0	48.78	0
44.58	0	46.70	0	48.82	0
44.62	0	46.74	0	48.86	0
44.66	0	46.78	0	48.90	0
44.70	0	46.82	0	48.94	0
44.74	0	46.86	0	48.98	0
44.78	0	46.90	0	49.02	0
44.82	0	46.94	0	49.06	0
44.86	0	46.98	0	49.10	0
44.90	0	47.02	0	49.14	0
44.94	0	47.06	0	49.18	0
44.98	0	47.10	0	49.22	0
45.02	0	47.14	0	49.26	0
45.06	0	47.18	0	49.30	0
45.10	0	47.22	0	49.34	0
45.14	0	47.26	0	49.38	0
45.18	0	47.30	0	49.42	0
45.22	0	47.34	0	49.46	0
45.26	0	47.38	0		
45.30	0	47.42	0		
45.34	0	47.46	0		
45.38	0	47.50	0		
45.42	0	47.54	0		
45.46	0	47.58	0		
45.50	0	47.62	0		
45.54	0	47.66	0		
45.58	0	47.70	0		
45.62	0	47.74	0		

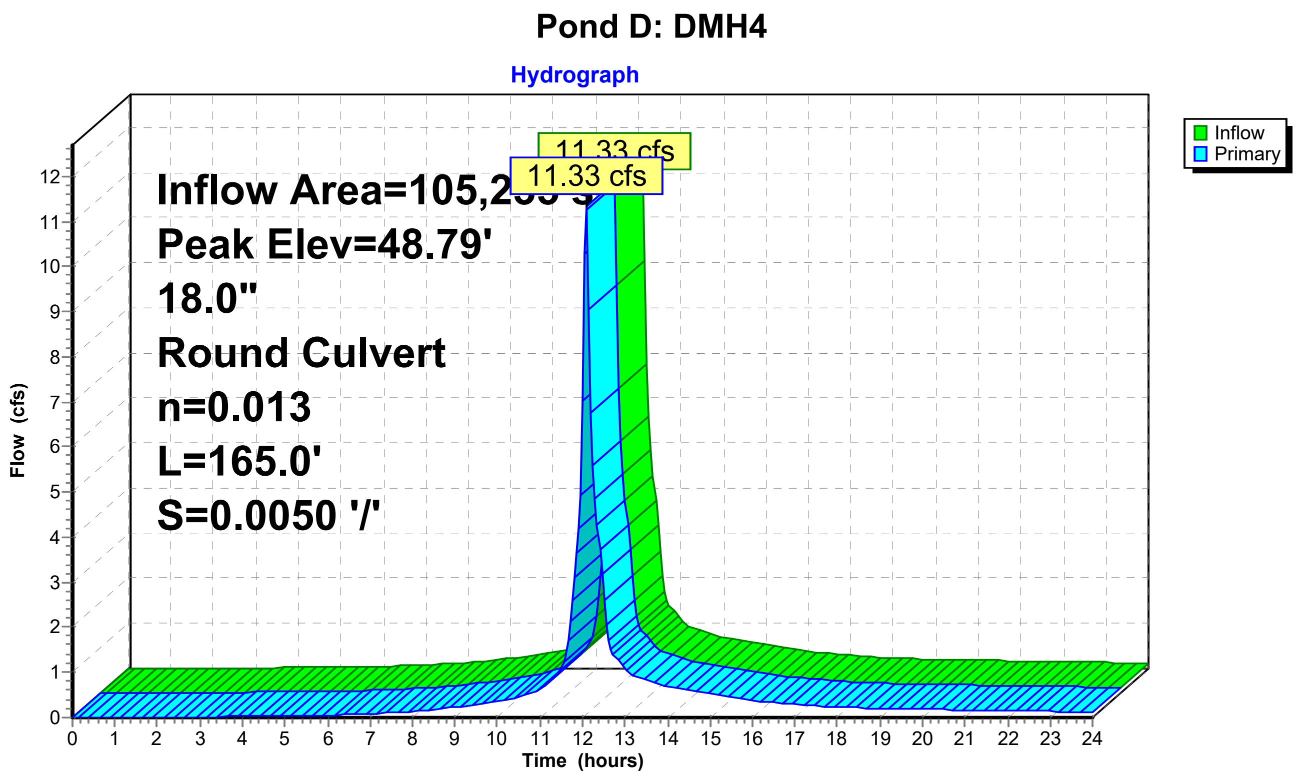
Summary for Pond D: DMH4

Inflow Area = 105,235 sf, 47.50% Impervious, Inflow Depth > 4.31" for 100-Year event
Inflow = 11.33 cfs @ 12.09 hrs, Volume= 37,789 cf
Outflow = 11.33 cfs @ 12.09 hrs, Volume= 37,789 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.33 cfs @ 12.09 hrs, Volume= 37,789 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 48.79' @ 12.11 hrs
Flood Elev= 48.47'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.95'	**18.0" Round Culvert** L= 165.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.95' / 42.13' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=10.51 cfs @ 12.09 hrs HW=48.32' TW=45.84' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 10.51 cfs @ 5.95 fps)



Stage-Area-Storage for Pond D: DMH4

Elevation (feet)	Storage (cubic-feet)
42.95	**0**
42.99	0
43.03	0
43.07	0
43.11	0
43.15	0
43.19	0
43.23	0
43.27	0
43.31	0
43.35	0
43.39	0
43.43	0
43.47	0
43.51	0
43.55	0
43.59	0
43.63	0
43.67	0
43.71	0
43.75	0
43.79	0
43.83	0
43.87	0
43.91	0
43.95	0
43.99	0
44.03	0
44.07	0
44.11	0
44.15	0
44.19	0
44.23	0
44.27	0
44.31	0
44.35	0
44.39	0
44.43	0
44.47	0
44.51	0
44.55	0
44.59	0
44.63	0
44.67	0
44.71	0
44.75	0
44.79	0
44.83	0
44.87	0
44.91	0
44.95	0
44.99	0
45.03	0
45.07	0
45.11	0
45.15	0
45.19	0
45.23	0
45.27	0
45.31	0
45.35	0
45.39	0
45.43	0
45.47	0
45.51	0
45.55	0
45.59	0
45.63	0
45.67	0
45.71	0
45.75	0
45.79	0
45.83	0
45.87	0
45.91	0
45.95	0
45.99	0
46.03	0
46.07	0
46.11	0
46.15	0
46.19	0
46.23	0
46.27	0
46.31	0
46.35	0
46.39	0
46.43	0
46.47	0
46.51	0
46.55	0
46.59	0
46.63	0
46.67	0
46.71	0
46.75	0
46.79	0
46.83	0
46.87	0
46.91	0
46.95	0
46.99	0
47.03	0
47.07	0
47.11	0
47.15	0
47.19	0
47.23	0
47.27	0
47.31	0
47.35	0
47.39	0
47.43	0
47.47	0
47.51	0
47.55	0
47.59	0
47.63	0
47.67	0
47.71	0
47.75	0
47.79	0
47.83	0
47.87	0
47.91	0
47.95	0
47.99	0
48.03	0
48.07	0
48.11	0
48.15	0
48.19	0
48.23	0
48.27	0
48.31	0
48.35	0
48.39	0
48.43	0
48.47	0
48.51	0
48.55	0
48.59	0
48.63	0
48.67	0
48.71	0
48.75	0

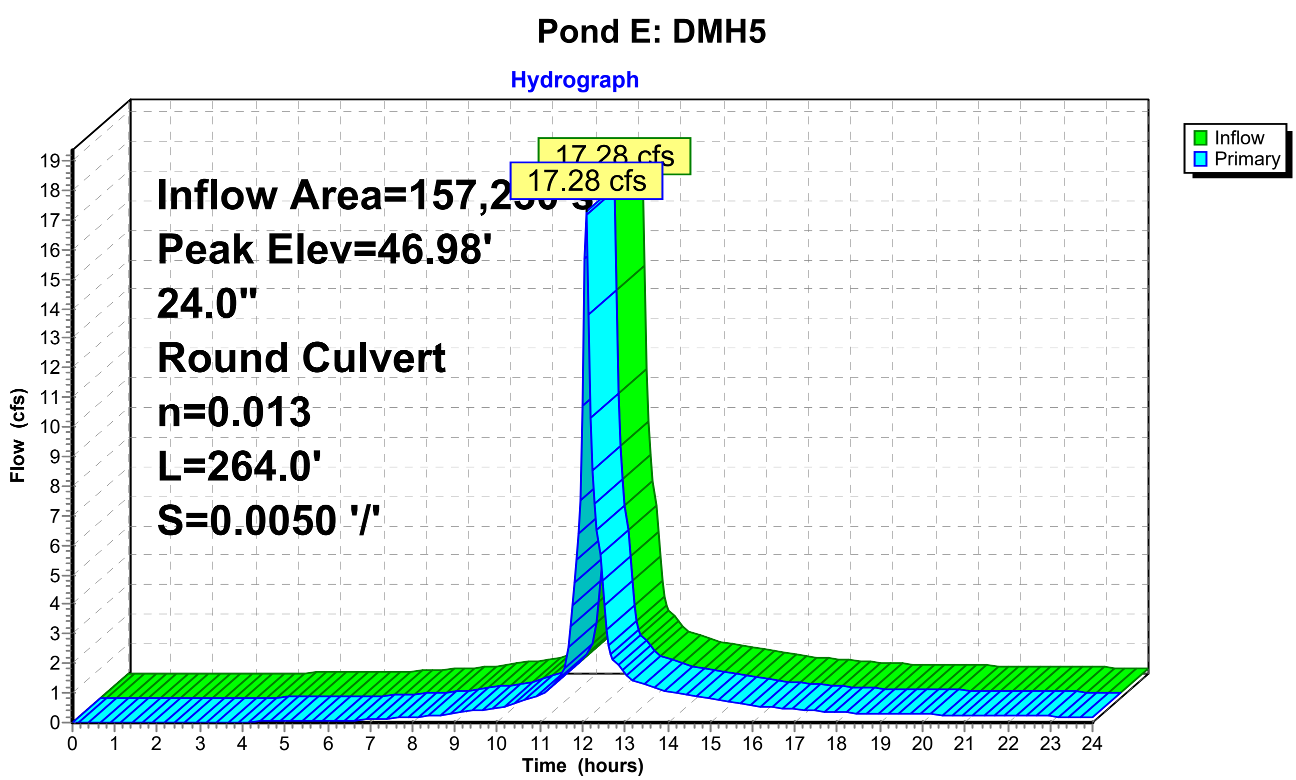
Summary for Pond E: DMH5

Inflow Area =	157,230 sf, 45.56% Impervious,	Inflow Depth > 4.34"	for 100-Year event
Inflow =	17.28 cfs @ 12.09 hrs, Volume=	56,806 cf	
Outflow =	17.28 cfs @ 12.09 hrs, Volume=	56,806 cf, Atten= 0%, Lag= 0.0 min	
Primary =	17.28 cfs @ 12.09 hrs, Volume=	56,806 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.98' @ 12.57 hrs
Flood Elev= 50.16'

Device	Routing	Invert	Outlet Devices
#1	Primary	42.03'	**24.0" Round Culvert** L= 264.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 42.03' / 40.71' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=12.91 cfs @ 12.09 hrs HW=45.84' TW=44.58' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 12.91 cfs @ 4.11 fps)



Stage-Area-Storage for Pond E: DMH5

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
42.03	**0**	47.33	0
42.13	0	47.43	0
42.23	0	47.53	0
42.33	0	47.63	0
42.43	0	47.73	0
42.53	0	47.83	0
42.63	0	47.93	0
42.73	0	48.03	0
42.83	0	48.13	0
42.93	0	48.23	0
43.03	0	48.33	0
43.13	0	48.43	0
43.23	0	48.53	0
43.33	0	48.63	0
43.43	0	48.73	0
43.53	0	48.83	0
43.63	0	48.93	0
43.73	0	49.03	0
43.83	0	49.13	0
43.93	0	49.23	0
44.03	0	49.33	0
44.13	0	49.43	0
44.23	0	49.53	0
44.33	0	49.63	0
44.43	0	49.73	0
44.53	0	49.83	0
44.63	0	49.93	0
44.73	0	50.03	0
44.83	0	50.13	0
44.93	0		
45.03	0		
45.13	0		
45.23	0		
45.33	0		
45.43	0		
45.53	0		
45.63	0		
45.73	0		
45.83	0		
45.93	0		
46.03	0		
46.13	0		
46.23	0		
46.33	0		
46.43	0		
46.53	0		
46.63	0		
46.73	0		
46.83	0		
46.93	0		
47.03	0		
47.13	0		
47.23	0		

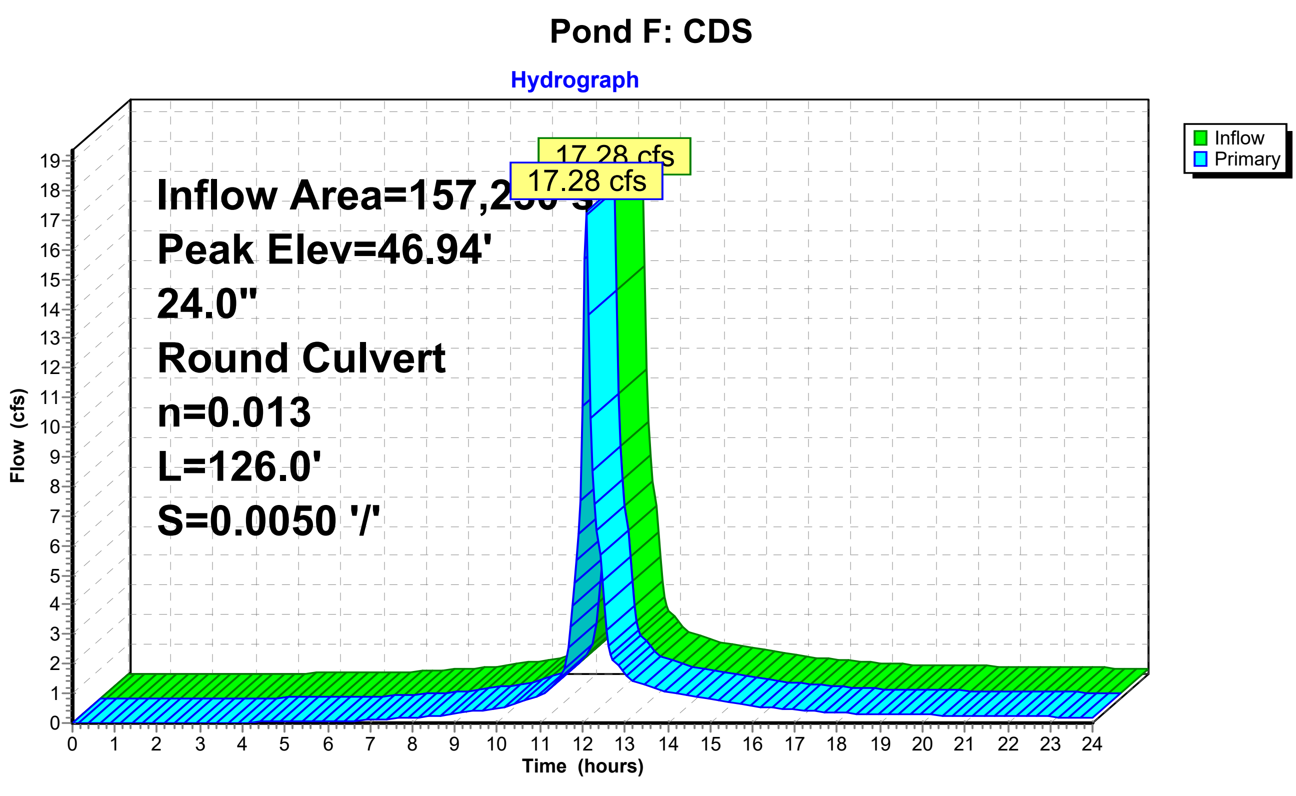
Summary for Pond F: CDS

Inflow Area =	157,230 sf,	45.56% Impervious,	Inflow Depth > 4.34"	for 100-Year event
Inflow =	17.28 cfs @	12.09 hrs, Volume=	56,806 cf	
Outflow =	17.28 cfs @	12.09 hrs, Volume=	56,806 cf,	Atten= 0%, Lag= 0.0 min
Primary =	17.28 cfs @	12.09 hrs, Volume=	56,806 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 46.94' @ 12.52 hrs
Flood Elev= 49.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	40.61'	**24.0" Round Culvert** L= 126.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 40.61' / 39.98' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf

Primary OutFlow Max=16.91 cfs @ 12.09 hrs HW=44.58' TW=43.20' (Dynamic Tailwater)
└─**1=Culvert** (Outlet Controls 16.91 cfs @ 5.38 fps)



Stage-Area-Storage for Pond F: CDS

Elevation (feet)	Storage (cubic-feet)
40.61	**0**
40.71	0
40.81	0
40.91	0
41.01	0
41.11	0
41.21	0
41.31	0
41.41	0
41.51	0
41.61	0
41.71	0
41.81	0
41.91	0
42.01	0
42.11	0
42.21	0
42.31	0
42.41	0
42.51	0
42.61	0
42.71	0
42.81	0
42.91	0
43.01	0
43.11	0
43.21	0
43.31	0
43.41	0
43.51	0
43.61	0
43.71	0
43.81	0
43.91	0
44.01	0
44.11	0
44.21	0
44.31	0
44.41	0
44.51	0
44.61	0
44.71	0
44.81	0
44.91	0
45.01	0
45.11	0
45.21	0
45.31	0
45.41	0
45.51	0
45.61	0
45.71	0
45.81	0
45.91	0
46.01	0
46.11	0
46.21	0
46.31	0
46.41	0
46.51	0
46.61	0
46.71	0
46.81	0
46.91	0
47.01	0
47.11	0
47.21	0
47.31	0
47.41	0
47.51	0
47.61	0
47.71	0
47.81	0
47.91	0
48.01	0
48.11	0
48.21	0
48.31	0
48.41	0
48.51	0
48.61	0
48.71	0
48.81	0
48.91	0

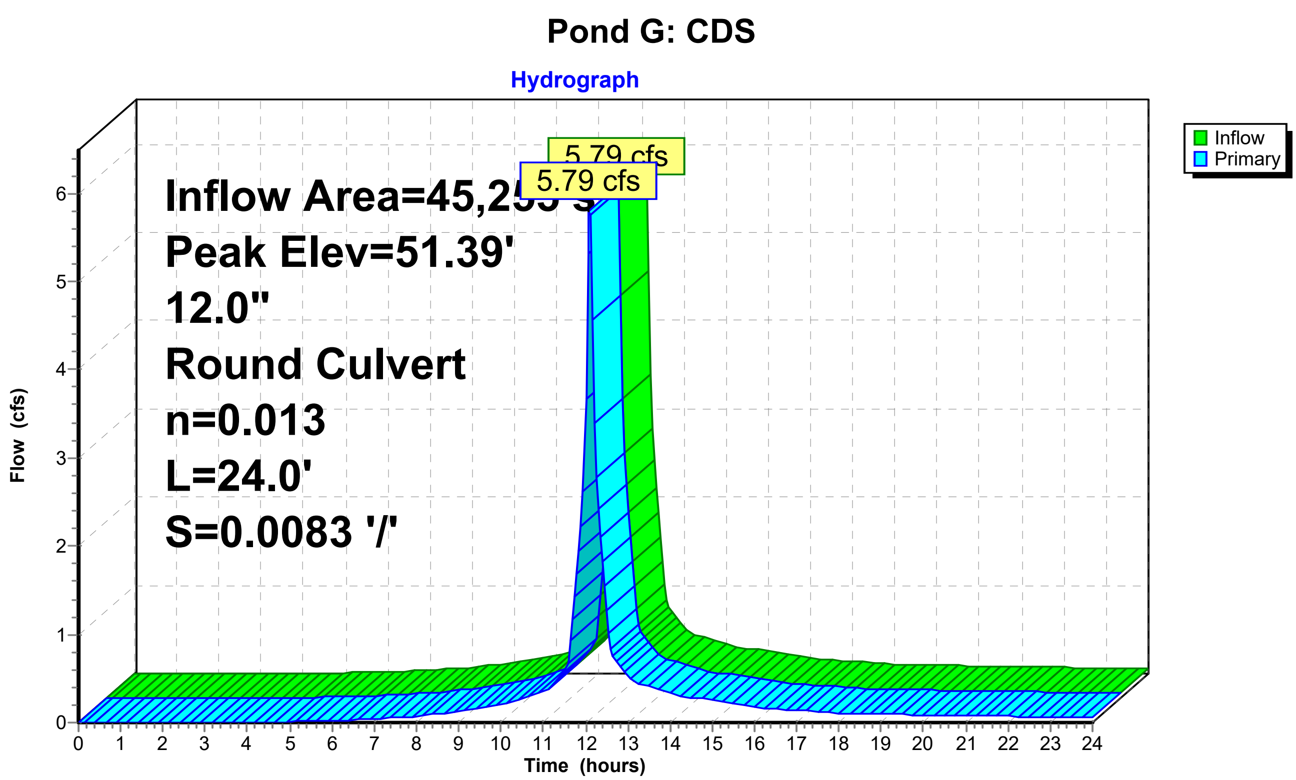
Summary for Pond G: CDS

Inflow Area =	45,255 sf,	1.33% Impervious,	Inflow Depth > 5.04"	for 100-Year event	
Inflow =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf	
Outflow =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf,	Atten= 0%, Lag= 0.0 min
Primary =	5.79 cfs @	12.09 hrs,	Volume=	19,012 cf	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 51.39' @ 12.12 hrs
Flood Elev= 50.70'

Device	Routing	Invert	Outlet Devices
#1	Primary	46.90'	**12.0" Round Culvert** L= 24.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 46.90' / 46.70' S= 0.0083 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=5.65 cfs @ 12.09 hrs HW=51.12' TW=48.89' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 5.65 cfs @ 7.20 fps)



Stage-Area-Storage for Pond G: CDS

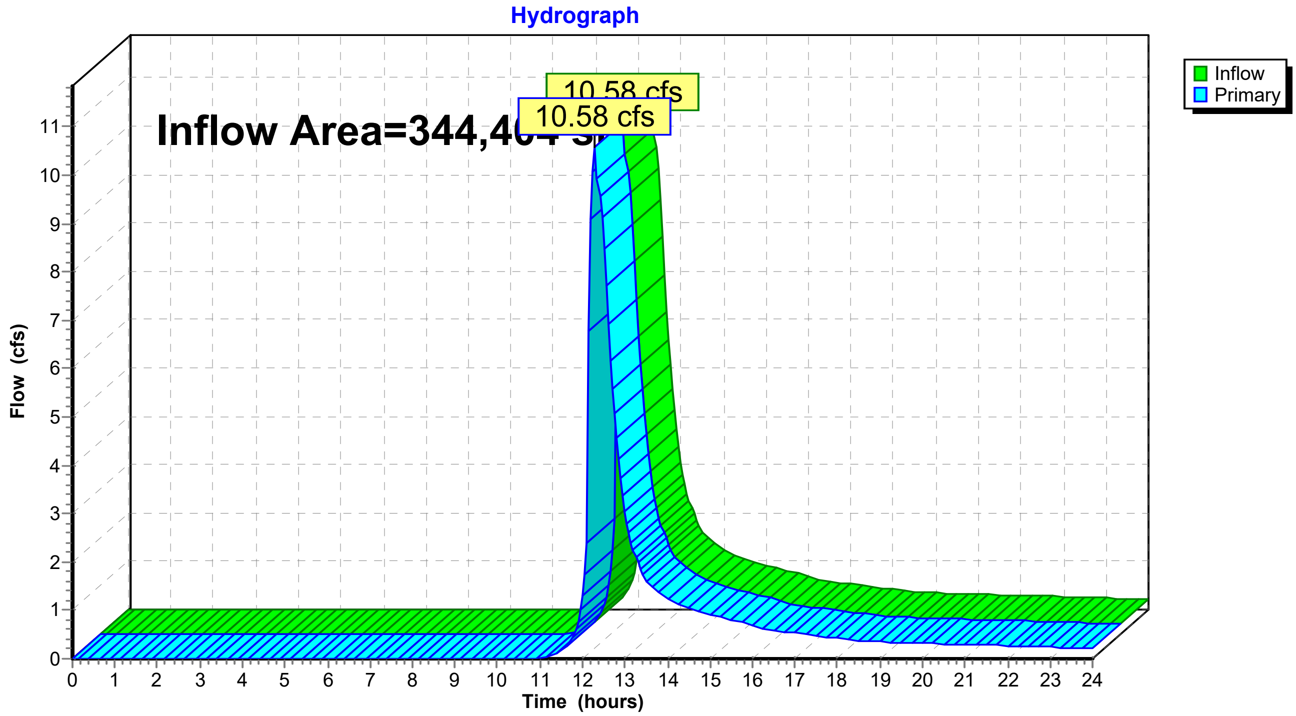
Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
46.90	**0**	49.55	0
46.95	0	49.60	0
47.00	0	49.65	0
47.05	0	49.70	0
47.10	0	49.75	0
47.15	0	49.80	0
47.20	0	49.85	0
47.25	0	49.90	0
47.30	0	49.95	0
47.35	0	50.00	0
47.40	0	50.05	0
47.45	0	50.10	0
47.50	0	50.15	0
47.55	0	50.20	0
47.60	0	50.25	0
47.65	0	50.30	0
47.70	0	50.35	0
47.75	0	50.40	0
47.80	0	50.45	0
47.85	0	50.50	0
47.90	0	50.55	0
47.95	0	50.60	0
48.00	0	50.65	0
48.05	0	50.70	0
48.10	0	50.75	0
48.15	0	50.80	0
48.20	0	50.85	0
48.25	0	50.90	0
48.30	0	50.95	0
48.35	0	51.00	0
48.40	0	51.05	0
48.45	0	51.10	0
48.50	0	51.15	0
48.55	0	51.20	0
48.60	0	51.25	0
48.65	0	51.30	0
48.70	0	51.35	0
48.75	0		
48.80	0		
48.85	0		
48.90	0		
48.95	0		
49.00	0		
49.05	0		
49.10	0		
49.15	0		
49.20	0		
49.25	0		
49.30	0		
49.35	0		
49.40	0		
49.45	0		
49.50	0		

Summary for Link 100L: Bordering Vegetated Wetland

Inflow Area =	344,404 sf,	0.17% Impervious, Inflow Depth > 1.65"	for 100-Year event
Inflow =	10.58 cfs @ 12.30 hrs, Volume=	47,327 cf	
Primary =	10.58 cfs @ 12.30 hrs, Volume=	47,327 cf, Atten= 0%, Lag= 0.0 min	

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link 100L: Bordering Vegetated Wetland



12.0 APPENDIX E – PROPRIETARY BMP DOCUMENTATION

Project:	163 Elm Street
Location:	Salisbury, MA
Prepared For:	Millennium Engineering

CONTECH ENGINEERED SOLUTIONS

Purpose: To calculate the water quality flow rate (WQF) over a given site area. In this situation the WQF is derived from the first 1" of runoff from the contributing impervious surface.

Reference: Massachusetts Dept. of Environmental Protection Wetlands Program / United States Department of Agriculture Natural Resources Conservation Service TR-55 Manual

Procedure: Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi^2/watershed inches (csm/in).

Compute Q Rate using the following equation:

Q = (qu) (A) (WQV)

where:

Q = flow rate associated with first 1" of runoff
qu = the unit peak discharge, in csm/in.
A = impervious surface drainage area (in square miles)
WQV = water quality volume in watershed inches (1" in this case)

Structure Name	Impv. (acres)	A (miles^2)	t_c (min)	t_c (hr)	WQV (in)	qu (csm/in.)	Q (cfs)
WQU 1 (Southwest)	1.42	0.0022188	6.0	0.100	1.00	774.00	1.72
WQU 2 (Northeast)	0.80	0.0012472	6.0	0.100	1.00	774.00	0.97

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

163 ELM STREET
SALISBURY, MA

Area	1.42 ac	Unit Site Designation	CDS
Weighted C	0.9	Rainfall Station #	67
t_c	6 min		
CDS Model	2020-5	CDS Treatment Capacity	**2.2 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.08	41.0%	41.0%	0.10	0.10	38.6
0.16	23.9%	64.9%	0.20	0.20	21.7
0.24	11.5%	76.5%	0.31	0.31	10.1
0.32	7.4%	83.9%	0.41	0.41	6.3
0.40	4.4%	88.3%	0.51	0.51	3.6
0.48	2.9%	91.2%	0.61	0.61	2.3
0.56	1.8%	93.0%	0.72	0.72	1.3
0.64	1.2%	94.2%	0.82	0.82	0.8
0.72	1.6%	95.8%	0.92	0.92	1.1
0.80	0.8%	96.6%	1.02	1.02	0.5
1.00	0.6%	97.1%	1.28	1.28	0.3
1.40	1.4%	98.6%	1.79	1.79	0.6
1.80	0.9%	99.5%	2.30	2.20	0.3
2.20	0.5%	100.0%	2.81	2.20	0.1
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
0.00	0.0%	100.0%	0.00	0.00	0.0
					87.7

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.8%
Predicted Net Annual Load Removal Efficiency =	**87.7%**

1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA

2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

CONTECH ENGINEERED SOLUTIONS

CDS TECHNOLOGIES

CDS ESTIMATED NET ANNUAL SOLIDS LOAD REDUCTION BASED ON THE RATIONAL RAINFALL METHOD

163 ELM STREET
SALISBURY, MA

Area	**0.80 ac**	Unit Site Designation	**WQU 2 (Southeast)**
Weighted C	**0.9**	Rainfall Station #	**67**
t_c	**6 min**		
CDS Model	**1515-3**	CDS Treatment Capacity	**1.0 cfs**

Rainfall Intensity[1] (in/hr)	Percent Rainfall Volume[1]	Cumulative Rainfall Volume	Total Flowrate (cfs)	Treated Flowrate (cfs)	Incremental Removal (%)
0.08	41.0%	41.0%	0.06	0.06	38.3
0.16	23.9%	64.9%	0.12	0.12	21.3
0.24	11.5%	76.5%	0.17	0.17	9.9
0.32	7.4%	83.9%	0.23	0.23	6.0
0.40	4.4%	88.3%	0.29	0.29	3.5
0.48	2.9%	91.2%	0.35	0.35	2.1
0.56	1.8%	93.0%	0.40	0.40	1.2
0.64	1.2%	94.2%	0.46	0.46	0.8
0.72	1.6%	95.8%	0.52	0.52	1.0
0.80	0.8%	96.6%	0.58	0.58	0.5
1.00	0.6%	97.1%	0.72	0.72	0.3
1.40	1.4%	98.6%	1.01	1.00	0.4
1.80	0.9%	99.5%	1.30	1.00	0.2
2.20	0.5%	100.0%	1.58	1.00	0.1
					85.6

Removal Efficiency Adjustment[2] =	0.0%
Predicted % Annual Rainfall Treated =	99.6%
Predicted Net Annual Load Removal Efficiency =	**85.6%**

1 - Based on 7 years of data from NCDC station #3276, Groveland, Essex County, MA
2 - Reduction due to use of 60-minute data for a site that has a time of concentration less than 30-minutes.

13.0 APPENDIX F - TSS REMOVAL SPREADSHEET

INSTRUCTIONS:

Non-automated: Mar. 4, 2008

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

Location: Infiltration System #2

TSS Removal Calculation Worksheet

A BMP[1]	B TSS Remova Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
CDS 1515-3	0.86	1.00	0.86	0.14

Total TSS Removal = **86%**

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: M183284
Prepared By: CMY
Date: 9/1/2022

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated: Mar. 4, 2008

INSTRUCTIONS:

1. Sheet is nonautomated. Print sheet and complete using hand calculations. Column A and B: See MassDEP Structural BMP Table
2. The calculations must be completed using the Column Headings specified in Chart and Not the Excel Column Headings
3. To complete Chart Column D, multiple Column B value within Row x Column C value within Row
4. To complete Chart Column E value, subtract Column D value within Row from Column C within Row
5. Total TSS Removal = Sum All Values in Column D

TSS Removal Calculation Worksheet

Location: Infiltration System #3

A BMP[1]	B TSS Remova Rate[1]	C Starting TSS Load*	D Amount Removed (B*C)	E Remaining Load (C-D)
Deep Sump CB	0.25	1.00	0.25	0.75
CDS 2015-5	0.88	0.75	0.66	0.09

Total TSS Removal = 91%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: M183284

Prepared By: CMY

Date: 9/1/2022

*Equals remaining load from previous BMP (E) which enters the BMP

14.0 APPENDIX G – NRCS SOIL DATA

SOIL SUITABILITY ASSESSMENT REPORT
COMMONWEALTH OF MASSACHUSETTS
SALISBURY, MASSACHUSETTS

SITE INFORMATION

Street Address: 163 Elm Street Town: Salisbury State: Massachusetts Zip Code: 01952 County: Essex

Land Use: Commercial Latitude: ~42° 50' 33.19" N Longitude: ~70° 53' 22.29" W

PUBLISHED SOIL DATA AND MAP UNIT DESCRIPTION

Physiographic Division: Appalachian Highlands Physio. Province: New England Physio. Section: Seaboard lowland section

Soil survey area: Essex County, Massachusetts, Northern Part Series name: 255A/D – Windsor LS, 0-15% slopes

Order: Entisol Suborder: Psamments Family: Mixed, mesic, Typic Udipsamments

Soil moisture regime: Udic Soil temperature regime: Mesic Runoff class: low Hydric soil rating: No

Soil hydric or upland: Upland Average depth to water table: ≥ 80" Depth to restrictive feature: ≥ 80"

Frequency of flooding: None Frequency of ponding: None Available water capacity: Low (~4.5")

Drainage Class: Excessively drained Hydrologic Soil Group: A Ksat: Moderately high to very high (1.42 – 99.90 in/hr)

Ecological site: Dry outwash

WETLAND AREA & USGS WELL MEASUREMENTS

National Wetland Inventory Map: NA Wetlands Conservancy Program: NA Bordering vegetative wetland: NA

Current Water Resource Condition (USGS): Well Site # 424841071004101- MA-HLW 23 Haverhill, MA.,

Well depth: 15.10 feet Land surface altitude: 100.00 feet above NGVD29 Latitude: ~42°48'41.8" N Longitude: ~71°00'41.7"

Most recent data value: 10.74' on 03/22/22 (depth to water level in feet below land surface) Range: Normal

SURFICIAL GEOLOGY:

Geologic parent material: Loose, sandy, glaciofluvial deposits Geomorphic component: Outwash plain

Slope aspect: Level to gently sloping Landform position (2D): Flat Landform position (3D): Tread

Slope gradient: ~00-05% Down slope shape: Linear Across slope shape: Linear Slope complexity: Simple

Bedrock outcropping in vicinity: None observed Glacial erratics in vicinity: None observed

Bedrock Type: Newburyport complex: Gray, medium-grained Tonalite and Granodiorite

TP22-1 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-1

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 18”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
18” → 65”	2C	Sand	2.5Y 5/3 light olive brown	38” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 38”; apparent water observed at 42”; no bedrock refusal at test hole depth.

Depth to bedrock: > 65” Seasonal High Groundwater Table: 38” Apparent water: 42”

TP22-1 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 42" (below land surface) Depth to stabilized apparent water: 42" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 38" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 38" inches below grade

Observed water weeping from side of deep hole: 42" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ▶ 3.92'

Depth of naturally occurring pervious material in TP22-1 Upper boundary: 18"
Lower boundary: 65"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

_________________ *#1848*

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-2 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▸ TP22-2

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 19”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
19” → 65”	2C	Sand	2.5Y 5/3 light olive brown	37” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 37”; apparent water observed at 40”; no bedrock refusal at test hole depth.

Depth to bedrock: > 65” Seasonal High Groundwater Table: 37” Apparent water: 40”

TP22-2 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 40" (below land surface) Depth to stabilized apparent water: 40" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 37" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 37" inches below grade

Observed water weeping from side of deep hole: 40" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 3.83'

Depth of naturally occurring pervious material in TP22-2

Upper boundary: 19"
Lower boundary: 65"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-3 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-3

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 17”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
17” → 67”	2C	Sand	2.5Y 5/3 light olive brown	36” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 36”; apparent water observed at 40”; no bedrock refusal at test hole depth.

Depth to bedrock: > 67” Seasonal High Groundwater Table: 36” Apparent water: 40”

TP22-3 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 40" (below land surface) Depth to stabilized apparent water: 40" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 36" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 36" inches below grade

Observed water weeping from side of deep hole: 40" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 4.16'

Depth of naturally occurring pervious material in TP22-3

Upper boundary: 17"
Lower boundary: 67"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

_#1848_

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-4 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-4

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 12”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
12” → 70”	2C	Sand	2.5Y 5/3 light olive brown	37” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 37”; apparent water observed at 43”; no bedrock refusal at test hole depth.

Depth to bedrock: > 70” Seasonal High Groundwater Table: 37” Apparent water: 43”

TP22-4 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 43" (below land surface) Depth to stabilized apparent water: 43" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 37" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 37" inches below grade

Observed water weeping from side of deep hole: 43" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 4.16'

Depth of naturally occurring pervious material in TP22-4 Upper boundary: 17"
Lower boundary: 67"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

_________________ *#1848*

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

M183284

TP22-5 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10⁺ feet Drainage way: 50⁺ feet Drinking water well: 100⁺ feet Abutting septic system: 50⁺ feet

Wetlands: 10⁺ feet Public water supply reservoir: 400⁺ feet Tributary to reservoir: 200⁺ feet

SOIL PROFILE ▸ TP22-5

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 11”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
11” → 65”	2C	Sand	2.5Y 5/3 light olive brown	40” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 40”; apparent water observed at 46”; no bedrock refusal at test hole depth.

Depth to bedrock: > 65” Seasonal High Groundwater Table: 40” Apparent water: 46”

TP22-5 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 46" (below land surface) Depth to stabilized apparent water: 46" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 40" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 40" inches below grade

Observed water weeping from side of deep hole: 46" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 4.50'

Depth of naturally occurring pervious material in TP22-5 Upper boundary: 11"
Lower boundary: 65"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848 October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 03/24/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-6 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▸ TP22-6

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00" → 21"	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
21" → 81"	$_2$C	Sand	2.5Y 5/3 light olive brown	52" (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 52"; apparent water observed at 71"; no bedrock refusal at test hole depth.

Depth to bedrock: > 81" Seasonal High Groundwater Table: 52" Apparent water: 71"

TP22-6 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 71" (below land surface) Depth to stabilized apparent water: 71" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 52" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 52" inches below grade

Observed water weeping from side of deep hole: 71" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.00'

Depth of naturally occurring pervious material in TP22-6 Upper boundary: 21"
Lower boundary: 81"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

__________ *#1848* October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 03/24/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-7 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-7

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 08”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
08” → 18”	B_w	Loamy Sand	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; diffuse wavy boundary.
18” → 88”	$_2$C	Sand	2.5Y 5/3 light olive brown	60” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 60”; apparent water observed at 79”; no bedrock refusal at test hole depth.

Depth to bedrock: > 88” Seasonal High Groundwater Table: 60” Apparent water: 79”

TP22-7 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 79” (below land surface) Depth to stabilized apparent water: 79” (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 60” (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 60” inches below grade

Observed water weeping from side of deep hole: 79” inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 6.66’

Depth of naturally occurring pervious material in TP22-7

Upper boundary: 08”
Lower boundary: 88”

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

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October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-8 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-8

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 08”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
08” → 19”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; diffuse wavy boundary.
19” → 75”	2C	Silt Loam	Gley 2 6/5PB bluish gray	46” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; slightly sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; very silty; saturated matrix; seasonal high-water table observed at 46”; apparent water observed at 55”; no bedrock refusal at test hole depth.

Depth to bedrock: > 75” Seasonal High Groundwater Table: 46” Apparent water: 55”

TP22-8 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 55" (below land surface) Depth to stabilized apparent water: 55" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 46" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 46" inches below grade

Observed water weeping from side of deep hole: 55" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.58'

Depth of naturally occurring pervious material in TP22-8 Upper boundary: 08"
Lower boundary: 75"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-9 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: March 24, 2022 Weather: Overcast, 35°-40° F, East breeze, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-9

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 09”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
09” → 14”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; diffuse wavy boundary.
14” → 42”	2C	Silt Loam	Gley 2 6/5PB bluish gray	40” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; slightly sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; very silty; saturated matrix; seasonal high-water table observed at 40”; apparent water observed at 42”; bedrock refusal at test hole depth.
R at 42”					Bedrock refusal at depth

Depth to bedrock: 42” Seasonal High Groundwater Table: 40” Apparent water: 42”

TP22-9 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 42" (below land surface) Depth to stabilized apparent water: 42" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 40" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: ________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 40" inches below grade

Observed water weeping from side of deep hole: 42" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 2.75'

Depth of naturally occurring pervious material in TP22-9 Upper boundary: 09"
Lower boundary: 42"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

03/24/2022

Date of soil testing

TP22-10 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-10

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 08”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
08” → 21”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
21” → 72”	2C	Silty Clay Loam	Gley 2 6/5PB bluish gray	40” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 21”; apparent water observed at 27”; no bedrock refusal at test hole depth.

Depth to bedrock: > 72” Seasonal High Groundwater Table: 21” Apparent water: 27”

TP22-10 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 27" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 21" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 21" inches below grade

Observed water weeping from side of deep hole: 27" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 1.08'

Depth of naturally occurring pervious material in TP22-10

Upper boundary: 08"
Lower boundary: 21"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

05/05/2022

Date of soil testing

M183284

TP22-11 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10+ feet Drainage way: 50+ feet Drinking water well: 100+ feet Abutting septic system: 50+ feet

Wetlands: 10+ feet Public water supply reservoir: 400+ feet Tributary to reservoir: 200+ feet

SOIL PROFILE ▸ TP22-11

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 04”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
04” → 12”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
12” → 48”	$2C_1$	Loamy Sand very fine	2.5Y 4/1 dark gray	none observed	Loose; structureless; mixed fine-to-very fine-grained mineral content; thinly stratified; damp matrix; non-sticky; non-plastic; poorly graded; free of clasts; gradual wavy boundary.
48” → 80”	$2C_2$	Sandy Loam	2.5Y 5/4 light olive brown	54” (c,1-2,p) 10YR 7/1 5YR 5/8	Friable; massive structure of moderate grade; mixed fine-to-medium grained mineral content; crudely stratified; damp matrix; non-sticky; non-plastic; well graded; approximately 10-15% sub-angular to sub-rounded gravel and 05% sub-rounded to angular cobble content of mixed lithology; redoximorphic features observed at 54”; apparent water observed at 60”; no bedrock refusal at test hole depth.

Depth to bedrock: > 80” Seasonal High Groundwater Table: 54” Apparent water: 60”

TP22-11 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 60" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 54" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 54" inches below grade

Observed water weeping from side of deep hole: 60" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 6.33'

Depth of naturally occurring pervious material in TP22-11 Upper boundary: 04"
Lower boundary: 80"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848 October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 05/05/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-12 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022   Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland   Landform: Marine terrace   Position on landscape: Tread/ flat

Slope aspect: Level   Slope (%): 00 – 07 %   Slope complexity: Simple   Land Cover: Wooded

Property line: 10^+ feet   Drainage way: 50^+ feet   Drinking water well: 100^+ feet   Abutting septic system: 50^+ feet

Wetlands: 10^+ feet   Public water supply reservoir: 400^+ feet   Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-12

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 05”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
08” → 19”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
21” → 65”	2C	Silt Loam	Gley 2 6/5PB bluish gray	19” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 19”; apparent water observed at 30”; no bedrock refusal at test hole depth.

Depth to bedrock: > 72”   Seasonal High Groundwater Table: 19”   Apparent water: 30”

TP22-12 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 30" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 19" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 30" inches below grade

Observed water weeping from side of deep hole: 19" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.00'

Depth of naturally occurring pervious material in TP22-12 Upper boundary: 05"
Lower boundary: 65"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

05/05/2022

Date of soil testing

TP22-13 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-13

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 07”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
07” → 23”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
23” → 61”	$2C_1$	Sandy Loam	2.5Y 5/4 light olive brown	none observed	Friable; massive structure of moderate grade; mixed fine-to-medium grained mineral content; crudely stratified; damp matrix; non-sticky; non-plastic; well graded; approximately 10-15% sub-angular to sub-rounded gravel and 05% sub-rounded to angular cobble content of mixed lithology; abrupt smooth boundary.
61” → 80”	$2C_2$	Silt Loam	Gley 2 6/5PB bluish gray	19” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 61”; apparent water observed at 65”; no bedrock refusal at test hole depth.

Depth to bedrock: > 80” Seasonal High Groundwater Table: 61” Apparent water: 65”

TP22-13 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 65" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 61" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 61" inches below grade

Observed water weeping from side of deep hole: 65" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ▶ 6.08'

Depth of naturally occurring pervious material in TP22-13 Upper boundary: 07"
Lower boundary: 80"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

05/05/2022

Date of soil testing

TP22-14 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-14

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 09”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
09” → 17”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
17” → 56”	$2C_1$	Sandy Loam	2.5Y 5/4 light olive brown	none observed	Friable; massive structure of moderate grade; mixed fine-to-medium grained mineral content; crudely stratified; damp matrix; non-sticky; non-plastic; well graded; approximately 10-15% sub-angular to sub-rounded gravel and 05% sub-rounded to angular cobble content of mixed lithology; abrupt smooth boundary.
56” → 79”	$2C_2$	Silt Loam	Gley 2 6/5PB bluish gray	34” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 34”; apparent water observed at 41”; no bedrock refusal at test hole depth.

Depth to bedrock: > 79” Seasonal High Groundwater Table: 34” Apparent water: 41”

TP22-14 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 41" (below land surface) Depth to stabilized apparent water: ____ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 34" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 34" inches below grade

Observed water weeping from side of deep hole: 41" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.83'

Depth of naturally occurring pervious material in TP22-14 Upper boundary: 09"
Lower boundary: 79"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848 October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 05/05/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-15 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10+ feet Drainage way: 50+ feet Drinking water well: 100+ feet Abutting septic system: 50+ feet

Wetlands: 10+ feet Public water supply reservoir: 400+ feet Tributary to reservoir: 200+ feet

SOIL PROFILE ► TP22-15

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 05”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; abrupt smooth boundary.
05” → 79”	2C	Silt Loam	Gley 2 6/5PB bluish gray	10” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 10”; apparent water observed at 13”; no bedrock refusal at test hole depth.

Depth to bedrock: > 79” Seasonal High Groundwater Table: 10” Apparent water: 13”

TP22-15 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 13" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 10" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 10" inches below grade

Observed water weeping from side of deep hole: 13" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.83'

Depth of naturally occurring pervious material in TP22-15

Upper boundary: 09"
Lower boundary: 79"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

A.F. *#1848*

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

05/05/2022

Date of soil testing

TP22-16 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-16

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 09”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
09” → 12”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
12” → 43”	2C	Sandy Loam	2.5Y 5/4 light olive brown	42” (m,1-2,p) 10R 4/8	Friable; massive structure of moderate grade; mixed fine-to-medium grained mineral content; crudely stratified; damp matrix; non-sticky; non-plastic; well graded; approximately 10-15% sub-angular to sub-rounded gravel and 05% sub-rounded to angular cobble content of mixed lithology seasonal high-water table observed at 42”; apparent water observed at 43”; bedrock refusal at test hole depth.
R @ 43”					BEDROCK REFUSAL AT 43”

Depth to bedrock: > 79” Seasonal High Groundwater Table: 42” Apparent water: 43”

TP22-16 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 43" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 42" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix   Shape: Irregular/ spherical

Hardness: Soft   Boundary: Clear   Abundance: Many   Size: Fine and medium   Contrast: Prominent

Concentration color: 10R 4/8 red   Reduction color: _________   Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 42" inches below grade

Observed water weeping from side of deep hole: 43" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 2.83'

Depth of naturally occurring pervious material in TP22-16   Upper boundary: 09"
Lower boundary: 43"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848   October 1998

Alexander F. Parker   Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design   05/05/2022

Town of Salisbury Board of Health Witness   Date of soil testing

TP22-17 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10+ feet Drainage way: 50+ feet Drinking water well: 100+ feet Abutting septic system: 50+ feet

Wetlands: 10+ feet Public water supply reservoir: 400+ feet Tributary to reservoir: 200+ feet

SOIL PROFILE ► TP22-17

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 09”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
09” → 18”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
18” → 75”	2C	Silt Loam	Gley 2 6/5PB bluish gray	20” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 20”; apparent water observed at 23”; no bedrock refusal at test hole depth.

Depth to bedrock: > 75” Seasonal High Groundwater Table: 20” Apparent water: 23”

TP22-17 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 23" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 20" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 20" inches below grade

Observed water weeping from side of deep hole: 23" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.50'

Depth of naturally occurring pervious material in TP22-17 Upper boundary: 09"
Lower boundary: 75"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848 October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 05/05/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-18 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: May 05, 2022 Weather: Overcast, 45°-50° F, East breeze, light rain.

Landscape: Upland Landform: Marine terrace Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 07 % Slope complexity: Simple Land Cover: Wooded

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-18

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 10”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
10” → 21”	B_w	Sandy Loam	10YR 4/4 dark yellowish brown	none observed	Very friable; weak-grade, fine, sub-angular blocky structure; somewhat cohesive; mixed medium to mostly fine-grained mineral content; damp matrix; non-sticky; non-plastic; few fine-to-medium roots; abrupt wavy boundary.
21” → 69”	2C	Silt Loam	Gley 2 6/5PB bluish gray	21” (m,1-2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; saturated matrix; sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; clayey; saturated matrix; seasonal high-water table observed at 21”; apparent water observed at 23”; no bedrock refusal at test hole depth.

Depth to bedrock: > 69” Seasonal High Groundwater Table: 21” Apparent water: 23”

TP22-18 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 23" (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 21" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating sand grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 21" inches below grade

Observed water weeping from side of deep hole: 23" inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 4.92'

Depth of naturally occurring pervious material in TP22-18 Upper boundary: 10"
Lower boundary: 69"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

05/05/2022

Date of soil testing

TP22-20 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: July 18, 2022 Weather: Overcast, 75°-70° F, East breeze, humid, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^{+} feet Drainage way: 50^{+} feet Drinking water well: 100^{+} feet Abutting septic system: 50^{+} feet

Wetlands: 10^{+} feet Public water supply reservoir: 400^{+} feet Tributary to reservoir: 200^{+} feet

SOIL PROFILE ▶ TP22-20

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 28”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 95% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
28” → 70”	$2C_1$	Sand	2.5Y 5/3 light olive brown	68” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; dry matrix; non-sticky; non-plastic; seasonal high-water table observed at 68”; no apparent water observed; abrupt wavy boundary.
70” → 100”	$2C_2$	Silt Loam	Gley 2 6/5PB bluish gray		Firm; massive to platy structure; very fine-grained mineral content; dry matrix; somewhat sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; silty; no bedrock refusal at test hole depth.

Depth to bedrock: > 100” Seasonal High Groundwater Table: 68” Apparent water: ____

TP22-20 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE: *NONE OBSERVED*

Apparent water seeping from pit face: ___ (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Dry

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 68" (below land surface)

Kind: Iron concentrations; noncemented to somewhat cemented iron masses coating sand grains

Location: In $2C_1$ matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: ________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 68" inches below grade

Observed water weeping from side of deep hole: ___ inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 6.00'

Depth of naturally occurring pervious material in TP22-20 Upper boundary: 28"
Lower boundary: 100"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

07/18/2022

Date of soil testing

TP22-21 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: July 18, 2022 Weather: Overcast, 75°-70° F, East breeze, humid, light rain.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10$^+$ feet Drainage way: 50$^+$ feet Drinking water well: 100$^+$ feet Abutting septic system: 50$^+$ feet

Wetlands: 10$^+$ feet Public water supply reservoir: 400$^+$ feet Tributary to reservoir: 200$^+$ feet

SOIL PROFILE ► TP22-21

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 20”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 95% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
20” → 80”	$2C_1$	Sand	2.5Y 5/3 light olive brown	59” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; dry matrix; non-sticky; non-plastic; seasonal high-water table observed at 59”; no apparent water observed; abrupt wavy boundary.
80” → 103”	$2C_2$	Silt Loam	Gley 2 6/5PB bluish gray		Firm; massive to platy structure; very fine-grained mineral content; dry matrix; somewhat sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; silty; no bedrock refusal at test hole depth.

Depth to bedrock: > 103” Seasonal High Groundwater Table: 59” Apparent water: ____

TP22-21 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE: *NONE OBSERVED*

Apparent water seeping from pit face: ___ (below land surface) Depth to stabilized apparent water: ___ (below land surface)

Soil moisture state: Dry

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 59" (below land surface)

Kind: Iron concentrations; noncemented to somewhat cemented iron masses coating sand grains

Location: In $2C_1$ matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp to wet

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 59" inches below grade

Observed water weeping from side of deep hole: ___ inches below grade

Observed depth to stabilized phreatic water: ___ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 6.92'

Depth of naturally occurring pervious material in TP22-21 Upper boundary: 20"
Lower boundary: 103"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

\#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

07/18/2022

Date of soil testing

TP22-46 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: December 06, 2022 Weather: Overcast, 40°-45° F, calm, damp.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ▶ TP22-46

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 05”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
05” → 90”	2C	Silt Loam	Gley 2 6/5PB bluish gray	21” (m,2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; damp matrix; somewhat sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; silty; seasonal high-water table observed at 21”; no apparent water observed; no bedrock refusal at test hole depth.

Depth to bedrock: > 90” Seasonal High Groundwater Table: 21” Apparent water: ___

TP22-46 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: ___ (below land surface) Depth to stabilized apparent water: ____ (below land surface)

Soil moisture state: Damp

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 21" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating silt grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 21" inches below grade

Observed water weeping from side of deep hole: ____ inches below grade

Observed depth to stabilized phreatic water: ____ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ▶ 7.08'

Depth of naturally occurring pervious material in TP22-46 Upper boundary: 05"
Lower boundary: 90"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

12/06/2022

Date of soil testing

TP22-47 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: December 06, 2022   Weather: Overcast, 40º-45º F, calm, damp.

Landscape: Upland   Landform: Outwash plain   Position on landscape: Tread/ flat

Slope aspect: Level   Slope (%): 00 – 01 %   Slope complexity: Simple   Land Cover: Gravel parking area

Property line: 10+ feet   Drainage way: 50+ feet   Drinking water well: 100+ feet   Abutting septic system: 50+ feet

Wetlands: 10+ feet   Public water supply reservoir: 400+ feet   Tributary to reservoir: 200+ feet

SOIL PROFILE ► TP22-47

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 08”	A	Sandy Loam	10YR 3/2 very dark grayish brown	none observed	Very friable; weak-grade fine-to-medium granular structure; somewhat cohesive; fine grained mineral content; damp matrix; non-sticky; non-plastic; many fine and few fine to medium roots; free of clasts; clear wavy boundary.
08” → 80”	2C	Silt Loam	Gley 2 6/5PB bluish gray	22” (m,2,p) 10R 4/8	Firm; massive to platy structure; very fine-grained mineral content; damp matrix; somewhat sticky; non-plastic; poorly graded; free of clasts; dense matrix - tight in-situ; silty; seasonal high-water table observed at 22”; no apparent water observed; no bedrock refusal at test hole depth.

Depth to bedrock: > 80”   Seasonal High Groundwater Table: 22”   Apparent water: ___

TP22-47 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: ___ (below land surface) Depth to stabilized apparent water: ____ (below land surface)

Soil moisture state: Damp

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 22" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating silt grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 22" inches below grade

Observed water weeping from side of deep hole: ____ inches below grade

Observed depth to stabilized phreatic water: ____ inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 6.00'

Depth of naturally occurring pervious material in TP22-47

Upper boundary: 08"

Lower boundary: 80"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848

Alexander F. Parker

Massachusetts Soil Evaluator & License number

October 1998

Date of License issuance

Unofficial testing for drainage design

Town of Salisbury Board of Health Witness

12/06/2022

Date of soil testing

TP22-48 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: December 06, 2022 Weather: Overcast, 40°-45° F, calm, damp.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10⁺ feet Drainage way: 50⁺ feet Drinking water well: 100⁺ feet Abutting septic system: 50⁺ feet

Wetlands: 10⁺ feet Public water supply reservoir: 400⁺ feet Tributary to reservoir: 200⁺ feet

SOIL PROFILE ► TP22-48

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00” → 15”	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
15” → 100”	2C	Sand	2.5Y 5/3 light olive brown	49” (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 49”; apparent water observed at 62”; no bedrock refusal at test hole depth.

Depth to bedrock: > 100” Seasonal High Groundwater Table: 22” Apparent water: 62”

TP22-48 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 62" (below land surface) Depth to stabilized apparent water: 62" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 49" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating silt grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: _________ Moisture state: Damp

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 49" inches below grade

Observed water weeping from side of deep hole: 62" inches below grade

Observed depth to stabilized phreatic water: 62" inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 7.08'

Depth of naturally occurring pervious material in TP22-48 Upper boundary: 15"
Lower boundary: 100"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

#1848 October 1998

Alexander F. Parker Date of License issuance

Massachusetts Soil Evaluator & License number

Unofficial testing for drainage design 12/06/2022

Town of Salisbury Board of Health Witness Date of soil testing

TP22-49 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

Date: December 06, 2022 Weather: Overcast, 40º-45º F, calm, damp.

Landscape: Upland Landform: Outwash plain Position on landscape: Tread/ flat

Slope aspect: Level Slope (%): 00 – 01 % Slope complexity: Simple Land Cover: Gravel parking area

Property line: 10^+ feet Drainage way: 50^+ feet Drinking water well: 100^+ feet Abutting septic system: 50^+ feet

Wetlands: 10^+ feet Public water supply reservoir: 400^+ feet Tributary to reservoir: 200^+ feet

SOIL PROFILE ► TP22-49

Depth below land surface (inches)	Soil Horizon/ Layer	Soil Texture (USDA/ NRCS)	Soil Color (Munsell)	Redoxomorphic Features/ ESHGWT	Consistence, grade, size, structure, grain size, soil moisture state, roots, horizon boundary, clasts, stratification, artifacts, restrictive features, etc.
00" → 09"	C^	Sandy Loam Fill mixture	10YR 2/1 black	none observed	Mechanically mixed anthropic layer; gravel parking area; structureless-massive; mixed fine-to-medium grained mineral content; non-sticky; non-plastic; damp; ~ 10-15% gravel and cobble content: somewhat compact; clean fill without artifacts; abrupt wavy boundary.
09" → 75"	2C	Sand	2.5Y 5/3 light olive brown	40" (m,1-2,p) 10R 4/8	Loose; single grained/ structureless; weakly stratified; non-cohesive; mixed fine-to- medium grained mineral content; free of clasts; damp matrix; non-sticky; non-plastic; seasonal high-water table observed at 40"; apparent water observed at 71"; no bedrock refusal at test hole depth.

Depth to bedrock: > 75" Seasonal High Groundwater Table: 40" Apparent water: 71"

TP22-49 DEEP OBSERVATION HOLE

163 Elm Street, Salisbury, Massachusetts

DEPTH TO PHREATIC GROUNDWATER TABLE:

Apparent water seeping from pit face: 71" (below land surface) Depth to stabilized apparent water: 71" (below land surface)

Soil moisture state: Damp to wet

ESTIMATED SEASONAL HIGH GROUNDWATER TABLE:

Depth of Estimated Seasonal High Groundwater Table: 40" (below land surface)

Kind: Iron concentrations; noncemented iron masses coating silt grains

Location: In 2C matrix Shape: Irregular/ spherical

Hardness: Soft Boundary: Clear Abundance: Many Size: Fine and medium Contrast: Prominent

Concentration color: 10R 4/8 red Reduction color: ________ Moisture state: Damp

DETERMINATION OF HIGH GROUNDWATER ELEVATION

Observed depth to redoximorphic features: 40" inches below grade

Observed water weeping from side of deep hole: 71" inches below grade

Observed depth to stabilized phreatic water: 71" inches below grade

DEPTH OF NATURALLY OCCURRING PERVIOUS MATERIAL: ► 5.50'

Depth of naturally occurring pervious material in TP22-49

Upper boundary: 09"
Lower boundary: 75"

Certification

I certify that I am currently approved by the Department of Environmental Protection pursuant to 310 CMR 15.017 to conduct evaluations and that the above analysis has been performed by me consistent with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation, as indicated in the attached Soil Evaluation Form, are accurate and in accordance with 310 CMR 15.017.

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12/06/2022

Date of soil testing

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Essex County, Massachusetts, Northern Part

163 Elm Street

January 3, 2023

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map


70° 53' 33" W
70° 53' 6" W
42° 50' 40" N
42° 50' 13" N
345400
345500
345600
345700
345800
345900
4745200
4745100
4745000
4744900
4744800
4744700
4744600
4744500
Elm St
110
255A
256A
38A
255A
255A
257E
255D
712A
721D
712A
16A
717E
Soil Map may not be valid at this scale.
Map Scale: 1:3,980 if printed on A portrait (8.5" x 11") sheet.
N
0 50 100 200 300 Meters
0 150 300 600 900 Feet
Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 18, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
16A	Scantic silt loam, 0 to 3 percent slopes	0.0	0.0%
38A	Pipestone loamy sand, 0 to 3 percent slopes	0.1	0.6%
255A	Windsor loamy sand, 0 to 3 percent slopes	4.8	19.8%
255D	Windsor loamy sand, 15 to 25 percent slopes	5.1	20.8%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	4.3	17.7%
257E	Hinckley and Windsor soils, 25 to 35 percent slopes	5.8	23.6%
712A	Ipswich and Westbrook mucky peats, 0 to 2 percent slopes, very frequently flooded	2.1	8.4%
717E	Rock outcrop-Charlton-Hollis complex, 15 to 35 percent slopes	0.1	0.4%
721D	Windsor-Rock outcrop complex, 15 to 25 percent slopes	2.1	8.8%
Totals for Area of Interest		**24.5**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Essex County, Massachusetts, Northern Part

16A—Scantic silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vjrl
Elevation: 10 to 900 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Scantic and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Scantic

Setting

Landform: Drainageways, depressions
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Soft fine-silty glaciolacustrine deposits and/or soft fine-silty glaciomarine deposits over hard fine-silty glaciolacustrine deposits and/or hard fine-silty glaciomarine deposits

Typical profile

H1 - 0 to 11 inches: silt loam
H2 - 11 to 26 inches: silty clay loam
H3 - 26 to 60 inches: clay

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately high (0.00 to 0.20 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 9.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: C/D
Ecological site: F144AY019NH - Wet Lake Plain
Hydric soil rating: Yes

Minor Components

Maybid

Percent of map unit: 10 percent

Landform: Depressions
Hydric soil rating: Yes

Buxton

Percent of map unit: 5 percent
Hydric soil rating: No

38A—Pipestone loamy sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: vjpy
Elevation: 600 to 1,000 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Pipestone and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pipestone

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Loose sandy glaciofluvial deposits

Typical profile

O - 0 to 3 inches: muck
H2 - 3 to 11 inches: loamy sand
H3 - 11 to 24 inches: loamy sand
H4 - 24 to 60 inches: stratified sand to fine sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (6.00 to 20.00 in/hr)
Depth to water table: About 18 to 41 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: Yes

Minor Components

Wareham
Percent of map unit: 10 percent
Landform: Terraces
Hydric soil rating: Yes

Scarboro
Percent of map unit: 7 percent
Landform: Terraces
Hydric soil rating: Yes

Deerfield
Percent of map unit: 3 percent
Hydric soil rating: No

255A—Windsor loamy sand, 0 to 3 percent slopes

Map Unit Setting
National map unit symbol: 2svkg
Elevation: 0 to 990 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition
Windsor, loamy sand, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor, Loamy Sand

Setting
Landform: Outwash plains, outwash terraces, deltas, dunes
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile
O - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand

C - 25 to 65 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2s
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield, loamy sand

Percent of map unit: 10 percent
Landform: Deltas, terraces, outwash plains
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Hinckley, loamy sand

Percent of map unit: 5 percent
Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

255D—Windsor loamy sand, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2svlb
Elevation: 0 to 1,290 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 90 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Dunes, deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread, riser
Down-slope shape: Convex, linear
Across-slope shape: Convex, linear
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 5 percent
Landform: Outwash plains, outwash terraces, moraines, stream terraces, eskers, kames
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent

Landform: Deltas, kames, eskers, outwash plains
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Hydric soil rating: No

256A—Deerfield loamy fine sand, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 2xfg8
Elevation: 0 to 1,100 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Deerfield and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Deerfield

Setting

Landform: Outwash terraces, outwash deltas, outwash plains, kame terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy outwash derived from granite, gneiss, and/or quartzite

Typical profile

Ap - 0 to 9 inches: loamy fine sand
Bw - 9 to 25 inches: loamy fine sand
BC - 25 to 33 inches: fine sand
Cg - 33 to 60 inches: sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: About 15 to 37 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Sodium adsorption ratio, maximum: 11.0

Available water supply, 0 to 60 inches: Moderate (about 6.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: A
Ecological site: F144AY027MA - Moist Sandy Outwash
Hydric soil rating: No

Minor Components

Windsor

Percent of map unit: 7 percent
Landform: Outwash terraces, kame terraces, outwash deltas, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Wareham

Percent of map unit: 5 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Sudbury

Percent of map unit: 2 percent
Landform: Outwash plains, kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

Ninigret

Percent of map unit: 1 percent
Landform: Kame terraces, outwash plains, outwash terraces
Landform position (three-dimensional): Tread
Down-slope shape: Convex, linear
Across-slope shape: Convex, concave
Hydric soil rating: No

257E—Hinckley and Windsor soils, 25 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2svm2
Elevation: 0 to 1,470 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 145 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 50 percent
Windsor and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Outwash deltas, outwash terraces, moraines, eskers, kames, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 8 inches: loamy sand
Bw1 - 8 to 11 inches: gravelly loamy sand
Bw2 - 11 to 16 inches: gravelly loamy sand
BC - 16 to 19 inches: very gravelly loamy sand
C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Windsor

Setting

Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear

Across-slope shape: Convex, linear, concave
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or loose sandy glaciofluvial deposits derived from schist and/or loose sandy glaciofluvial deposits derived from gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 25 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Minor Components

Merrimac

Percent of map unit: 10 percent
Landform: Kame terraces, outwash plains, kames, outwash terraces, moraines, eskers
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, crest, riser
Down-slope shape: Concave, convex, linear
Across-slope shape: Convex, linear, concave
Hydric soil rating: No

712A—Ipswich and Westbrook mucky peats, 0 to 2 percent slopes, very frequently flooded

Map Unit Setting

National map unit symbol: 2tyqn

Elevation: 0 to 10 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Ipswich and similar soils: 55 percent
Westbrook and similar soils: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ipswich

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partially- decomposed herbaceous organic material

Typical profile

Oe - 0 to 42 inches: mucky peat
Oa - 42 to 59 inches: muck

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to very high (0.14 to 99.90 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (0.7 to 111.6 mmhos/cm)
Sodium adsorption ratio, maximum: 20.0
Available water supply, 0 to 60 inches: Very high (about 26.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

Description of Westbrook

Setting

Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Partly-decomposed herbaceous organic material over loamy mineral material

Typical profile

Oe - 0 to 19 inches: mucky peat
Cg - 19 to 59 inches: silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Very poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 14.17 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Very frequent
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to strongly saline (0.7 to 111.6 mmhos/cm)
Sodium adsorption ratio, maximum: 33.0
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

Minor Components

Pawcatuck

Percent of map unit: 15 percent
Landform: Tidal marshes
Landform position (three-dimensional): Dip
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R144AY001CT - Tidal Salt Low Marsh mesic very frequently flooded, R144AY002CT - Tidal Salt High Marsh mesic very frequently flooded
Hydric soil rating: Yes

717E—Rock outcrop-Charlton-Hollis complex, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: vjrb
Elevation: 0 to 260 feet
Mean annual precipitation: 45 to 54 inches
Mean annual air temperature: 43 to 54 degrees F
Frost-free period: 125 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Rock outcrop: 40 percent
Charlton and similar soils: 30 percent
Hollis and similar soils: 15 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Rock Outcrop

Setting

Parent material: Granite and gneiss

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 0 inches to lithic bedrock

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: Unranked

Description of Charlton

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Friable coarse-loamy eolian deposits over friable coarse-loamy basal till derived from granite and gneiss

Typical profile

H1 - 0 to 4 inches: fine sandy loam
H2 - 4 to 28 inches: gravelly fine sandy loam
H3 - 28 to 60 inches: gravelly fine sandy loam

Properties and qualities

Slope: 15 to 25 percent
Surface area covered with cobbles, stones or boulders: 1.6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: F144AY034CT - Well Drained Till Uplands
Hydric soil rating: No

Description of Hollis

Setting

Landform: Ridges, hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Parent material: Shallow, friable loamy eolian deposits over granite and gneiss

Typical profile

O - 0 to 1 inches: muck
H2 - 1 to 6 inches: fine sandy loam
H3 - 6 to 17 inches: gravelly fine sandy loam
H4 - 17 to 20 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 10 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: F144AY033MA - Shallow Dry Till Uplands
Hydric soil rating: No

Minor Components

Sutton

Percent of map unit: 5 percent
Hydric soil rating: No

Chatfield

Percent of map unit: 5 percent
Hydric soil rating: No

Leicester

Percent of map unit: 5 percent
Landform: Depressions
Hydric soil rating: Yes

721D—Windsor-Rock outcrop complex, 15 to 25 percent slopes

Map Unit Setting

National map unit symbol: 2w2x7
Elevation: 90 to 350 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Windsor and similar soils: 55 percent
Rock outcrop: 30 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Windsor

Setting

Landform: Deltas, outwash terraces, dunes, outwash plains
Landform position (three-dimensional): Riser
Down-slope shape: Linear, convex
Across-slope shape: Linear, convex
Parent material: Loose sandy glaciofluvial deposits derived from granite and/or schist and/or gneiss

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material
A - 1 to 3 inches: loamy sand
Bw - 3 to 25 inches: loamy sand
C - 25 to 65 inches: sand

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F144AY022MA - Dry Outwash
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Ridges, hills
Parent material: Igneous and metamorphic rock

Typical profile

R - 0 to 79 inches: bedrock

Properties and qualities

Slope: 15 to 25 percent
Depth to restrictive feature: 0 inches to lithic bedrock
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: Unranked

Minor Components

Wareham

Percent of map unit: 8 percent
Landform: Drainageways, depressions
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Scarboro

Percent of map unit: 7 percent
Landform: Depressions, drainageways
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Soil Information for All Uses

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

Soil Qualities and Features

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

Hydrologic Soil Group

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

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

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

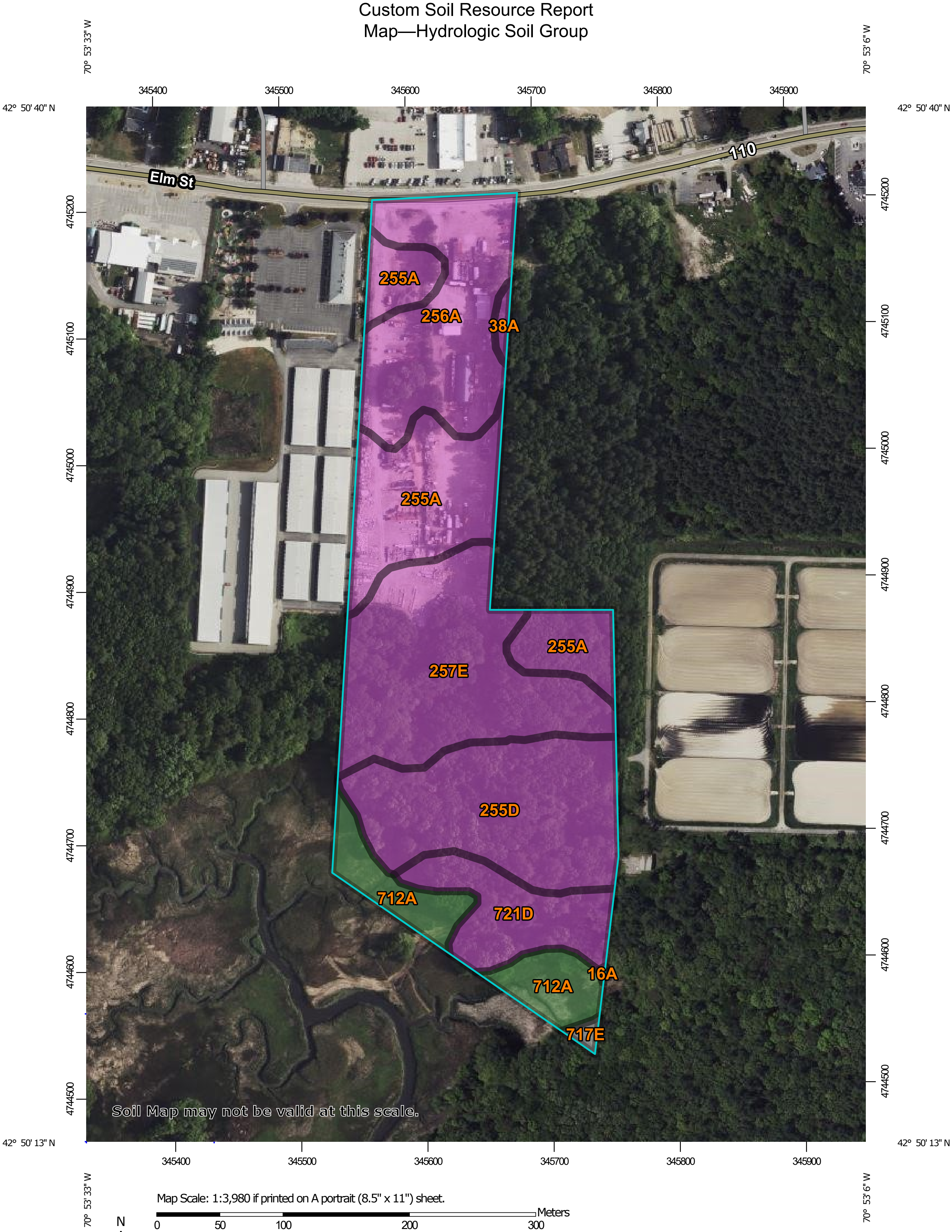
Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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

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

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

Map—Hydrologic Soil Group



Map Scale: 1:3,980 if printed on A portrait (8.5" x 11") sheet.

Meters: 0 50 100 200 300

Feet: 0 150 300 600 900

N

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

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

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

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

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

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

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

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

Soil Survey Area: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 18, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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

Table—Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
16A	Scantic silt loam, 0 to 3 percent slopes	C/D	0.0	0.0%
38A	Pipestone loamy sand, 0 to 3 percent slopes	A	0.1	0.6%
255A	Windsor loamy sand, 0 to 3 percent slopes	A	4.8	19.8%
255D	Windsor loamy sand, 15 to 25 percent slopes	A	5.1	20.8%
256A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	4.3	17.7%
257E	Hinckley and Windsor soils, 25 to 35 percent slopes	A	5.8	23.6%
712A	Ipswich and Westbrook mucky peats, 0 to 2 percent slopes, very frequently flooded	A/D	2.1	8.4%
717E	Rock outcrop-Charlton-Hollis complex, 15 to 35 percent slopes		0.1	0.4%
721D	Windsor-Rock outcrop complex, 15 to 25 percent slopes	A	2.1	8.8%
Totals for Area of Interest			**24.5**	**100.0%**

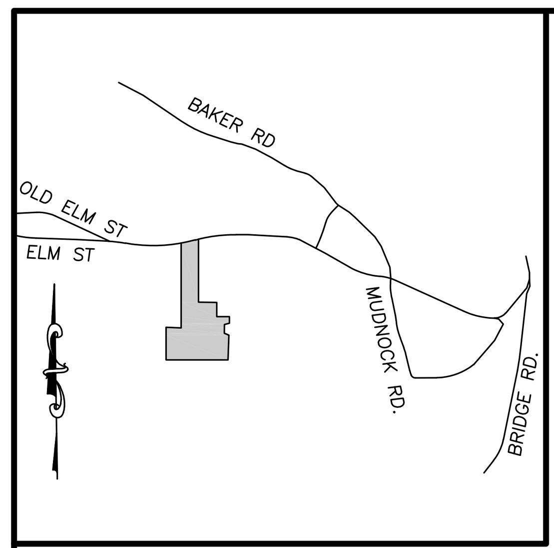
Rating Options—Hydrologic Soil Group

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

15.0 APPENDIX IH– WATERSHED PLANS



LOCUS MAP
N.T.S.

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100'

PREPARED FOR

F & D REALTY LLC
1 MELVIN STREET, SUITE C
WAKEFIELD, MA 01880

NO.	DATE	DESCRIPTION	BY
1	2/7/23	REVISIONS TO SITE PLAN	J.T.M.

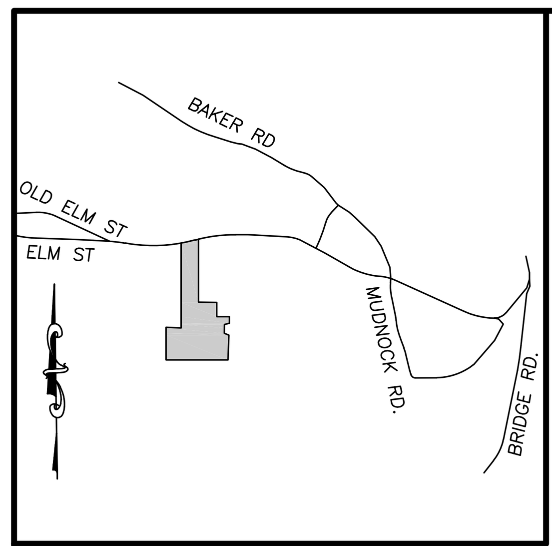
MEI
MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: 1"=100'	DESG. BY: C.M.Y.	PROJECT: M183284
DATE: JAN. 4, 2023	CHKD. BY: E.W.B.	

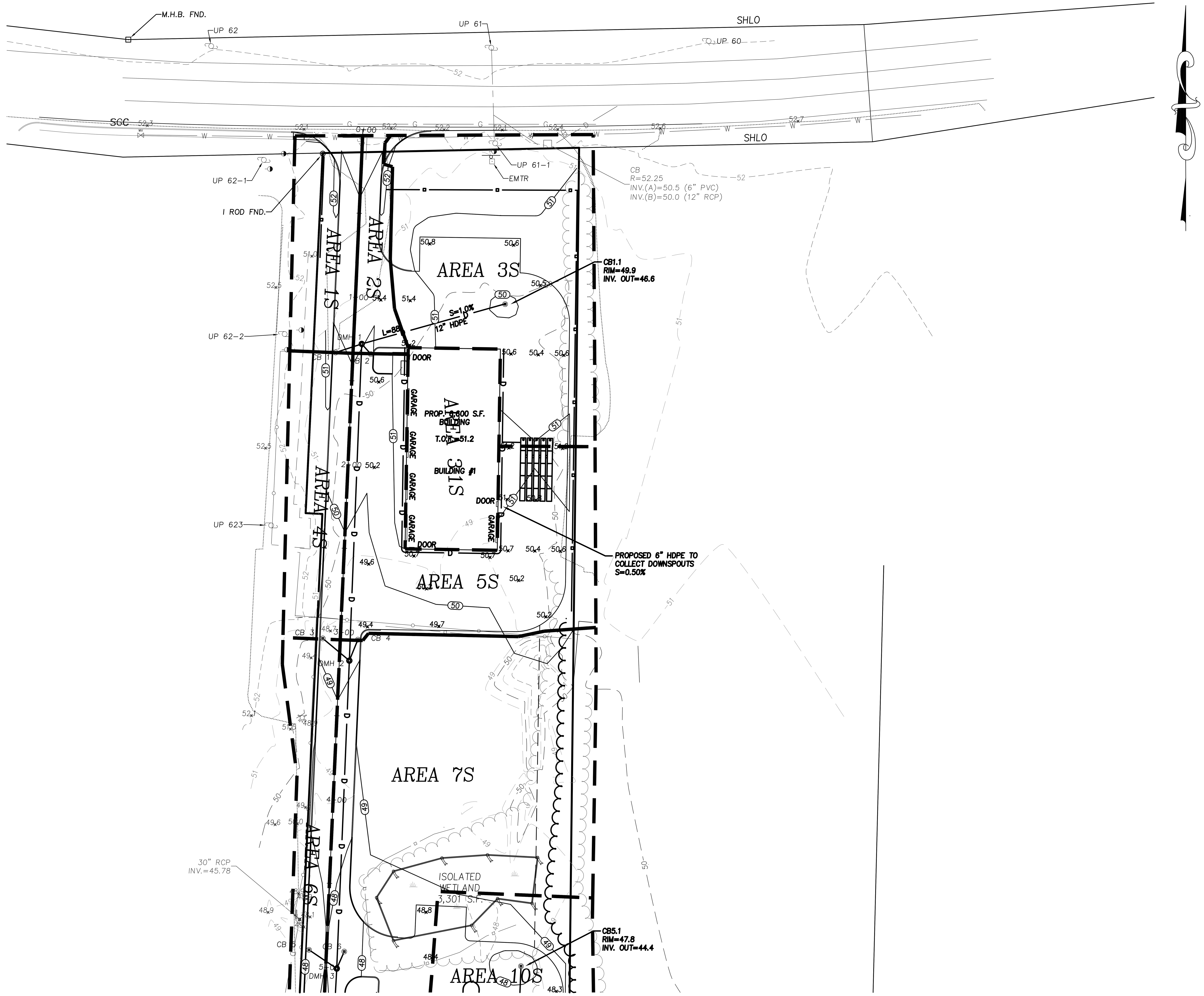
PLAN OF LAND
IN
SALISBURY, MA
SHOWING
PROPOSED SITE IMPROVEMENTS
AT
163 ELM STREET

PRE-DEV
WATERSHED
AREAS

SHEET: 1 OF 1



LOCUS MAP
N.T.S.



GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30'

PREPARED FOR

CARDILLO ELM STREET REALTY TRUST
1 MELVIN STREET, SUITE C
WAKEFIELD, MA 01880

NO.	DATE	DESCRIPTION	BY

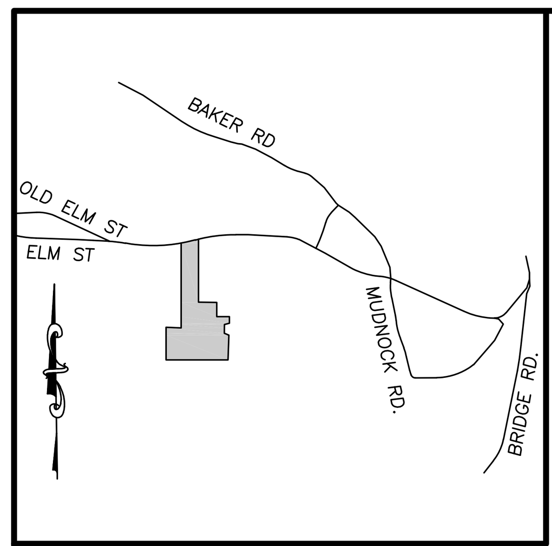
MEI
MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: 1"=30'	DESG. BY: C.M.Y.	PROJECT: M183284
DATE: JAN. 4, 2023	CHKD. BY: E.W.B.	

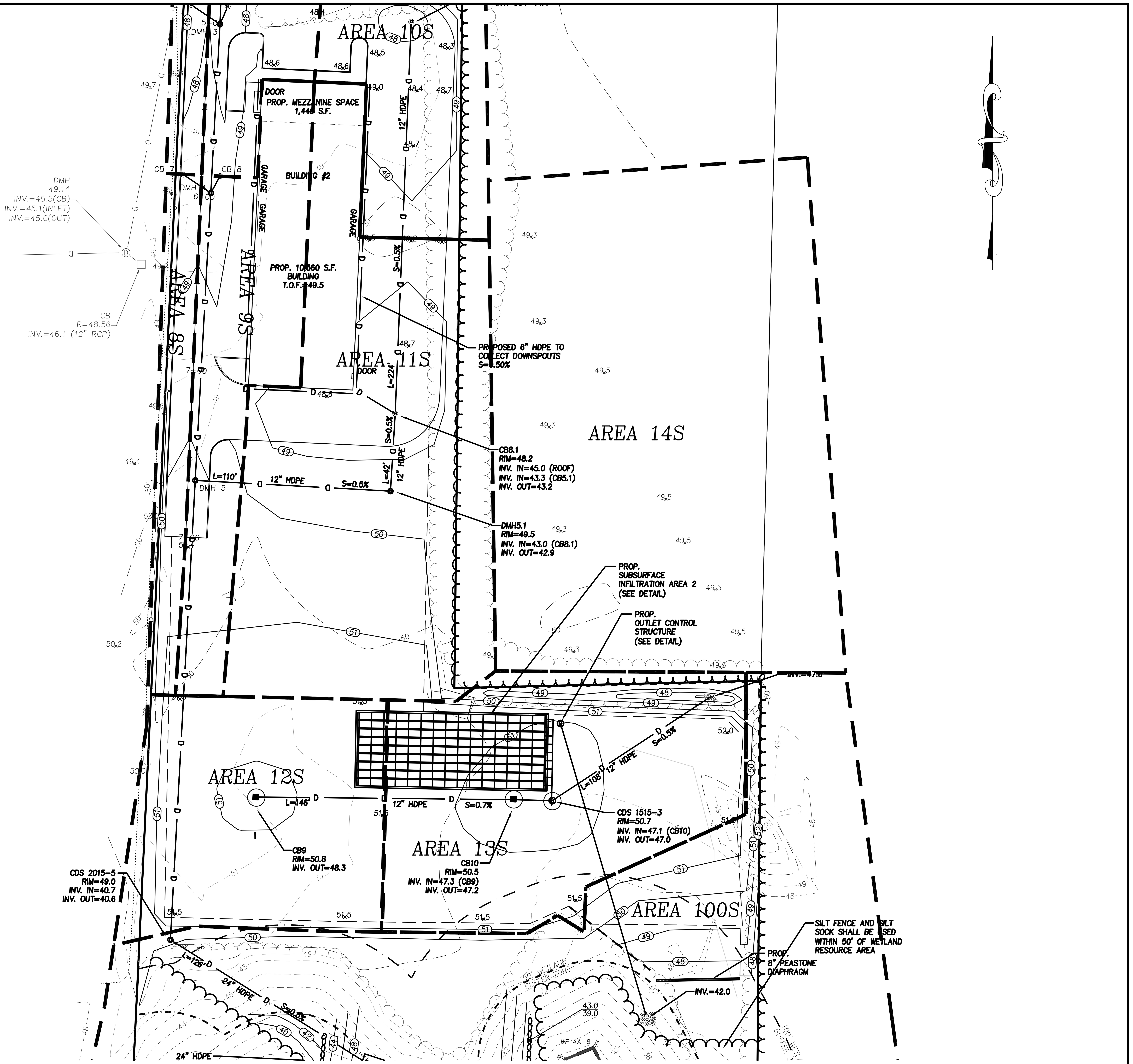
PLAN OF LAND
IN
SALISBURY, MA
SHOWING
PROPOSED SITE IMPROVEMENTS
AT
163 ELM STREET

POST-DEV WATERSHED AREAS

SHEET: 1 OF 4



LOCUS MAP
N.T.S.



GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30'

PREPARED FOR

CARDILLO ELM STREET REALTY TRUST
1 MELVIN STREET, SUITE C
WAKEFIELD, MA 01880

NO.	DATE	DESCRIPTION	BY

MEI MILLENNIUM ENGINEERING, INC.
ENGINEERING AND LAND SURVEYING
62 ELM ST. SALISBURY, MA 01952 (978) 463-8980
13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528

SCALE: 1"=30'	DESG. BY: C.M.Y.	PROJECT: M183284
DATE: JAN. 4, 2023	CHKD. BY: E.W.B.	

PLAN OF LAND
IN
SALISBURY, MA
SHOWING
PROPOSED SITE IMPROVEMENTS
AT
163 ELM STREET

POST-DEV WATERSHED AREAS

SHEET: 2 OF 4

GRAPHIC SCALE 30 0 15 30 60 120 (IN FEET) 1 inch = 30'	PREPARED FOR CARDILLO ELM STREET REALTY TRUST 1 MELVIN STREET, SUITE C WAKEFIELD, MA 01880	NO. DATE DESCRIPTION BY	MEI MILLENNIUM ENGINEERING, INC. ENGINEERING AND LAND SURVEYING 62 ELM ST. SALISBURY, MA 01952 (978) 463-8980 13 HAMPTON RD. EXETER, NH 03833 (603) 778-0528	PLAN OF LAND IN SALISBURY, MA SHOWING PROPOSED SITE IMPROVEMENTS AT 163 ELM STREET
			SCALE: 1"=30' DESG. BY: C.M.Y. DATE: JAN. 4, 2023 CHKD. BY: E.W.B. PROJECT: M183284	POST-DEV WATERSHED AREAS SHEET: 3 OF 4

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30'

PREPARED FOR

CARDILLO ELM STREET REALTY TRUST
1 MELVIN STREET, SUITE C
WAKEFIELD, MA 01880

NO.	DATE	DESCRIPTION	BY

MEI MILLENNIUM ENGINEERING, INC.
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PLAN OF LAND
IN
SALISBURY, MA
SHOWING
PROPOSED SITE IMPROVEMENTS
AT
163 ELM STREET

POST-DEV WATERSHED AREAS

SHEET: 4 OF 4