

# **12 LECLAIR DRIVE SUBDIVISION PLAN & CONDITIONAL USE PERMIT**

**SB# 01-26 & CUP# 03-26**

## **STAFF REPORT**

May 27, 2026

**SITE:** 12 Leclair Drive, Map 147 /Lot 006-000

**ZONING:** Residential – Two (R-2)

**PURPOSE OF PLAN:** to depict the subdivision of Map 147/Lot 006 into seven (7) residential lots, consisting of six (6) new residential lots and one (1) existing residential lot. The proposed development will utilize the existing wetland crossing and includes an increase in wetland disturbance.

### **PLAN UNDER REVIEW:**

Proposed Subdivision Plan, SB# 01-26 & CUP# 03-26, Map 147 Lot 006, 12 Leclair Drive, Hudson, New Hampshire; prepared by: Meridian Land Services Inc., 31 Old Nashua Road, Amherst, NH 03031; prepared for: MR Lacasse Homes, LLC., 9 Scenic Lane, Hudson, NH 03051; consisting of 19 sheets and general notes 1-27 on Sheet GN-1, dated March 3, 2026, last revised May 13, 2026.

### **ATTACHMENTS:**

- 1) Site Plan & CUP Applications received March 3, 2026 – Attachment “A”.
- 2) Project Narrative – Attachment “B”.
- 3) Department Review Comments – Attachment “C”.
- 4) Conservation Commission Recommendation, dated May 11, 2026 – Attachment “D”.
- 5) Stormwater Management Report, prepared by Meridian, last revised May 12, 2026 – Attachment “E”. (Digital Only)
- 6) Wastewater report, prepared by Meridian, dated May 13, 2026 – Attachment “F”.
- 7) Peer Review Comments, prepared by Fuss & O’Neill, dated April 24, 2026 – Attachment “G”.
- 8) Response Letter, prepared by Meridian, dated May 13, 2026 – Attachment “H”.
- 9) Planning Board Member Jim Crowley’s Comments, dated May 4, 2026 – Attachment “I”.
- 10) CAP fee sheet – Attachment “J”.
- 11) Buffer Disturbance Exhibit – Attachment “K”.
- 12) Site Plan dated March 3, 2026, last revised May 13, 2026.

### **APPLICATION TRACKING:**

- March 3, 2026 – Site plan & CUP applications received.
- April 22, 2026 – Public Hearing continued to May 27, 2026.
- May 27, 2026 – Public Hearing scheduled.

**WAIVERS REQUESTED:**

- §289-18.C.(1) – Horizontal and Vertical Curves
- §289-18.R.(1).(b) - Sidewalks
- §289-37.A – Lot Phasing
- §289-20.C.1 & 290-5.A.4 – Stormwater Runoff

**COMMENTS & RECOMMENDATIONS:**

**BACKGROUND**

The subject site consists of approximately 12.44 acres located within the Residential – Two (R-2) Zoning District. The property is currently improved with a single-family dwelling constructed in 1994 and is accessed by a gravel driveway.

The proposed development includes the creation of new residential lots to be serviced by municipal water and sewer. The site contains wetlands along the central portion of the property.

At present, the site is accessed by one curb cut. The applicant proposes to extend Leclair Drive to provide access to the newly created lots. Utilities are proposed to be installed within the roadway layout or alternatively via an existing easement located to the rear of 1, 3, & 5 Shoreline Drive.

As part of the proposed development, the applicant is seeking to modify an existing wetland crossing. This work is subject to a Conditional Use Permit, which has been recommended by the Conservation Commission.

**WAIVER REQUESTS**

The applicant has submitted four waivers at this time:

**§289-18.C.(1) – Horizontal and Vertical Curves** – To allow for a center-line radius of less than 150 feet where otherwise 150 feet would be required. The applicant states that this is to better fit the existing topography of the site and due to the low speeds should not be a hinderance. (*Reference memorandum from Elvis Dhima, Director of Development Services and Jason Twardosky, Director of Pubic Works, dated April 27, 2026 in Attachment “C”.*)

**§289-18.R.(1).(b) – Sidewalks** – To allow for no sidewalk to be constructed where one would otherwise be required. The applicant states that this is a dead-end road of seven lots, which does not justify a sidewalk being built due to the volume of vehicle traffic and pedestrian traffic.

**§289-37.A – Lot Phasing** – To allow for all six proposed lots to be constructed and sold in one phase. The applicant states that this creates undue hardship due to the upfront cost of construction.

**§289-20.C.1 & 290-5.A.4 – Stormwater Runoff** – To allow for an increased rate into the existing LeClair Drive stormwater catch basin where it would otherwise not be allowed. The applicant states that this increase is only in smaller storm events, and that it is unavoidable to maintain the grade of the road. The increase in runoff rates and volumes is into a stormwater conveyance system and not to an abutting property that will be negatively affected.

**DEPARTMENT COMMENTS**

The following comments remain pertinent from the previous round:

**Engineering** provided the following comments:

*ENG Dep. does not recommend relief on the sidewalk request.*

**DPW** provided the following reply: *Public Works has no additional comments over what engineering has stated.*

**Fire** provided the following comments: *Revised plans do show apparatus turning plan and the additional fire hydrants. Acceptable.*

Staff review of **F&O** identified the following sections of peer review as outstanding:

*4b: The applicant shall obtain written approval from the Town Engineer for proposed peak storm water elevations within the cul-de-sac basin that exceed the elevation of the roadway's construction.*

*4l - 4m: Coordination of a Long-Term Maintenance Agreement (LTMA) with the Town for the proposed storm water infrastructure shall be required.*

*6b: The applicant has labeled the size of the proposed water main on the utility plan and the roadway profile. Town Code: Chapter 274 Town of Hudson Water Utility Section IV. C. (A.) states that main extensions will be a minimum of eight-inches in residential areas.*

*6r: The applicant needs to obtain approval from the Town Engineer concerning the proposed location of the water main. In numerous locations the water main will be at the ROW boundary.*

Full Comments can be found in **Attachment "C"**.

**STORMWATER MANAGEMENT REPORT**

As part of the application, a revised Stormwater Management Report dated May 12, 2026, was submitted (**Attachment "E"**). The report concludes that the proposed drainage design adequately mitigates runoff for the analyzed storm events. Runoff generated from the proposed development will be effectively collected, treated, recharged and discharged in accordance with applicable standards. In addition, the proposed design reduces peak volume of stormwater runoff and complies with the NHDES AoT groundwater recharge requirements. Summary tables comparing pre – and post-development peak runoff rates and volumes are included in **Attachment "E"**.

The report further concludes that Observation Points 1, 2, and 3, will experience a net decrease in stormwater runoff rates and volumes under post-development conditions, resulting in no anticipated impact to downstream properties. At Observation Point 4, the increase in outflow compared to existing conditions is attributed to the proposed portion of Leclair Drive that cannot be captured and flows to the existing catch basins along LeClair Drive. This runoff will be captured and conveyed through the existing stormwater system that currently services the roadway, and the report indicated that the increase will have a negligible impact on the existing system.

**WASTEWATER REPORT**

The 6 new lots are proposed to be connected to the existing sewer located at the end of LeClair Drive. Due to the shallow depth of the existing sewer the proposed sewer extension is a combination of gravity sewer and low-pressure force main. The existing dwelling on the remaining lot is proposed to remain on the existing well and septic system. If the future homeowner wants to connect to the force main, the system has been designed to accommodate the connection.

The report concludes that the system is able to handle the expected demand from the properties, along with some buffer storage and recommendations for pump selection. The full report may be found in **Attachment “F”**.

#### **PEER REVIEW**

Fuss & O’Neill completed a second round of peer review of the application materials, dated April 24, 2026. The current submission reflects revisions made in response to the comments contained within that review. The full peer review report is included as **Attachment “G”**.

#### **APPLICANT RESPONSE**

The applicant submitted a response letter to the Fuss & O’Neill peer review as well as revised plans dated May 13, 2026. This submission addresses both peer review and departmental comments. The response letter is included as **Attachment “H”**.

The applicant also submitted

#### **CONSERVATION COMMISSION**

A Conditional Use Permit application has been filed with the Conservation Commission. A motion to recommend was made on May 11, 2026, with the following stipulations:

1. A stipulation and/or note should be added to the plan(s) that states: “During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s).”
2. A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within fifty (50) feet of any wetland overnight".
3. A stipulation and/or note should be added to the plan(s) that states: "Refueling vehicles shall not be parked overnight or left unattended within fifty (50) feet of any wetland".
4. A stipulation and/or note should be added to the plan(s) that states: "Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation".
5. It is recommended that the applicant install approved “Do Not Cut/Do Not Disturb” town conservation markers along the conservation districts boundaries (fifty (50) foot wetland buffer).

- 6. A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period."
- 7. A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within fifty (50) feet of wetland resource areas. Pesticides and herbicides shall not be used within fifty (50) feet of a wetland resource area."
- 8. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

Full recommendation can be found in **Attachment "D"**.

**STAFF COMMENTS**

Staff notes that the request for a sidewalk waiver is not supported by either DPW or Engineering. At this time, however, staff has no objection to the other waiver request at this time.

**RECOMMENDATIONS**

Staff recommends that the Board continue the ongoing public hearing. Following public testimony, staff further recommends that the Board address any outstanding questions or concerns with the applicant, including clarification of and submission for any outstanding waiver requests. Upon receipt of a recommendation from the Conservation Commission, the Board may consider approval motions if it is so inclined.

**DRAFT MOTIONS:**

**TO CONTINUE:**

I move to continue the **Proposed Subdivision Plan** for LeClair Drive Extension, SB# 01-26, Map 147 / Lot 006, 12 Leclair Drive, Hudson, New Hampshire, to date certain \_\_\_\_\_, 2026.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

I move to continue the **Conditional Use Permit** for LeClair Drive Extension, CUP# 03-26, Map 147 / Lot 006, 12 Leclair Drive, Hudson, New Hampshire, to date certain \_\_\_\_\_, 2026.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

**TO GRANT A WAIVER:**

I move to grant a waiver from **§289-18.C.(1) – Horizontal and Vertical Curves** – To allow for a center-line radius of less than 150 feet where otherwise 150 feet would be required, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

I move to grant a waiver from **§289-18.R.(1).(b) – Sidewalks** – To allow for no sidewalk to be constructed where one would otherwise be required, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

I move to grant a waiver from **§289-37.A – Lot Phasing** – To allow for all six proposed lots to be constructed and sold in one phase, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

I move to grant a waiver from **§289-20.C.1 & 290-5.A.4 – Stormwater Runoff** – To allow for an increased rate into the existing LeClair Drive stormwater catch basin where it would otherwise not be allowed, based on the Board’s discussion, the testimony of the Applicant’s representative, and in accordance with the language included in the submitted Waiver Request Form for said waiver.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

**TO APPROVE:**

I move to approve the **Site Plan Application** for the Proposed Retail Building: Proposed Subdivision Plan, SB# 01-26, Map 147 Lot 006, 12 Leclair Drive, Hudson, New Hampshire; prepared by: Meridian Land Services Inc., 31 Old Nashua Road, Amherst, NH 03031; prepared for: MR Lacasse Homes, LLC., 9 Scenic Lane, Hudson, NH 03051; consisting of 19 sheets and general notes 1-27 on Sheet GN-1, dated March 3, 2026, last revised May 13, 2026; and:

That the Planning Board finds that this application complies with the Zoning Ordinance, and with the Land Use Regulations with consideration of the waivers granted and for the reasons set forth in the written submissions, together with the testimony and factual representations made by the applicant during the public hearing;

Subject to, and revised per, the following stipulations:

1. All stipulations of approval shall be incorporated into the Development Agreement, which shall be recorded at the HCRD, together with the Site-Plan-of-Record.
2. All improvements shown on the Site Plan-of-Record, including all Notes, shall be completed in their entirety and at the expense of the applicant or the applicant’s assigns.
3. Prior to recording, the easement depicted to the Town shall be subject to final administrative review by the Town Planner and Town Engineer.

4. Prior to the Planning Board endorsement of the Plan, it shall be subject to final administrative review by Town Planner and Town Engineer.
5. All monumentation shall be set or bonded for prior to the Planning Board endorsing the Plan-of-Record.
6. Prior to the issuance of the final certificate of occupancy, an L.L.S. Certified "As-Built" site plan shall be provided to the Town of Hudson Development Services Department, confirming that the site conforms to the Planning Board approved Site Plan.
7. A cost allocation procedure (CAP) amount of \$6,230.00 per single-family unit, or \$5,769.00 per two-family residential duplex unit shall be paid prior to the issuance of the Certificate of Occupancy. This fee is comprised of traffic, school, and recreation impact fees.
8. Prior to application for a building permit, the Applicant shall schedule a pre-construction meeting with the Town Engineer.
9. The onsite drainage system shall be constructed and maintained in compliance with NHDES requirements for such systems.
10. Construction activities involving the proposed undeveloped lots shall be limited to the hours between 7:00 A.M. and 7:00 P.M., Monday through Saturday. No exterior construction activities shall be allowed on Sundays.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

I move to approve the **Conditional Use Permit Application** for the Proposed Subdivision Plan, CUP# 03-26, Map 147 Lot 006, 12 Leclair Drive, Hudson, New Hampshire; prepared by: Meridian Land Services Inc., 31 Old Nashua Road, Amherst, NH 03031; prepared for: MR Lacasse Homes, LLC., 9 Scenic Lane, Hudson, NH 03051; consisting of 19 sheets and general notes 1-27 on Sheet GN-1, dated March 3, 2026, last revised May 13, 2026; subject to, and revised per, the following stipulations:

1. All stipulations of approval shall be incorporated into the Site Plan Development Agreement, which shall be recorded at the HCRD, together with the Plan.
2. Prior to the Planning Board endorsement of the Plan, it shall be subject to final administrative review by the Town Planner, Town Engineer, and Town Counsel.
3. Planning Board endorsement of the Plan shall be contingent upon proof of a valid Alteration of Terrain (AOT) Permit issued by New Hampshire Department of Environmental Services (NHDES).
4. Construction activities involving the subject lot shall be limited to the hours between 7:00 A.M. and 7:00 P.M, Monday thru Saturday. No exterior construction activities shall be allowed on Sundays.

Motion by: \_\_\_\_\_ Second: \_\_\_\_\_ Carried/Failed: \_\_\_\_\_

*CUP approval draft stipulations recommended by the Conservation Commission:*

1. A stipulation and/or note should be added to the plan(s) that states: "During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or wetland buffer(s)."
2. A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within fifty (50) feet of any wetland overnight".
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5. It is recommended that the applicant install approved "Do Not Cut/Do Not Disturb" town conservation markers along the conservation districts boundaries (fifty (50) foot wetland buffer).
6. A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period."
7. A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within fifty (50) feet of wetland resource areas. Pesticides and herbicides shall not be used within fifty (50) feet of a wetland resource area."
8. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

**SUBDIVISION APPLICATION**

Date of Application: 3/3/26 Tax Map #: 147 Lot #: 6

Site Address: 12 LeClair Dr, Hudson NH

Name of Project: LeClair Dr Extension

Zoning District: R-2 General SB#: \_\_\_\_\_  
(For Town Use Only)

Z.B.A. Action: \_\_\_\_\_

**PROPERTY OWNER:**

Name: Leclair, Ronald O. Trust

Address: 12 LeClair Dr

Address: HUDSON, NH 03051

Telephone # 603-438-5611

Email: onl70@outlook.com

**DEVELOPER:**

MR Lacasse Homes, LLC, C/o Mike Lacasse

9 Scenic lane

Hudson, NH 03051

603-321-8374

michelrlacasse@gmail.com

**PROJECT ENGINEER:**

Name: Sam Foisie, P.E., Meridian Land Services, Inc

Address: 31 Old Nashua RD

Address: Amherst, NH 03055

Telephone # 603-673-1441

Email: SRFoisie@meridianlandservices.com

**SURVEYOR:**

Sam Ingram, LLS., Meridian Land Services, Inc

31 Old Nashua RD

Amherst, NH 03055

603-673-1441

SDIngram@meridianlandservices.com

**PURPOSE OF PLAN:**

The purpose of the plan is to show the site improvements to extend LeClair Dr

**(For Town Use Only)**

Routing Date: \_\_\_\_\_ Deadline Date: \_\_\_\_\_ Meeting Date: \_\_\_\_\_

\_\_\_\_\_ I have no comments \_\_\_\_\_ I have comments (attach to form)

\_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

(Initials)

Department:

Zoning: \_\_\_ Engineering: \_\_\_ Assessor: \_\_\_ Police: \_\_\_ Fire: \_\_\_ DPW: \_\_\_ Consultant: \_\_\_

**SUBDIVISION PLAN DATA SHEET**

PLAN NAME: LeClair Drive Extension

PLAN TYPE: Conventional Subdivision Plan or Open Space Development (Circle One)

LEGAL DESCRIPTION: MAP 147 LOT 6

DATE: 3/3/26

-----  
Address: 12 LeClair Dr

Total Area: S.F. 545,137 Acres: 12.5146

Zoning: R-2

Required Lot Area: 43,560 (Buildable area)

Required Lot Frontage: 120'

Number of Lots Proposed: 6 new lots plus 1 remaining, totaling 7lots

Water and Waste System Proposed: yes

Area in Wetlands: 27,347 sf

Existing Buildings To Be Removed: 0

Flood Zone Reference: Zone X with portion in zone AE, found on flood panel 33011C0512D

Proposed Linear Feet Of New Roadway: 1,000'



**SUBDIVISION PLAN APPLICATION AUTHORIZATION**

I hereby apply for *Subdivision Plan* Review and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Subdivision Plan* specifications or application form are incomplete, the application will be considered rejected.

Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name of Owner: \_\_\_\_\_

- ❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name of Developer: \_\_\_\_\_

- ❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

TOWN OF HUDSON  
SUBDIVISION PLAN REVIEW CHECKLIST

This checklist is intended to help the applicant and staff to ensure application completeness. Please refer to the regulations on the exact language of each requirement.

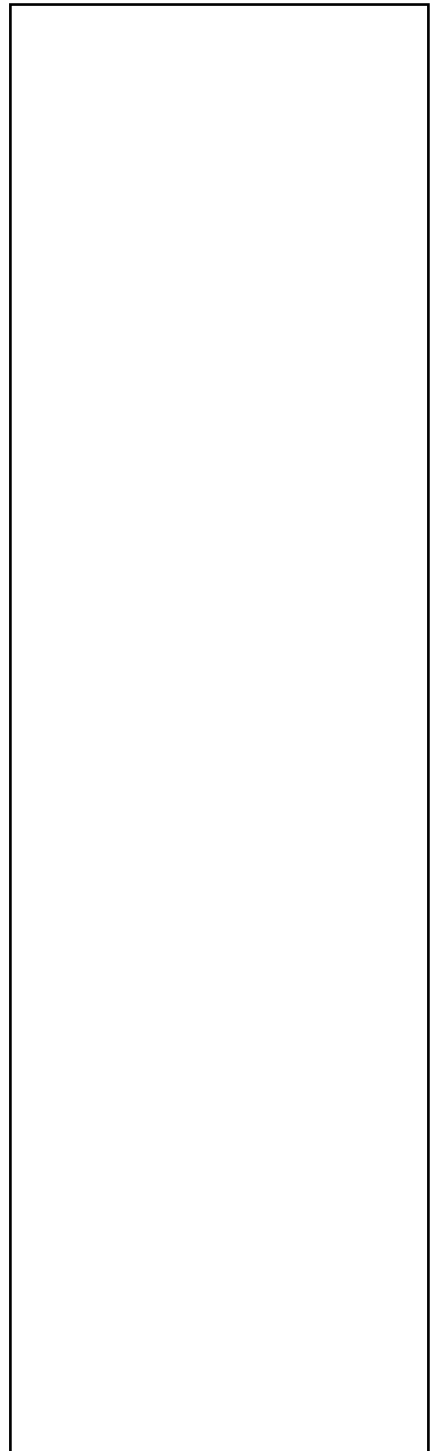
Key: Y=Yes P =Pending W=Waiver Request NA=Not Applicable

§ 276-11.1 General Plan Requirements

- | <u>Y</u> | <u>P</u>                            | <u>W</u>                 | <u>NA</u>                |                          |  |
|----------|-------------------------------------|--------------------------|--------------------------|--------------------------|--|
| 1.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - A list of the names and addresses of the owner(s) of the property, the applicant(s), and all abutters as indicated in the office of the Town Assessor records not more than five (5) days prior to the day of filing [§ 276-11.1.A.] |
| 2.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - One (1) set of Plans on size 22" x 34" sheet [§ 276-11.1.B.(1)]  |
| 3.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Scale no smaller than 50 feet to the inch (1" = 50') [§ 276-11.1.B.(2)]  |
| 4.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Title block in the lower right-hand corner of the plan, containing: [§ 276-11.1.B.(3)]   |
| 5.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -Title, including the term "site plan" or "subdivision plan"   |
| 6.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The name for whom the plan was prepared  |
| 7.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Preparer of the plan   |
| 8.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - The scale(s) of the plan   |
| 9.       | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Date of the plan   |
| 10.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Appropriate revision block   |
| 11.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Approval block located on the lower left corner of each sheet, with the require language and signature lines [§ 276-11.1.B.(4)]  |
| 12.      | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Owner's printed name and address and signature [§ 276-11.1.B.(6)]  |
| 13.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Name and address of all abutting property owners [§ 276-11.1.B.(7)]  |
| 14.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - A locus plan at one inch equals 1,000 feet (1" = 1,000') [§ 276-11.1.B.(8)]  |
| 15.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | -Boundary of the entire parcel held in single ownership with boundary dimensions and bearings [§ 276-11.1.B.(9)]   |
| 16.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Error of closure shown and certified by a licensed land surveyor   |
| 17.      | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - North point arrow  |

Notes

- 18.     - Zoning classification note of the tract and location of the zoning district boundaries if the property is located in two or more zoning district [§ 276-11.1.B.(10)]
- 19.     - The location of all building setback lines as required by Chapter 334, Zoning, or as listed under § 276-11.1.B.(12), whichever is more stringent [§ 276-11.1.B.(12)].
- 20.     - The location size and character of all signs or a note\* stating "All signs are subject to approval by the Hudson Zoning Administrator prior to installation thereof." [§ 276-11.1.B.(13)] \*The discrepancy on the note language is correct – reference to the Planning Board in the regulations is outdated.
- 21.     - The location, detail and character of all exterior lighting or a note stating: "There will be no exterior lighting." [§ 276-11.1.B.(14)]
- 22.     - The location of all buildings within 50 feet of the tract [§ 276-11.1.B.(15)]
- 23.     - The location of roadways, driveways, travel areas or parking areas within 200 feet of the tract, with the use of an additional sheet, aerial photography, or Town topographic mapping as necessary [§ 276-11.1.B.(16)]
- 24.     - Existing topography at two-foot contour intervals of that portion of the tract being proposed for development from a topographic survey and contours on the remainder of the tract from a reliable plan source [§ 276-11.1.B.(17)]
- 25.     - Proposed topography at two-foot contour intervals [§ 276-11.1.B.(18)]
- 26.     - A note identifying the Tax Map and Lot Number of the tract [§ 276-11.1.B.(19)]
- 27.     - The location of all existing buildings (including size and height), driveways, sidewalks, parking spaces, loading area, open spaces, large trees, open drainage courses, signs, exterior lighting, service areas, easements landscaping and other pertinent items. [§ 276-11.1.B.(20)]



- Y P W NA
28.     - The location of all proposed construction, buildings, structures, pavement, etc. [§ 276-11.1.B.(21)]
29.     - A green area shown between the right-of-way line and any pavement, gravel or structure meeting the required minimum width [§ 276-11.1.B.(22)]
30.     - Highway protects listed on the transportation improvement program adopted by the Nashua Regional Planning Commission, shown in the Hudson Master Plan, or listed in the Corridor Study adopted by the Hudson Planning Board [§ 276-11.1.B.(23)]
31.     - Required open space, including the calculation showing the requirement is met [§ 276-11.1.B.(24)]

Notes

**§§ 275-8 – 275-9 Site Plan Requirements**

**(If this checklist is for a subdivision plan application, skip to the next section on page 5)**

- Y P W NA
33.     - Parking space calculation showing and a statement stating the required parking spaces are provided [§ 275-8.C.(2) & (3)]
34.     - Required dimensions for parking space [§ 275-8.C.(4)]
35.     - Required dimensions for aisle/access drive [§ 275-8.C.(5)]
36.     - Required off-street loading spaces, including calculation showing the required loading spaces are provided [§ 275-8.C.(6)]
37.     - Required landscaping for the parking lot, including calculation shown the planting requirement is met [§ 275-8.C.(7)]
38.     - Required screening for visual separation of incompatible uses [§ 275-8.C.(8)]

Notes

# Attachment "A"

## Notes

- |     | <u>Y</u>                 | <u>P</u>                 | <u>W</u>                 | <u>NA</u>                |  |
|-----|--------------------------|--------------------------|--------------------------|--------------------------|--|
| 39. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Handicap accessibility provided in accordance with the latest ADA Regulations<br>[§ 275-8.C.(11)]  |
| 40. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Stormwater Management Plan [§ 275-9.A]   |
| 41. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Traffic Study, if required [§ 275-9.B]   |
| 42. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Noise Study, if required [§ 275-9.C]   |
| 43. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Fiscal Impact Study, if required [§ 275-9.D]   |
| 44. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Utility Study [§ 275-9.E]  |
| 45. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Copies of any proposed or existing easements, covenants, deed restrictions or any other similar document pertinent to the Site Plan<br>[§ 275-9.F] |
| 45. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - A copy of all applicable Town, state, county or federal approvals or permits [§ 275-9.G]   |
| 46. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Chapter 270, Sewers  |
| 47. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Floodplain permit  |
| 48. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Special exception to the Wetland Ordinance   |
| 49. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Septic system construction approval from the New Hampshire Water Supply and Pollution Control Commission   |
| 50. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Approval of the New Hampshire Wetland Bureau for relocation, filling, dredging or rechanneling   |
| 51. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Approval of the New Hampshire Department of Public Works and Highways for any required driveway permits or curb cuts                               |
| 52. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - NH RSA 149:9-a Permit  |
| 53. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Environmental Impact Study, if required<br>[§ 275-9.I]   |

**(End here if this checklist is for a site plan application).**

TOWN OF HUDSON  
SUBDIVISION PLAN REVIEW CHECKLIST

This checklist is intended to help the applicant and staff to ensure application completeness. Please refer to the regulations on the exact language of each requirement.

Key: Y=Yes P =Pending W=Waiver Request NA=Not Applicable

§§ 289-26 – 289-27 Subdivision Plan Requirements

(Not applicable if this checklist is for a site plan application)

- |     | <u>Y</u>                            | <u>P</u>                 | <u>W</u>                 | <u>NA</u>                |   |
|-----|-------------------------------------|--------------------------|--------------------------|--------------------------|---|
| 54. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Proposed subdivision name [§ 289-26.B.(1)]  |
| 55. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | - Abutting subdivision names, streets, easements, setbacks, alleys, parks and public open spaces and similar facts regarding abutting property [§ 289-26.B.(2)] |

Notes

**CONDITIONAL USE PERMIT APPLICATION**

Date of Application: 3/3/26 Tax Map #: 147 Lot #: 6

Site Address: 12 LECLAIR DR, Hudson NH

Name of Project: LeClair Drive Extension

Zoning District: r2 General CUP#: \_\_\_\_\_

(For Town Use Only)

Z.B.A. Action: \_\_\_\_\_

**PROPERTY OWNER:**

Name: LECLAIR, RONALD O., TR.

Address: 12, LeClair Dr

Address: HUDSON, NH 03051

Telephone # 603-438-5611

Email: onl70@outlook.com

**DEVELOPER:**

MR Lacassee Homes, LLC, C/O Mike Lacasse

9 Scenic Rd

HUDSON, NH 03051

603-321-8374

michelrlacasse@gmail.com

**PROJECT ENGINEER or SURVEYOR:**

Name: Sam Foisie, P.E., Meridian Land Services, Inc

Address: 31 Old Nashua RD

Address: Amherst, NH 03055

Telephone # 603-673-1441

Email: SRFoisie@meridianlandservices.com

**CERTIFIED WETLANDS SCIENTIST:**

Sam Ingram, LLS., Meridian Land Services, Inc

31 Old Nashua RD

Amherst, NH 03055

603-673-1441

SDIngram@meridianlandservices.com

**PURPOSE OF PLAN:**

The purpose of the plan is to show the site improvements to extend LeClair Dr

**(For Town Use Only)**

Routing Date: \_\_\_\_\_ Deadline Date: \_\_\_\_\_ Meeting Date: \_\_\_\_\_

\_\_\_\_\_ I have no comments \_\_\_\_\_ I have comments (attach to form)

\_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

(Initials)

Department:

Zoning: \_\_\_ Engineering: \_\_\_ Assessor: \_\_\_ Police: \_\_\_ Fire: \_\_\_ DPW: \_\_\_ Consultant: \_\_\_

**SITE DATA SHEET**

PLAN NAME: LeClair Drive Extension

PLAN TYPE: (Site Plan, Subdivision, or other) Subdivision

LEGAL DESCRIPTION: MAP 147 LOT 6

DATE: 3/3/26

-----

Location by Street: 12 LeClair Dr

Zoning: R-2

Proposed Land Use: Residential

Existing Use: Single Family Home

Total Site Area: S.F.: 545,137 Acres: 12.5146

Total Wetland Area (SF): 27,347 sf

Permanent Wetland Impact Area (SF): 235+/-

Permanent Wetland Buffer Impact Area (SF): 5,999+/-

Temporary Wetland Impact Area (SF): 200 +/-

Temporary Wetland Buffer Impact Area (SF): 3,454 +/-

Flood Zone Reference: Zone X with portion in zone AE, found on flood panel 33011C0512D

Proposed Mitigation:

Minimization of buffer impact, temporary impacts as needed, and removal of invasive species within remaining wetlands and buffer

\_\_\_\_\_  
\_\_\_\_\_

<b>(For Town Use Only)</b>	
Data Sheets Checked By: _____	Date: _____

**CONDITIONAL USE PERMIT APPLICATION AUTHORIZATION**

I hereby apply for *Conditional Use Permit* and acknowledge I will comply with all of the Ordinances of the Town of Hudson, New Hampshire State Laws, as well as any stipulations of the Planning Board, in development and construction of this project. I understand that if any of the items listed under the *Conditional Use Permit* specifications or application form are incomplete, the application will be considered rejected.

Pursuant to RSA 674:1-IV, the owner(s) by the filing of this application as indicated above, hereby given permission for any member of the Hudson Planning Board, the Hudson Conservation Commission, the Town Planner, the Town Engineer, and such agents or employees of the Town or other persons as the Planning Board may authorize, to enter upon the property which is the subject of this application at all reasonable times for the purpose of such examinations, surveys, tests and inspections as may be appropriate. The owner(s) release(s) any claim to or right he/she (they) may now or hereafter possess against any of the above individuals as a result of any examinations, surveys, tests and/or inspections conducted on his/her (their) property in connection with this applications.

Signature of Owner: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name of Owner: \_\_\_\_\_

- ❖ If other than an individual, indicate name of organization and its principal owner, partners, or corporate officers.

Signature of Developer: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name of Developer: \_\_\_\_\_

- ❖ The developer/individual in charge must have control over all project work and be available to the Code Enforcement Officer/Building Inspector during the construction phase of the project. The individual in charge of the project must notify the Code Enforcement Officer/Building Inspector within two (2) working days of any change.

**SCHEDULE OF FEES**

(Fee covers both Conservation Commission & Planning Board)

**A. REVIEW FEES:**

1. Conditional Use Permit  
\$100 Flat Fee \$ 100.00

**LEGAL FEE:**

The applicant shall be charged attorney costs billed to the Town for the Town’s attorney review of any application plan set documents.

**B. POSTAGE:**

\_\_\_\_\_ Direct Abutters Applicant, Professionals, etc. as required \$ \_\_\_\_\_  
by RSA 676:4.1.d @\$5.58 (or **Current Certified Mail Rate**)

\_\_\_\_\_ Indirect Abutters (property owners within 200 feet) \$ \_\_\_\_\_  
@\$0.73 (or **Current First Class Rate**)

**TOTAL** \$ See attached fee clac

<b>(For Town Use)</b>	
AMOUNT RECEIVED: \$ _____	DATE RECEIVED: _____
RECEIPT NO.: _____	RECEIVED BY: _____

**WETLAND CONDITIONAL USE PERMIT CHECKLIST**

Yes	No	NA	<u>QUESTIONS/INFORMATION NEEDED</u>	HCC Comments
<b>NARRATIVE REPORT</b>				
Existing Conditions				
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Has a DES Dredge and Fill Permit been issued for any part of this site? If yes, provide number, date, and description.	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Is there evidence of altered wetlands or surface waters on site?	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	All prime and other wetlands in the vicinity, plus any wetlands/watersheds past the immediate vicinity affected by this project	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	• Description of each wetland and associated values	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Wetland mapping results – Including the flagging date and technique plus the name, company and qualifications of the wetland scientist	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Was property surveyed? If yes, the date of survey. (Please attach the survey plan)	
<b>National Wetland Inventory</b>				
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	• Vegetative cover types	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	• Existence of vernal pools and associated habitat	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	• Unique geological and cultural features	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	NH Natural Heritage inventory – For list of rare and endangered species, contact the • NH Division of Forests and Lands (603)271-3623	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	• Wildlife and fauna species, including estimated number and locations (large projects)	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	• Public or private wells located within the vicinity	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	• Monitoring well(s) located on site	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	• Current land use and zoning district	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Photos of existing area (please use color photos)	
<b>Proposed Project Description</b>				
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Entire project and associated activities	
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	Time table of project and anticipated phasing	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Land use	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Grading plan	
<b>Impact to Wetlands and/or Buffers</b>				
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	• Depending on size and proposed impacts, a report from a biologist may be appropriate	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Removing, filling, dredging, or altering (Area square ft. and locations)	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Intercepting or diverging of ground or surface water (Locations and size)	
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	• Change in run-off characteristics	
<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Delineation of drainage area contributing to each discharge point	

# Attachment "A"

Yes	No	NA	Questions/Information Needed	<u>HCC COMMENTS</u>
✓	<input type="radio"/>	<input type="radio"/>	Estimated water quality characteristics of runoff at each point of discharge for both pre- and post-development	
✓	<input type="radio"/>	<input type="radio"/>	Erosion control practices	
✓	<input type="radio"/>	<input type="radio"/>	<ul style="list-style-type: none"> <li>• If using rip-rap, attach documentation explaining why other erosion control methods are not feasible</li> </ul>	
✓	<input type="radio"/>	<input type="radio"/>	<ul style="list-style-type: none"> <li>• How storm water runoff will be handled</li> </ul>	
✓	<input type="radio"/>	<input type="radio"/>	If backyards or lots include a buffer area, buffer restriction wording shall be included in each deed (A physical marker may be requested to designate buffer boundaries at site)	

### Mitigation

✓	<input type="radio"/>	<input type="radio"/>	Square footage of mitigation – wetland and upland areas	
<input type="radio"/>	✓	<input type="radio"/>	Wetland or upland plants identified to replace any losses	
<input type="radio"/>	✓	<input type="radio"/>	<ul style="list-style-type: none"> <li>• Restoration plan for planting and vegetation</li> </ul>	
<input type="radio"/>	✓	<input type="radio"/>	Conservation easements, including location and aesthetic, wildlife and vegetative values	
<input type="radio"/>	<input type="radio"/>	✓	<ul style="list-style-type: none"> <li>• If easement is on or added to the site(s), a copy of the legal document shall be given to the HCC (HCC conservation easement markers may also be required along the easement)</li> </ul>	

### CONCEPTUAL SITE PLAN/DRAWING

✓	<input type="radio"/>	<input type="radio"/>	Locus map depicting project site and vicinity within approximately ½ mile and also on a larger scale	
✓	<input type="radio"/>	<input type="radio"/>	All prime and other wetlands in the vicinity	
✓	<input type="radio"/>	<input type="radio"/>	Wetland(s) impacted (identified as prime or other) and the wetland boundaries with 50', buffer areas highlighted in color	
✓	<input type="radio"/>	<input type="radio"/>	Assessor's sheet(s), lot(s), and property account number(s)	
✓	<input type="radio"/>	<input type="radio"/>	Existing and proposed structures	
✓	<input type="radio"/>	<input type="radio"/>	Square footage listed for temporary and permanent impact	
✓	<input type="radio"/>	<input type="radio"/>	Erosion control plan (Suggested: Biodegradable silt fences so area won't be disturbed again and no hay to avoid invasive species)	
✓	<input type="radio"/>	<input type="radio"/>	Topographical map with contours	
<input type="radio"/>	✓	<input type="radio"/>	Storm water treatment swales and basins highlighted in color if in buffer area	
✓	<input type="radio"/>	<input type="radio"/>	Conservation and utility easements	
✓	<input type="radio"/>	<input type="radio"/>	Grading plan	
✓	<input type="radio"/>	<input type="radio"/>	Culvert, arch, bridge - sizes, material, etc.	
✓	<input type="radio"/>	<input type="radio"/>	Vegetative cover types	
<input type="radio"/>	✓	<input type="radio"/>	Vernal pools	
✓	<input type="radio"/>	<input type="radio"/>	Existing and proposed stone walls, tree lines, and unusually large, rare or beautiful trees, and other notable site features	

**QUESTIONS TO CONSIDER BEFORE SUBMITTING**

- Will the increased discharge cause erosion and channelization?

---

- Is there potential for off-site flooding?

---

- Does the decreased infiltration in the drainage area cause vegetation stress due to reduced or increased ground water or surface water discharge into wetland?

---

- Will the nutrients in the runoff increase eutrophication potential in downstream water bodies?

---

- Do you own any adjacent parcels or easements for roadways across adjacent parcels which could be used for access to avoid a wetland crossing

---

- Does a wetland crossing occur where it will result in the least amount of alteration to a wetland?

---

- Is preservation of upland areas adjacent to the impacted wetland a priority?

---

- Can using an alternative crossing design such as a bridge, retaining wall, etc. decrease the width or area of wetland alteration?

---

- Does a proposed road crossing of a wetland exceed the minimum width acceptable to the Planning Board and can this be negotiated downwards?

---

- Have you established that no reasonable alternative access from a public way to an upland is possible?

---

- Can the parking lot spaces be decreased?

---

- Is the roadway designed in such a way that does not restrict the flow of water?

---

- Is additional information needed to assess water quality impacts due to runoff?

---

- Is there an increase in other pollutants (e.g., heavy metals, turbidity, coli form) from streets and parking lots?

---

- Is there a need to restrict or prohibit the use of pesticides and fertilizers?

---

- Is there a need to restrict the use of roadway salting?

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# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING  
SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "A"

LeClair Dr Extension  
12 LeClair Dr  
Lot 147-6  
Hudson, NH

### Planning Board Application - Fee Calculation

Site Plan				
Description	Fee Calculation		Units	Amount
Review Fee	\$ 170.00	per proposed lot	7	\$ 1,190.00
Notice to Direct Abutters	\$ 6.08	per abutter and Owner, applicant & consultants	15	\$ 91.20
Notice to Indirect Abutters	\$ 0.78	per abutter	1	\$ 0.78
Tax map Update fee	\$ 30.00	2 to 7 lots (# of lots x \$30.00) + \$25.00 (min. \$85.00) 8 lots or more (min. \$325.00)	7	\$ 210.00
			<b>Subtotal</b>	<b>\$ 1,491.98</b>

WETLAND CONSERVATION OVERLAY DISTRICT Conditional Use Permits (CUP)				
Description	Fee Calculation		Units	Amount
Base Fee	\$ 100.00	Per Application	1	\$ 100.00
Notice to Direct Abutters		NOTICES INCLUDED FOR SITE PLAN FEE		\$ -
Notice to Indirect Abutters		NOTICES INCLUDED FOR SITE PLAN FEE		\$ -
			<b>Subtotal</b>	<b>\$ 100.00</b>

<b>Total Permitting Fees Made Payable to the Town of Hudson =</b>	<b>\$ 1,591.98</b>
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CONSULTANT REVIEW FEE:	\$ 600.00	\$600 per acre or \$1,250 whichever is greater	12.51	<b>\$ 7,506.00</b>
<b>Made Payable to the town of Hudson</b>				

NOTES



**MERIDIAN**  
**LAND SERVICES, INC.**

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

**LIST OF ABUTTERS**

**Tax Map 147 Lot 6**

**12 Leclaire Drive**

**Hudson, NH**

March 2nd, 2026  
#12916-01

Meridian Land Services, Inc.  
PO Box 118  
Milford, NH 03055  
Attn: Sam Foisie

Map 147 Lot 1-1  
TURNER, JUSTIN M., TR.  
TURNER, JENNIFER B., TR.  
3 SHORELINE DR.  
HUDSON, NH 03051

Map 147 Lot 6  
LECLAIR, RONALD O., TR  
LECLAIR REVOCABLE TRUST  
12 LECLAIR DR  
HUDSON, NH 03051

Map 147 Lot 7  
RAFFERTY, LINDA E  
RAFFERTY, GARY D  
220 WEBSTER STREET  
HUDSON, NH 03051

Map 147 Lot 5  
GAGNE, EMILY  
FITCH, JAMES  
216 WEBSTER STREET  
HUDSON, NH 03051

Map 147 Lot 4  
BROMLEY, MICHAEL K.  
BROMLEY, ROBERTA M  
214 WEBSTER STREET  
HUDSON, NH 03051

Map 147 Lot 3  
DAVILA, LUIS  
ROJAS-MARIN, LUZ ADRIANA  
212 WEBSTER ST  
HUDSON, NH 03051

Map 147 Lot 2  
HAMEL, ERIC J.  
633 VIA LINDA  
NEWBURY PARK, CA 91320

Map 147 Lot 1-2  
KAUFFMAN, RONALD A  
5 SHORELINE DRIVE  
HUDSON, NH 03051

Map 147 Lot 1-3  
PUOPOLO, STEPHEN T., TR  
PUOPOLO, KIMBERLY M., TR.  
9 SHORELINE DRIVE  
HUDSON, NH 03051

Map 147 Lot 1-4  
MANDEVILLE, DOMINICK L.  
MANDEVILLE, CAROLA F.  
11 SHORELINE DRIVE  
HUDSON, NH 03051

Map 147 Lot 1-5  
ASHFORD, CHRISTINE J., TR.  
ASHFORD REVOCABLE TRUST  
13 SHORELINE DR.  
HUDSON, NH 03051

Map 147 Lot 1-6  
MILLER, LISA  
MILLER, JOSEPH  
15 SHORELINE DR.  
HUDSON, NH 03051

Map 147 Lot 1-7  
MONCHAMP, DOUGLAS J., TR  
MONCHAMP, KAREN L., TR  
17 SHORELINE DR.  
HUDSON, NH 03051

MR LACASSE HOMES, LLC  
9 SCENIC WAY  
HUDSON, NH 03051



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "A"

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

**March 3, 2026**

### **Conditional Use Permit Application: Wetland Conservation Overlay District – Checklist Questions**

1. Will the increased discharge cause erosion and channelization?

**No, the stormwater management system controls the stormwater to meet predevelopment rates. Additionally the site is situated immediately adjacent to the Merrimack River, the river has the capacity to handle large amounts of runoff.**

2. Is there potential for off-site flooding?

**No, the stormwater management system controls the stormwater to meet predevelopment rates. It also slowly releases the runoff over a longer period of time and infiltrates the groundwater recharge volume (GRV). Additionally the site is situated immediately adjacent to the Merrimack River, the river has the capacity to handle large amounts of runoff.**

3. Does the decreased infiltration in the drainage area cause vegetation stress due to reduced or increased ground water or surface water discharge into wetland?

**No, the stormwater management system is an infiltration basin. The basin has been designed to meet NHDES Alteration of Terrain's GRV, thereby not decreasing the amount of surface waters being infiltrated into the ground.**

4. Will the nutrients in the runoff increase eutrophication potential in downstream water bodies?

**No, the stormwater management system has been designed to comply with nutrient removal requirements established within the town of Hudson's stormwater regulations.**

5. Do you own any adjacent parcels or easements for roadways across adjacent parcels which could be used for access to avoid a wetland crossing?

**No easements have been identified during the deed research for the creation and certification of the boundary plan by this office. The proposed wetland crossing is in the location that will cause minimal impacts to the wetlands and the associated buffers.**

6. Does a wetland crossing occur where it will result in the least amount of alteration to a wetland?

**Yes. The proposed wetland crossing is in the location of the existing driveway crossing. A waiver from the roadway geometry has been requested to allow for a reduction in curvature radius cross the wetland at the existing crossing. Without this waiver the road would cross the wetland in another location creating a new and larger impact area.**



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "A"

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

LeClair Drive Extension  
Subdivision and CUP – Initial Submittal

March 3, 2026

Page 2 of 3

7. Is preservation of upland areas adjacent to the impacted wetland a priority?

**Yes, The majority of the disturbances to the wetland buffer area is the for the roadway crossing.**

8. Can using an alternative crossing design such as a bridge, retaining wall, etc. decrease the width or area of wetland alteration?

**The proposed crossing is in a location that has already been impacted. From review of historic aerials the crossing has existed since before 1947.**

9. Does a proposed road crossing of a wetland exceed the minimum width acceptable to the Planning Board and can this be negotiated downwards?

**The roadway is at the minimum width allowed by the town engineering standards.**

10. Have you established that no reasonable alternative access from a public way to an upland is possible?

**Yes. See responses above to #8. Additionally, the wetland bisects the property. To reach the other side a crossing is required.**

11. Can the parking lot spaces be decreased?

**N/A. Parking areas are limited to driveways.**

12. Is the roadway designed in such a way that does not restrict the flow of water?

**Yes. The culvert has been designed to allow runoff to flow freely through the system.**

13. Is additional information needed to assess water quality impacts due to runoff?

**No.**

14. Is there an increase in other pollutants (e.g., heavy metals, turbidity, coli form) from streets and parking lots?

**No, the stormwater management system mitigates increases in pollutants.**

15. Is there a need to restrict or prohibit the use of pesticides and fertilizers?

**No. There are no known issues in this area that would require the restriction of either pesticides and/or fertilizers.**



**MERIDIAN**  
**LAND SERVICES, INC.**

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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LeClair Drive Extension  
Subdivision and CUP – Initial Submittal

March 3, 2026  
Page 3 of 3

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16. Is there a need to restrict the use of roadway salting?

**No. The road is intended to be turned over to the town. If the town wants to restrict the use of salt they are free to do so.**

**WAIVER REQUEST FORM**

Name of Subdivision/Site Plan: LeClair Drive Extension

Street Address: 12 LeClair Dr, Hudson NH

I Sam Foisie, P.E., Meridian Land Services, Inc hereby request that the Planning Board waive the requirements of item 289-18 C.(1) Horizontal and vertical curves. of the Hudson Land Use Regulations in reference to a plan presented by Sam Foisie, P.E., Meridian Land Services, Inc (name of surveyor and engineer) dated March 3, 2026 for property tax map(s) 147 and lot(s) 6 in the Town of Hudson, NH.

As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e., without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Land Use Regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

Subdivision of Land Regulations Section 289-18 C. Horizontal and vertical curves. (1) No horizontal curve shall have a center line radius of less than 150 feet except on a cul-de-sac.

To allow the horizontal curvature of 100' to better fit into the existing topography of the site.

The subject property one point of access via the existing road stubbed to the property, LeClair Drive. The property is bisected by a wetland that runs from the east property line to the west property line (Merrimack River). This wetland is in a small ravine that gets deeper the closer to the Merrimack River. There is an existing wetland crossing that is the most appropriate location to cross the wetland with the road extension.

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Signed:

Applicant or Authorized Agent



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "A"

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

### **Waiver Request Form – Attachment**

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations:  
(if additional space is needed please attach the appropriate documentation hereto):

The granting of this waiver is to create a better roadway design while meeting the spirit and intent of the regulations while simultaneously achieving the objectives of other sections of the Town of Hudsons zoning ordinance, ARTICLE IX Wetland Conservation District.

The extension of LeClair drive is to serve 7 lots on a dead-end roadway, making it a low volume road. The road is situated off a residential neighborhood. Vehicles turning onto LeClair Drive are starting at a slow rate of speed due to a 90-degree turning condition. With the road length of only 1,000 ft it is not expected for drivers to accelerate at a frequency to reach the speed limit of the roadway. Additionally, most of the traffic being local traffic with LeClair Drive being the destination, except for a few drivers traveling down LeClair drive due to a wrong turn or "sightseeing". The reduced curves act as a traffic calming device by forcing vehicles to drive at a slower speed than roads with a larger horizontal curve. This will make the neighborhood a safer community for the future residents.

The last purpose of the design curves is to align the roadway with the existing wetland crossing that has been in existence since before 1947. The purpose and objective of the Wetland Conservation District is protecting the wetlands.

*B. The purpose of the Wetland Conservation District is to protect the health, safety and general welfare of the public by promoting both the most appropriate use of land and by protecting wetland and surface water ecosystems and water quality in accordance with the goals and objectives of Hudson's Master Plan.*

Part of the criteria for the conditional use permit is to seek the least impactful location for a wetland crossing. By designing the roadway to use the existing crossing the impacts to the wetlands and associated buffers are minimized.

By granting this waiver the spirit and intent of the Land Use Regulations is maintained by creating a safe roadway and the purposes of the Wetland Conservation District are achieved.

**WAIVER REQUEST FORM**

Name of Subdivision/Site Plan: LeClair Drive Extension

Street Address: 12 LeClair Dr, Hudson NH

I Sam Foisie, P.E., Meridian Land Services, Inc hereby request that the Planning Board waive the requirements of item 289-18.R.(1)(b) PSidewalk of the Hudson Land Use Regulations in reference to a plan presented by Sam Foisie, P.E., Meridian Land Services, Inc (name of surveyor and engineer) dated March 3, 2026 for property tax map(s) 147 and lot(s) 6 in the Town of Hudson, NH.


As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e., without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Land Use Regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Signed:   
Applicant or Authorized Agent



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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www.MeridianLandServices.com

**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

### **Waiver Request Form – Attachment - HR 89-18. R(1)(b) Sidewalks**

As part of the Subdivision review process for the above referenced project, the following waivers are being requested from Town of Hudson Subdivision regulation. This request are to allow the applicant to construct a better project.

The applicant request relief from the **Subdivision of Land Regulations Section 289-18. R. Installation of improvements.**

#### R. Installation of improvements.

(1)The PLANNING BOARD shall weigh the burden that proposed DEVELOPMENT places on public facilities, infrastructure, sewers and amenities and shall require the installation of public improvements, both on-site and off-site, to compensate for this burden. Improvements may include, but are not limited to:

(a) Granite curbing.

(b) Sidewalk and STREET trees.

(c) Improvements to existing roadways and drainage.

(d) Traffic control devices.

(e) Open space.

(f) Recreational space.

(g) Moneys granted in lieu of land for recreational space, which shall be held by the Town in a nonlapsing fund for the future purchase and DEVELOPMENT of recreational space/facilities to serve this particular neighborhood/development.

(h) Improvements to nearby traffic corridors as warranted by the Town's cost allocation procedure traffic study.

(2)All requested improvements, whether on-site or off, shall be consistent with the standards enunciated by the New Hampshire Supreme Court and this legislature.

To allow for all for no sidewalk to be constructed

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

The project consists of constructing an 800' road off the existing 200' LeClair Dr. A dead end road supporting 7 lots does not justify the construction of sidewalks due to the volume of vehicle traffic and pedestrian traffic.

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):

The intent of the regulations is to create a safe roadway for vehicles and pedestrians. In this specific case the volume of vehicle traffic and pedestrian traffic does not create conflicts between the two uses to justify



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LeClair Dr Extension

May 13, 2026

Waiver Request Form – Attachment - HR 89-18. R(1)(b) Sidewalks

Page 2 of 2

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the expense of the sidewalk. This is similar to roadways are designed based on level of vehicle traffic, the need for the sidewalk is determined by volume of pedestrian traffic.

**WAIVER REQUEST FORM**

Name of Subdivision/Site Plan: LeClair Drive Extension

Street Address: 12 LeClair Dr, Hudson NH

I Sam Foisie, P.E., Meridian Land Services, Inc hereby request that the Planning Board waive the requirements of item 289-37. Plan schedule and form. of the Hudson Land Use Regulations in reference to a plan presented by Sam Foisie, P.E., Meridian Land Services, Inc (name of surveyor and engineer) dated March 3, 2026 for property tax map(s) 147 and lot(s) 6 in the Town of Hudson, NH.


As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e., without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Land Use Regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Signed:   
Applicant or Authorized Agent



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**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

### **Waiver Request Form – Attachment - Lot Phasing HR 289-37.A**

As part of the Subdivision review process for the above referenced project, the following waivers are being requested from Town of Hudson Subdivision regulation. This request are to allow the applicant to construct a better project.

The applicant request relief from the **Subdivision of Land Regulations Section 289-37. Plan schedule and form.**

In consonance with RSA 674:36, I and II, the minimum duration of time for total DEVELOPMENT and the extent to which a proposed SUBDIVISION may be developed in any given year shall conform at least to the schedule set forth below so that said minimum duration of time for total DEVELOPMENT shall not be less than the amount specified, and the maximum extent to which the SUBDIVISION may be developed in any given year shall not be more than the amount specified below.

<b>Number of LOTS Proposed</b>	<b>Length of Time (years)</b>	<b>Number of LOTS Given Final Approval in One Year (percent)</b>
Under 6	—	All
6 to 16	2	50%
17 to 30	3	30%
31 to 50	4	25%
51 to 100	5 or more	20%

To allow for all 7 lots (6 new lots and 1 existing lot) to be constructed and sold in one phase

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

The project consists of constructing an 800' road with water and sewer, which is a large up-front investment compared to the number of lots (6 new lots and 1 existing lot). To strictly follow the regulations, no more than 50% of the lots would not be allowed to be developed and/or sold in the first year. In this specific case only 3 lots would be allowed to be developed and/or sold in the first year, including the existing home. Although the remaining single-family home does not increase burden on town infrastructure. In the scenario for a 5-lot subdivision ,5 lots would be able to be able to be sold and/or constructed in the first year. This regulation creates an unnecessary hardship for a project that is immaterially greater than a 5-lot subdivision.



**MERIDIAN**  
**LAND SERVICES, INC.**

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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LeClair Dr Extension

Waiver Request Form – Attachment - Lot Phasing HR 289-37.A

May 13, 2026

Page 2 of 2

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Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations:  
(if additional space is needed please attach the appropriate documentation hereto):

The intent of the regulations is to have steady growth of residential lots so to not over burden town infrastructure. If this was a more typical subdivision, meaning did not include remaining lot with the single-family home, the increase in year one phasing from a 5-lot subdivision to these 6 new lots is only 1 lot. Adding one additional lot to the year one phasing is not a substantial increase and does not overburden the town. By granting this waiver this allows the developer to construct the project in an efficient manner.

**WAIVER REQUEST FORM**

Name of Subdivision/Site Plan: LeClair Drive Extension

Street Address: 12 LeClair Dr, Hudson NH

I Sam Foisie, P.E., Meridian Land Services, Inc hereby request that the Planning Board waive the requirements of item 2HR 289-20.C.1. & 290-5.A.4 of the Hudson Land Use Regulations in reference to a plan presented by Sam Foisie, P.E., Meridian Land Services, Inc (name of surveyor and engineer) dated March 3, 2026 for property tax map(s) 147 and lot(s) 6 in the Town of Hudson, NH.


As the aforementioned applicant, I, herein, acknowledge that this waiver is requested in accordance with the provisions set forth in RSA 674:36, II (n), i.e., without the Planning Board granting said waiver, it would pose an unnecessary hardship upon me (the applicant), and the granting of this waiver would not be contrary to the spirit and intent of the Land Use Regulations.

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):

See Attached

Signed:   
Applicant or Authorized Agent



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CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

### **Waiver Request Form – Attachment - HR 289-20.C.1. & 290-5.A.4**

As part of the Subdivision review process for the above referenced project, the following waivers are being requested from Town of Hudson Subdivision regulation. This request are to allow the applicant to construct a better project.

The applicant request relief from the **Subdivision of Land Regulations Section HR 289-20.C.1**

(1) No STORMWATER RUNOFF in excess of rates existing prior to new construction shall be allowed to be discharged onto a public way or into a public drainage system unless there is sufficient capacity to handle the additional runoff. All drainage shall be designed to achieve a zero-increase in runoff for both peak and volume where practicable.

To allow an increase rate into the existing LeClair Drive stormwater catch basin

The applicant request relief from the **Stormwater Regulations Section HR 290-5.A.4**

(4) Maintain existing groundwater recharge volume GRv in accordance with the NHDES Alteration of Terrain regulations (Env-Wq 1504.04) while accounting for the existing Hydrologic Soil Group (HSG) types. For sites where infiltration is limited or not practicable, the applicant must demonstrate that the project will not create or contribute to water quality impairment. All groundwater recharge systems shall require on-site test pit and percolation test data to be submitted as part of the review.

To allow for relief n

Hardship reason(s) for granting this waiver (if additional space is needed please attach the appropriate documentation hereto):

The hardship is due to the connection to the existing LeClair Dr. to maintain the suggested 2% minimum slopes requires the roadway to slope up as it enters the property. This causes the runoff to travel down the curbline into the existing LeClair dr drainage system. It is unable to divert this stormwater away from this drainage system and reduce the rate. This has a greater effect on smaller storm events due to the types of soils that are found onsite. However, in the larger storm event (50-year) the combined rates and volumes are a decrease.

Reason(s) for granting this waiver, relative to not being contrary to the spirit and intent of the Land Use Regulations: (if additional space is needed please attach the appropriate documentation hereto):



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "A"

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LeClair Dr Extension

Waiver Request Form – Attachment - HR 289-20.C.1. & 290-5.A.4

May 13, 2026

Page 2 of 2

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The intent of the regulations is to not cause adverse effects to downstream properties. In this scenario the increase in runoff rates and volumes are into a stormwater conveyance system and not to an abutting property that will be negatively affected.



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "B"

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

**March 3, 2026**

### **Subdivision Application**

**Conditional Use Permit Application: Wetland Conservation Overlay District**

## **Project Narrative**

### **I) INTRODUCTION**

The applicant, MR Lacasse Homes, LLC, has requested to be heard at the Hudson Planning Board for a review of a Subdivision Application and a Conditional Use Permit Application: Wetland Conservation Overlay District at Tax Map 147 - Lot 6. The project involves constructing approximately 800 LF +/- of roadway, utilities, and associated drainage improvements to support a 7 lot subdivision (6 new lots + 1 remaining lot).

### **II) EXISTING USE**

The property is currently a 12.5-acre parcel with one single family home situated along the Merrimack River.

### **III) SUBDIVISION**

The proposed application is to subdivide the parcel into 7 lot subdivision (6 new lots + 1 remaining lot). These lots comply with the underlying zoning, R-2 zoning. The lots have a minimum lot size of 43,560, exclusive of wetlands, flood plain, and steep slopes. The lots are proposed with a minimum frontage of 120 LF.

### **IV) STORMWATER MANAGEMENT**

The proposed disturbance is about 70,000 sf therefore not triggering a NHDES Alteration of Terrain stormwater permit; however, the site's stormwater has been designed to Env-Wq 1500: Alteration of Terrain and the stormwater ordinance outlined in Chapter 290 of the Town of Hudson Part 1: Administrative Legislation. T

### **V) ROADWAY**

The roadway has been designed to the Town of Hudson's subdivision regulations and engineering standards with the exception of the horizontal radius. The request for a reduction in roadway curvature is to utilize the existing wetland cross while still maintaining acceptable traffic safety. LeClair Drive is proposed to be extended to total length of 1,000 LF measured from the intersection of Shoreline Drive to the end of the proposed Cul-de-Sac. Per conversations with the Town Engineer, the roadway longitudinal grades have been increased to 2.0%, instead of the minimum allowed 1% to allow for better stormwater conveyance and increased tolerances during construction.

### **VI) UTILITIES**

The proposed lots are to be served by municipal water and sewer. Three of the proposed lots will have private low-pressure force main to convey the sanitary sewer beyond the wetland crossing into the extended gravity sewer. The remaining lot will remain on the existing well and septic system. The proposed lots will be served by underground power and cable.

### **VII) LANDSCAPING**

No landscaping is proposed.



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**LeClair Drive Extension**

MLS #: 12916.00

March 3, 2026

Page 2 of 2

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VIII) SITE LIGHTING

No roadway lighting is proposed.

# Planning Board Sign-off

Project Name		Map/Lot:	
Site Address:		Zone:	
		Due by:	

<b>Project Status</b>		<b>Ready for Approval</b>	<b>Awaiting Revisions</b>	<b>Approval with Stipulations</b>
<b>DEPARTMENT</b>	<b>INITIAL</b>			
FUSS & O'NEILL:				
ZONING:				
ASSESSING:				
ENGINEERING:				
PUBLIC WORKS:				
FIRE:				
POLICE:				

***Comments:***

# Planning Board Sign-off

Project Name		Map/Lot:	
Site Address:		Zone:	
		Due by:	

*Extended Comments:*



## TOWN OF HUDSON

### Development Services Department

12 School Street  
Hudson, New Hampshire 03051

Elvis Dhima, P.E., Development Services Director  
edhima@hudsonnh.gov · Tel: 603-886-6008 · Fax: 603-816-1291

To: Tim Malley, Chairman of the Planning Board  
Brooke Dubowik, Town Planner

From: Elvis Dhima, P.E., Director of Development Services  
Jason Twardosky, Director of Public Works

Date: April 27, 2026

Re: 12 LeClair Drive – Horizontal and Vertical Road Curvature

The Engineering Department and Public Works initially expressed concerns regarding this request and identified the following conditions that needed to be satisfied:

- a. The applicant must demonstrate that the proposed roadway geometry can adequately accommodate fire apparatus.
- b. All proposed driveways must meet the required sight distance standards.
- c. Public Works must confirm that no operational issues are anticipated during winter maintenance.

As of April 27, 2026, the applicant has satisfactorily addressed all three conditions. Accordingly, the Engineering Department and Public Works have no objection should the Planning Board choose to grant the requested waiver.



# TOWN OF HUDSON

## Conservation Commission



Carl Murphy, Chairman

Dillon Dumont, Selectmen Liaison

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12 School Street • Hudson, New Hampshire 03051 • Tel: 603-886-6008 • Fax: 603-816-1291

### **Motion to Recommend approval by the Planning Board of the Wetland/Wetland Buffer Conditional Use Permit Application related to the subject Subdivision Application**

**Date:**

**May 11, 2026**

**Case:**

**LeClair Drive Extension** – Conditional Use Permit Application within Wetland Conservation Overlay District

12 LeClair Dr., Hudson, NH; Map 147, Lot 6

Zone: Residential (R-2) & Wetland Conservation Overlay District

**Description of work to be performed:**

The project involves constructing approximately eight-hundred (800) linear-feet (LF) of roadway, utilities, and associated drainage improvements to support a proposed seven (7) lot subdivision. The proposed Subdivision Plan, if constructed as shown, will have a permanent wetland impact of 580 +/- square-feet (SF), a permanent buffer impact of 13,155 +/- SF and a temporary wetland buffer impact of 1,503 +/- SF.

**Motion to "Recommend":**

Mr. Dickinson moved to recommend a favorable acceptance by the Hudson Planning Board of the Conditional Use Permit application filed by representatives of MR Lacassee Homes, LLC, reference Tax Map 147, Lot 6, dated March 2, 2026, revised May 11, 2026. After application review, the Hudson Conservation Commission finds that the uses presented by the applicant, along with the proposed culvert head walls and associated site grading and drainage piping, comply with Town of Hudson Zoning Ordinance 334, Article IX- Wetland Conservation Overlay District, paragraphs 334-36(C) 2 through 4, and 334-37. This favorable acceptance is contingent upon Planning Board approval of the proposed subdivision plan along with the recommendations and stipulations listed below:

**General recommendations by the Hudson Conservation Commission to the Planning Board:**

1. A stipulation and/or note should be added to the plan(s) that states: “During construction and restoration erosion control barriers shall be installed and maintained, to the satisfaction of the Town Engineer, along the limits of disturbance within, and/or adjacent to, any wetland(s) and/or

## Attachment "D"

wetland buffer(s).”

2. A stipulation and/or note should be added to the plan(s) that states: "Construction vehicles (non-refueling vehicles) shall not be parked within fifty (50) feet of any wetland overnight".
3. A stipulation and/or note should be added to the plan(s) that states: "Refueling vehicles shall not be parked overnight or left unattended within fifty (50) feet of any wetland".
4. A stipulation and/or note should be added to the plan(s) that states: "Stockpiling of construction materials is not allowed within the wetland or wetland buffer areas of the site or in areas designated for permanent conservation".
5. It is recommended that the applicant install approved “Do Not Cut/Do Not Disturb” town conservation markers along the conservation districts boundaries (fifty (50) foot wetland buffer).
6. A stipulation and/or note should be added to the plan(s) that states: "Any vegetation associated with post-construction BMPs and slope restoration including storm water management area shall be suitably established to withstand erosion and shall be inspected by the Town Engineer and the property owner shall be required to provide a suitable replacement for any vegetation not suitably established during the relevant monitoring period.”
7. A stipulation and/or note should be added to the plan(s) that states: "Fertilizers utilized for landscaping and lawn care shall be slow release, low-nitrogen types (<5%), and shall not be used within fifty (50) feet of wetland resource areas. Pesticides and herbicides shall not be used within fifty (50) feet of a wetland resource area.”
8. It is recommended to specify native shrub plantings along proposed slopes facing the wetlands. Species to be selected shall be salt-tolerant and appropriate for the respective slopes.

\*This motion is based on the plan(s) submitted by the applicant. It is recommended that if changes are made to the plan(s) that result in additional impacts to the wetland and/or wetland buffer area(s), the plan(s) be resubmitted to the Conservation Commission for further review.

### **Motion seconded by:**

Mr. Cameron

Motion X carried or \_\_\_ failed (check one). Vote count: 5 / 0 / 0 (yea/nay/abstain).

Respectfully submitted,



Christopher Cameron  
HCC Clerk



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "E"

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Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

## PROJECT STORMWATER MANAGEMENT REPORT

### SUBDIVISION OF TAX MAP 147 LOT 6

Leclair Drive

Tax Map 147 Lot 6

Hudson, New Hampshire 03051

Prepared for:

MR Lacasse Homes, LLC

9 Scenic Lane

Hudson, New Hampshire 03051

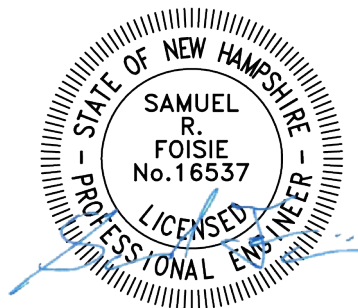
Owner of Record:

Ronald O. Leclair Revocable Trust

C/O Ron Leclair

12 Leclair Drive

Hudson, New Hampshire 03051



May 12, 2026

Prepared by: Noah C. Greene, EIT

Reviewed by: Samuel R. Foisie, PE



## Index

Drainage Narrative

Web Soil Survey - Natural Resource Conservation Service

Rainfall Totals – Northeast Regional Climate Center

NHDES BMP Sheets

### **Section 1.1: Existing Conditions – Site Design**

Routing Diagram

Area and Soils Listings

2-, 10-, 25- and 50-year Storm Nodes

### **Section 1.2: Existing Conditions – Full Summary**

25- and 50-year Storm Full Summary

### **Section 2.1: Developed Conditions – Site Design**

Routing Diagram

Area and Soils Listings

2-, 10-, 25- and 50-year Storm Nodes

50-year Storm Frozen Ground Conditions

### **Section 2.2: Developed Conditions – Full Summary**

25- and 50-year Storm Full Summary

### **Section 3.1: Drainage Plans**

Existing Conditions – Site Design Plan (See attached)

Developed Conditions – Site Design Plan (See attached)





# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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## **Storm Water Management Report Subdivision of Tax Map 147 Lot 6 Map 147 Lot 6 12 Leclair Drive Hudson, New Hampshire 03051**

### **I. Introduction**

These drainage calculations have been prepared in support of the above referenced development project located on Tax Map 147 Lot 6 in Hudson, New Hampshire. The development will subdivide the parcel into six (6) additional lots, seven (7) lots total. The development of the lot includes extending Leclair Drive to be 1,000 FT and all site improvements required to support the development of the lot.

### **II. Site Description**

The subject parcel is located east of the Merrimack River with Webster Street to the west and Shoreline Drive to the south. The site exists as a single-family residential lot that is accessed via a gravel driveway. The topography of the site generally slopes towards the Merrimack River with a tier 1 stream splitting the site.

The rainfall data utilized in calculations have been determined by the Northeast Regional Climate Center Extreme Precipitation Data Tables as follows: 2-Year=2.93 Inches, 10-Year=4.42 Inches, 25-Year=5.58 Inches, and 50-Year=6.66 Inches. See attached Precipitation Tables.

The soils onsite are depicted via the Natural Resources Conservation Service (NRCS) Web Soil Survey and are identified as Occum fine sandy loam, high bottom (HSG B) and Windsor Loamy Sand (HSG A). See attached NRCS Soil Map.



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "E"

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### III. Drainage Design

To meet the requirements of the Town of Hudson, stormwater generated by the site is conveyed to the infiltration basins shown on the plans via a combination of sheet flow and closed drainage. The infiltration basins utilize a sediment forebay for pretreatment. The site was analyzed for the 2-, 10-, 25- and 50-year storm events. The ponds utilize infiltration and an outlet control riser structure to attenuate peak flows. The basin was designed to be as low impact as possible by utilizing the natural slope of the site and location the stormwater basins in a natural location. To accommodate for frozen ground conditions the 50-year storm was analyzed in HydroCAD with an AMC factor of 4. During this event the stormwater systems can safely mitigate the generated runoff.

Four (4) observation points have been modeled to compare the peak flows from the pre-development and post-development conditions. Observation Point 1 (OP1) is located at the edge of the Merrimack River. Observation Point 2 (OP2) is a low spot in the topography located north of the existing house adjacent to the abutting lot. Observation Point 3 (OP3) is the southernmost lot line and represents the portion of the site that flows to the abutting lots. Observation point 4 (OP4) represents the portion of the site draining to the existing stretch of Leclair Drive. No portion of the site drains to the existing roadway in the predevelopment condition. In the developed condition a short section of the proposed roadway will be conveyed to the existing catch basins and has been modeled separately to show the reduction of rates to the abutting property lines. The results of the analysis are denoted in the "Summary" section of this report.

The infiltration rate utilized in the attached calculations have been determined utilizing the methods required per ENV-wq 1504.14.e(2). The tests were conducted in the locations of both infiltration basins with the test at Basin 1 yielding an average rate of 1.10 inches per hour. The test at basin 2 yielded an average design rate of 3.30 inches per hour. After applying the required factor of safety of 2, the design infiltration rates are 0.55 inches per hour and 1.65 inches per hour, respectively.

### IV. Methodology

The quantity of runoff and the conveyance of that flow through the site are determined using the software package HydroCAD 10.20-9a by HydroCAD Software Solutions, LLC. HydroCAD is a computer aided design program for modeling storm water hydrology based on the Soil Conservation Service (SCS) TR-55 method combined with standard hydraulics calculations.



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### V. Summary

The proposed drainage design effectively mitigates runoff during the analyzed storm events. Runoff from the proposed development is effectively collected, treated, recharged and discharged. The peak volume of stormwater generated is reduced and in accordance with the NHDES AoT groundwater recharge requirements. Summary tables comparing pre- and post-development peak runoff rates and volumes are shown below.

At Observation Points 1, 2, and 3 it was determined that there was a net decrease in stormwater rates and volumes. As such, there will be no impact to downstream properties. At Observation Point 4 the increase in outflow from the predevelopment conditions is generated from the proposed portion of Leclair Drive that cannot be captured and flows to the existing catch basins along Leclair Drive. As such, this generated runoff will be captured and conveyed to the existing stormwater system treating the road. The increase in runoff will have negligible effects on the existing system.

*Table 1: Peak Rate of Stormwater Discharge Summary*

Location	Q2 (CFS)			Q10 (CFS)			Q25 (CFS)			Q50 (CFS)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
OP1	0.86	0.84	-0.02	4.63	4.55	-0.08	8.95	8.50	-0.45	13.93	12.87	-1.06
OP2	0.18	0.18	0.00	0.98	0.96	-0.02	1.82	1.79	-0.03	2.71	2.68	-0.03
OP3	0.28	0.25	-0.03	1.37	1.20	-0.17	2.50	2.19	-0.31	3.67	3.22	-0.45
OP4	0.00	0.35	0.35	0.00	0.68	0.68	0.00	0.95	0.95	0.00	1.20	1.20

*Table 2: Peak Volume of Stormwater Discharge Summary*

Location	Q2 (CFS)			Q10 (CFS)			Q25 (CFS)			Q50 (CFS)		
	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ	Pre	Post	Δ
OP1	0.161	0.145	-0.016	0.597	0.500	-0.097	1.117	0.950	-0.167	1.709	1.544	-0.165
OP2	0.032	0.032	0.000	0.102	0.100	-0.002	0.172	0.169	-0.003	0.246	0.242	-0.004
OP3	0.046	0.041	-0.005	0.141	0.124	-0.017	0.236	0.208	-0.028	0.336	0.295	-0.041
OP4	0.00	0.025	0.025	0.00	0.048	0.048	0.00	0.068	0.068	0.00	0.087	0.087





<b>MLS Project Number</b>	12916.01	<b>Culvert Outlet Protection</b>
<b>Project Name</b>	Division of Tax Map 147 Lc	
<b>Date</b>	5/11/26	
<b>Calculated By</b>		
<b>Revised Date</b>		
<b>Revised By</b>		

Riprap Apron								
<b>Equations</b>	If $T_w < Dia/2$ then $L = 1.8Q/Dia^{1.5} + 7Dia$				<u>Note:</u> For outlets to flat area with no defined channel. Otherwise, $W_2 = W_1$ .			
	If $T_w \Rightarrow Dia/2$ then $L = 3Q/Dia^{1.5} + 7Dia$ .							
	$W_1$ at Outlet = $3Dia$ .							
	$W_2$ at Downstream edge, If $T_w < Dia/2 = 3Dia + L$							
	$W_2$ at Downstream edge, If $T_w \Rightarrow Dia/2 = 3Dia + 0.4L$							
<b>Notes</b>	1. This spreadsheet is based on the December 2008 Volume 2 "Stormwater Management Manual" for New Hampshire							
	2. Fifty percent by weight of the riprap mixture shall be smaller than the median size stone designated as d50. The largest stone size in the mixture shall be 1.5 times the d50 size.							
<b>Design Storm:</b>		<b>10 Year</b>		<b>Calculations</b>				
<b>Location</b>	Q	Dia. Pipe	$T_w$	<b>Length</b>	<b>Width</b>		<b>Stone Size</b>	
	(cfs)	(ft)	(ft)	(ft)	<b>W1 (ft)</b>	<b>W2 (ft)</b>	<b>d50 (in)</b>	<b>Thickness (in)</b>
				#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!
				#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!
				#DIV/0!	0	#DIV/0!	#DIV/0!	#DIV/0!

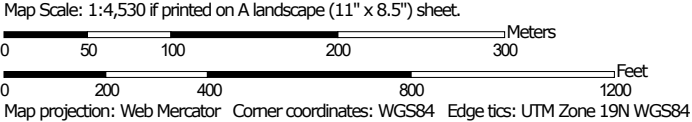
Scour Hole								
<b>Equations</b>	Depth = $0.5d$							
	Length = $3d + 6(\text{Depth})$							
	Width = $2d + 6(\text{Depth})$							
<b>Design Storm:</b>		<b>10 Year</b>		<b>Calculations</b>				
<b>Location</b>	Q	Dia. Pipe	$T_w$	<b>Depth</b>	<b>Length</b>	<b>Width</b>	<b>Stone Size</b>	
	(cfs)	(ft)	(ft)	(ft)	(ft)	(ft)	<b>d50 (in)</b>	<b>Thickness (in)</b>
FES-A	0.00	1.3	0.01	0.63	7.50	6.25	4	8
FES-B	0.56	1.3	0.89	0.63	7.50	6.25	4	8
FES-D	0.23	1.3	0.42	0.63	7.50	6.25	4	8
FES-E	0.00	1.3	0.01	0.63	7.50	6.25	4	8




Hydrologic Soil Group—Hillsborough County, New Hampshire, Eastern Part



Soil Map may not be valid at this scale.











**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


**Water Features**

-  Streams and Canals





**Transportation**

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

**Background**

-  Aerial Photography

**Other Legend Items:**

-  C
-  C/D
-  D
-  Not rated or not available

**MAP INFORMATION**

The soil surveys that comprise your AOI were mapped at 1:20,000.

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

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

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

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

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

Soil Survey Area: Hillsborough County, New Hampshire, Eastern Part  
 Survey Area Data: Version 28, Sep 9, 2025

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.

## Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
AgA	Agawam fine sandy loam, 0 to 3 percent slopes	B	0.0	0.0%
DeA	Deerfield loamy fine sand, 0 to 3 percent slopes	A	0.2	0.3%
Om	Occum fine sandy loam, high bottom	B	27.0	30.3%
So	Scarboro mucky fine sandy loam, 0 to 3 percent slopes	A/D	2.4	2.6%
Su	Suncook loamy fine sand	A	0.9	1.0%
W	Water (less than 40 acres)		15.0	16.9%
WdA	Windsor loamy sand, 0 to 3 percent slopes	A	14.0	15.7%
WdB	Windsor loamy sand, 3 to 8 percent slopes	A	14.4	16.1%
WdC	Windsor loamy sand, 8 to 15 percent slopes	A	6.3	7.1%
WdD	Windsor loamy sand, 15 to 35 percent slopes	A	8.9	10.0%
<b>Totals for Area of Interest</b>			<b>89.1</b>	<b>100.0%</b>

## Description

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

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

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

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

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

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

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

## Rating Options

*Aggregation Method:* Dominant Condition

*Component Percent Cutoff:* None Specified

*Tie-break Rule:* Higher

# Extreme Precipitation Tables

## Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point	
Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	42.786 degrees North
Longitude	71.453 degrees West
Elevation	30 feet
Date/Time	Wed Feb 25 2026 13:36:36 GMT-0500 (Eastern Standard Time)

### Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.27	0.42	0.52	0.68	0.85	1.07	1yr	0.73	1.01	1.24	1.55	1.95	2.47	2.71	1yr	2.18	2.61	3.03	3.71	4.32	1yr
2yr	0.33	0.51	0.64	0.84	1.05	1.32	2yr	0.91	1.21	1.52	1.90	2.36	2.93	3.26	2yr	2.60	3.14	3.64	4.36	4.95	2yr
5yr	0.39	0.61	0.77	1.03	1.31	1.66	5yr	1.13	1.51	1.93	2.40	2.99	3.70	4.15	5yr	3.28	3.99	4.61	5.47	6.18	5yr
10yr	0.44	0.69	0.88	1.19	1.55	1.98	10yr	1.34	1.79	2.31	2.88	3.58	4.42	4.98	10yr	3.91	4.79	5.53	6.50	7.31	10yr
25yr	0.52	0.83	1.06	1.46	1.94	2.50	25yr	1.67	2.24	2.91	3.66	4.54	5.58	6.34	25yr	4.94	6.10	7.02	8.17	9.13	25yr
50yr	0.59	0.95	1.21	1.70	2.30	3.00	50yr	1.98	2.65	3.51	4.40	5.44	6.66	7.61	50yr	5.90	7.32	8.42	9.71	10.81	50yr
100yr	0.68	1.10	1.41	2.00	2.72	3.57	100yr	2.35	3.15	4.19	5.26	6.50	7.96	9.15	100yr	7.04	8.80	10.09	11.54	12.80	100yr
200yr	0.77	1.26	1.63	2.34	3.23	4.27	200yr	2.79	3.73	5.01	6.31	7.79	9.51	11.01	200yr	8.42	10.58	12.10	13.73	15.17	200yr
500yr	0.93	1.53	1.99	2.89	4.06	5.39	500yr	3.50	4.68	6.36	8.00	9.89	12.05	14.05	500yr	10.67	13.51	15.40	17.29	18.99	500yr

### Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.22	0.34	0.42	0.56	0.69	0.80	1yr	0.60	0.78	1.06	1.32	1.67	2.32	2.56	1yr	2.06	2.46	2.76	3.30	3.92	1yr
2yr	0.31	0.49	0.60	0.81	1.00	1.20	2yr	0.86	1.17	1.37	1.78	2.29	2.87	3.19	2yr	2.54	3.07	3.56	4.25	4.85	2yr
5yr	0.36	0.55	0.68	0.94	1.19	1.41	5yr	1.03	1.38	1.62	2.10	2.68	3.48	3.90	5yr	3.08	3.75	4.32	5.14	5.81	5yr
10yr	0.39	0.60	0.75	1.05	1.35	1.60	10yr	1.17	1.56	1.81	2.38	3.03	4.02	4.53	10yr	3.55	4.36	5.01	5.92	6.64	10yr
25yr	0.45	0.68	0.84	1.21	1.59	1.87	25yr	1.37	1.83	2.13	2.80	3.53	4.85	5.50	25yr	4.30	5.29	6.12	7.16	7.88	25yr
50yr	0.48	0.74	0.92	1.32	1.78	2.12	50yr	1.53	2.07	2.41	3.18	3.97	5.62	6.39	50yr	4.97	6.14	7.11	8.26	8.99	50yr
100yr	0.53	0.80	1.00	1.45	1.99	2.39	100yr	1.71	2.34	2.72	3.49	4.47	6.43	7.43	100yr	5.69	7.14	8.27	9.54	10.23	100yr
200yr	0.58	0.87	1.11	1.60	2.23	2.71	200yr	1.93	2.65	3.06	3.95	5.07	7.42	8.63	200yr	6.57	8.30	9.64	11.02	11.64	200yr
500yr	0.66	0.98	1.26	1.83	2.60	3.21	500yr	2.24	3.14	3.61	4.67	5.99	8.96	10.57	500yr	7.93	10.16	11.81	13.37	13.79	500yr

### Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.31	0.48	0.58	0.78	0.96	1.12	1yr	0.83	1.10	1.27	1.65	2.09	2.61	2.86	1yr	2.31	2.75	3.31	4.09	4.65	1yr
2yr	0.35	0.54	0.67	0.91	1.12	1.31	2yr	0.96	1.28	1.48	1.92	2.46	3.02	3.36	2yr	2.67	3.23	3.74	4.46	5.11	2yr
5yr	0.44	0.67	0.83	1.14	1.45	1.66	5yr	1.25	1.63	1.89	2.42	3.03	3.98	4.43	5yr	3.52	4.26	4.90	5.79	6.52	5yr
10yr	0.52	0.81	1.00	1.39	1.80	2.03	10yr	1.56	1.98	2.29	2.88	3.59	4.91	5.46	10yr	4.34	5.25	6.04	7.07	7.89	10yr
25yr	0.68	1.03	1.28	1.83	2.40	2.63	25yr	2.07	2.57	2.96	3.65	4.47	6.49	7.21	25yr	5.74	6.93	7.96	9.19	10.18	25yr
50yr	0.82	1.24	1.55	2.23	3.00	3.21	50yr	2.59	3.14	3.59	4.36	5.28	8.02	8.91	50yr	7.10	8.57	9.81	11.20	12.36	50yr
100yr	1.00	1.51	1.89	2.73	3.74	3.91	100yr	3.23	3.83	4.37	5.38	6.25	9.84	11.01	100yr	8.70	10.59	12.08	13.67	15.01	100yr
200yr	1.21	1.82	2.31	3.35	4.67	4.77	200yr	4.03	4.66	5.29	6.45	7.39	12.15	13.61	200yr	10.75	13.09	14.87	16.68	18.25	200yr
500yr	1.58	2.36	3.03	4.40	6.26	6.19	500yr	5.40	6.05	6.85	8.23	9.23	16.09	18.00	500yr	14.24	17.30	19.58	21.71	23.64	500yr



# Attachment "E"

## INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

**Type/Node Name:** Stormwater Pond IB-1

Enter the type of infiltration practice (such as basin, trench) and the node name in the drainage analysis, if applicable.

<b>Yes</b>		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
2.03	ac	A = Area draining to the practice	
0.20	ac	A <sub>I</sub> = Impervious area draining to the practice	
0.10	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.14	unitless	R <sub>v</sub> = Runoff coefficient = 0.05 + (0.9 x I)	
0.28	ac-in	WQV = 1" x R <sub>v</sub> x A	
1,030	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
257	cf	25% x WQV (check calc for sediment forebay volume)	
Forebay		Method of pretreatment? (not required for clean or roof runoff)	
361	cf	V <sub>SED</sub> = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
2,633	cf	V = Volume <sup>1</sup> (attach a stage-storage table)	≥ WQV
752	sf	A <sub>SA</sub> = Surface area of the bottom of the pond	
0.55	iph	K <sub>sat</sub> <sub>DESIGN</sub> = Design infiltration rate <sup>2</sup>	
29.9	hours	I <sub>DRAIN</sub> = Drain time = V / (A <sub>SA</sub> * I <sub>DESIGN</sub> )	≤ 72-hrs
119.00	feet	E <sub>BTM</sub> = Elevation of the bottom of the basin	
115.90	feet	E <sub>SHWT</sub> = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
115.90	feet	E <sub>ROCK</sub> = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.10	feet	D <sub>SHWT</sub> = Separation from SHWT	≥ * <sup>3</sup>
3.1	feet	D <sub>ROCK</sub> = Separation from bedrock	≥ * <sup>3</sup>
N/A	ft	D <sub>amend</sub> = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
N/A	ft	D <sub>T</sub> = Depth of trench, if trench proposed	4 - 10 ft
N/A	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
N/A		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. <sup>4</sup>	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥3:1
120.43	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
121.53	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
122.00	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? <sup>5</sup>	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

1. Volume below the lowest invert of the outlet structure and excludes forebay volume
2. K<sub>sat</sub><sub>DESIGN</sub> includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
3. 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
4. Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
5. If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

**Designer's Notes:** \_\_\_\_\_

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12916DV01C

Type III 24-hr 10-Year Rainfall=4.42"

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## Stage-Area-Storage for Pond 1.3P: Sediment Forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
119.00	61	0	121.65	453	617
119.05	65	3	121.70	463	640
119.10	70	7	121.75	473	663
119.15	74	10	121.80	483	687
119.20	79	14	121.85	493	711
119.25	83	18	121.90	503	736
119.30	88	22	121.95	513	762
119.35	93	27	122.00	<b>523</b>	<b>788</b>
119.40	98	32			
119.45	104	37			
119.50	109	42			
119.55	115	48			
119.60	120	53			
119.65	126	60			
119.70	132	66			
119.75	138	73			
119.80	145	80			
119.85	151	87			
119.90	158	95			
119.95	164	103			
120.00	171	111			
120.05	178	120			
120.10	185	129			
120.15	193	139			
120.20	200	149			
120.25	207	159			
120.30	215	169			
120.35	223	180			
120.40	231	192			
120.45	239	203			
120.50	247	215			
120.55	256	228			
120.60	264	241			
120.65	273	254			
120.70	281	268			
120.75	290	283			
120.80	299	297			
120.85	309	313			
120.90	318	328			
120.95	327	344			
<b>121.00</b>	<b>337</b>	<b>361</b>			
121.05	345	378			
121.10	354	395			
121.15	362	413			
121.20	371	432			
121.25	380	450			
121.30	389	470			
121.35	397	489			
121.40	407	509			
121.45	416	530			
121.50	425	551			
121.55	434	572			
121.60	444	594			

12916DV01C

Type III 24-hr 10-Year Rainfall=4.42"

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**Stage-Area-Storage for Pond 1P: Stormwater Management Pond IB-1**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
119.00	752	0	121.65	1,431	2,845
119.05	763	38	121.70	1,446	2,917
119.10	774	76	121.75	1,461	2,989
119.15	785	115	121.80	1,476	3,063
119.20	796	155	121.85	1,491	3,137
119.25	807	195	121.90	1,506	3,212
119.30	818	235	121.95	1,522	3,288
119.35	829	277	122.00	1,537	3,364
119.40	841	318	122.05	1,558	3,441
119.45	852	361	122.10	1,579	3,520
119.50	864	404	122.15	1,599	3,599
119.55	875	447	122.20	1,621	3,680
119.60	887	491	122.25	1,642	3,761
119.65	899	536	122.30	1,663	3,844
119.70	910	581	122.35	1,685	3,928
119.75	922	627	122.40	1,706	4,012
119.80	934	673	122.45	1,728	4,098
119.85	946	720	122.50	1,750	4,185
119.90	958	768	122.55	1,772	4,273
119.95	971	816	122.60	1,794	4,363
120.00	983	865	122.65	1,817	4,453
120.05	995	914	122.70	1,839	4,544
120.10	1,008	964	122.75	1,862	4,637
120.15	1,020	1,015	122.80	1,885	4,730
120.20	1,033	1,066	122.85	1,907	4,825
120.25	1,045	1,118	122.90	1,931	4,921
120.30	1,058	1,171	122.95	1,954	5,018
120.35	1,071	1,224	123.00	<b>1,977</b>	<b>5,116</b>
120.40	1,084	1,278			
120.45	1,097	1,333			
120.50	1,110	1,388			
120.55	1,123	1,443			
120.60	1,136	1,500			
120.65	1,149	1,557			
120.70	1,163	1,615			
120.75	1,176	1,673			
120.80	1,190	1,733			
120.85	1,203	1,792			
120.90	1,217	1,853			
120.95	1,231	1,914			
121.00	1,244	1,976			
121.05	1,258	2,038			
121.10	1,272	2,102			
121.15	1,286	2,166			
121.20	1,301	2,230			
121.25	1,315	2,296			
121.30	1,329	2,362			
121.35	1,343	2,429			
121.40	1,358	2,496			
121.45	1,372	2,564			
121.50	1,387	2,633			
121.55	1,402	2,703			
121.60	1,416	2,774			

## INFILTRATION PRACTICE CRITERIA (Env-Wq 1508.07)

**Type/Node Name: Stormwater Pond IB-2**

Enter the type of infiltration practice (such as basin, trench) and the node name in the drainage analysis, if applicable.

<b>Yes</b>		Have you reviewed Env-Wq 1508.07(a) to ensure that infiltration is allowed?	← yes
1.40	ac	A = Area draining to the practice	
0.24	ac	$A_I$ = Impervious area draining to the practice	
0.17	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.21	unitless	$R_v$ = Runoff coefficient = $0.05 + (0.9 \times I)$	
0.29	ac-in	$WQV = 1'' \times R_v \times A$	
1,038	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
260	cf	25% x WQV (check calc for sediment forebay volume)	
	Forebay	Method of pretreatment? (not required for clean or roof runoff)	
262	cf	$V_{SED}$ = Sediment forebay volume, if used for pretreatment	≥ 25%WQV
2,980	cf	V = Volume <sup>1</sup> (attach a stage-storage table)	≥ WQV
1,948	sf	$A_{SA}$ = Surface area of the bottom of the pond	
1.65	iph	$K_{SAT\_DESIGN}$ = Design infiltration rate <sup>2</sup>	
3.9	hours	$I_{DRAIN}$ = Drain time = $V / (A_{SA} \times I_{DESIGN})$	≤ 72-hrs
121.70	feet	$E_{BTM}$ = Elevation of the bottom of the basin	
118.67	feet	$E_{SHWT}$ = Elevation of SHWT (if none found, enter the lowest elevation of the test pit)	
118.67	feet	$E_{ROCK}$ = Elevation of bedrock (if none found, enter the lowest elevation of the test pit)	
3.03	feet	$D_{SHWT}$ = Separation from SHWT	≥ * <sup>3</sup>
3.0	feet	$D_{ROCK}$ = Separation from bedrock	≥ * <sup>3</sup>
N/A	ft	$D_{amend}$ = Depth of amended soil, if applicable due high infiltration rate	≥ 24"
N/A	ft	$D_T$ = Depth of trench, if trench proposed	4 - 10 ft
N/A	Yes/No	If a trench or underground system is proposed, has observation well been provided?	← yes
N/A		If a trench is proposed, does material meet Env-Wq 1508.07(k)(2) requirements. <sup>4</sup>	← yes
Yes	Yes/No	If a basin is proposed, Is the perimeter curvilinear, and basin floor flat?	← yes
3.0	:1	If a basin is proposed, pond side slopes.	≥ 3:1
122.78	ft	Peak elevation of the 10-year storm event (infiltration can be used in analysis)	
123.12	ft	Peak elevation of the 50-year storm event (infiltration can be used in analysis)	
123.50	ft	Elevation of the top of the practice (if a basin, this is the elevation of the berm)	
YES		10 peak elevation ≤ Elevation of the top of the trench? <sup>5</sup>	← yes
YES		If a basin is proposed, 50-year peak elevation ≤ Elevation of berm?	← yes

- Volume below the lowest invert of the outlet structure and excludes forebay volume
- $K_{SAT\_DESIGN}$  includes a factor of safety. See Env-Wq 1504.14 for requirements for determining the infiltr. rate
- 1' separation if treatment not required; 4' for treatment in GPAs & WSIPAs; & 3' in all other areas.
- Clean, washed well graded diameter of 1.5 to 3 inches above the in-situ soil.
- If 50-year peak elevation exceeds top of trench, the overflow must be routed in HydroCAD as secondary discharge.

**Designer's Notes:**


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12916DV01C

Type III 24-hr 10-Year Rainfall=4.42"

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## Stage-Area-Storage for Pond 2.1P: Sediment Forebay

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
121.70	191	0	122.76	348	283
121.72	194	4	122.78	351	290
121.74	196	8	122.80	354	297
121.76	199	12	122.82	356	304
121.78	201	16	122.84	359	311
121.80	204	20	122.86	362	318
121.82	207	24	122.88	365	325
121.84	209	28	122.90	367	333
121.86	212	32	122.92	370	340
121.88	215	36	122.94	373	347
121.90	217	41	122.96	376	355
121.92	220	45	122.98	379	363
121.94	223	50	123.00	382	370
121.96	226	54	123.02	384	378
121.98	228	59	123.04	387	385
122.00	231	63	123.06	390	393
122.02	234	68	123.08	393	401
122.04	237	73	123.10	396	409
122.06	240	77	123.12	399	417
122.08	243	82	123.14	402	425
122.10	245	87	123.16	405	433
122.12	248	92	123.18	408	441
122.14	251	97	123.20	411	449
122.16	254	102	123.22	413	458
122.18	257	107	123.24	416	466
122.20	260	112	123.26	419	474
122.22	263	118	123.28	422	483
122.24	266	123	123.30	425	491
122.26	269	128	123.32	428	500
122.28	272	134	123.34	431	508
122.30	275	139	123.36	434	517
122.32	278	145	123.38	438	526
122.34	281	150	123.40	441	534
122.36	285	156	123.42	444	543
122.38	288	162	123.44	447	552
122.40	291	167	123.46	450	561
122.42	294	173	123.48	453	570
122.44	297	179	123.50	<b>456</b>	<b>579</b>
122.46	300	185			
122.48	304	191			
122.50	307	197			
122.52	310	203			
122.54	313	210			
122.56	317	216			
122.58	320	222			
122.60	323	229			
122.62	327	235			
122.64	330	242			
122.66	333	248			
122.68	337	255			
122.70	340	262			
122.72	343	269			
122.74	345	276			

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Type III 24-hr 10-Year Rainfall=4.42"

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**Stage-Area-Storage for Pond 2P: Stormwater Management Pond IB-2**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
121.70	1,948	0	122.76	2,515	2,360
121.72	1,958	39	122.78	2,526	2,410
121.74	1,968	78	122.80	2,537	2,461
121.76	1,978	118	122.82	2,548	2,512
121.78	1,988	157	122.84	2,559	2,563
121.80	1,999	197	122.86	2,570	2,614
121.82	2,009	237	122.88	2,581	2,666
121.84	2,019	278	122.90	2,592	2,718
121.86	2,029	318	122.92	2,603	2,770
121.88	2,040	359	122.94	2,614	2,822
121.90	2,050	400	122.96	2,625	2,874
121.92	2,060	441	122.98	2,636	2,927
121.94	2,070	482	123.00	2,647	2,980
121.96	2,081	524	123.02	2,659	3,033
121.98	2,091	565	123.04	2,670	3,086
122.00	2,102	607	123.06	2,681	3,139
122.02	2,112	649	123.08	2,692	3,193
122.04	2,123	692	123.10	2,703	3,247
122.06	2,133	734	123.12	2,715	3,301
122.08	2,144	777	123.14	2,726	3,356
122.10	2,154	820	123.16	2,737	3,410
122.12	2,165	863	123.18	2,749	3,465
122.14	2,175	907	123.20	2,760	3,520
122.16	2,186	950	123.22	2,771	3,576
122.18	2,197	994	123.24	2,783	3,631
122.20	2,207	1,038	123.26	2,794	3,687
122.22	2,218	1,082	123.28	2,806	3,743
122.24	2,229	1,127	123.30	2,817	3,799
122.26	2,240	1,172	123.32	2,828	3,855
122.28	2,250	1,216	123.34	2,840	3,912
122.30	2,261	1,262	123.36	2,852	3,969
122.32	2,272	1,307	123.38	2,863	4,026
122.34	2,283	1,352	123.40	2,875	4,084
122.36	2,294	1,398	123.42	2,886	4,141
122.38	2,305	1,444	123.44	2,898	4,199
122.40	2,316	1,490	123.46	2,910	4,257
122.42	2,327	1,537	123.48	2,921	4,315
122.44	2,338	1,584	123.50	<b>2,933</b>	<b>4,374</b>
122.46	2,349	1,630			
122.48	2,360	1,677			
122.50	2,371	1,725			
122.52	2,382	1,772			
122.54	2,393	1,820			
122.56	2,404	1,868			
122.58	2,415	1,916			
122.60	2,427	1,965			
122.62	2,438	2,013			
122.64	2,449	2,062			
122.66	2,460	2,111			
122.68	2,472	2,161			
122.70	2,483	2,210			
122.72	2,494	2,260			
122.74	2,505	2,310			





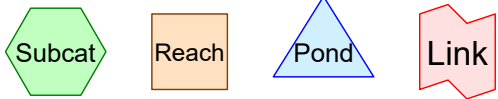
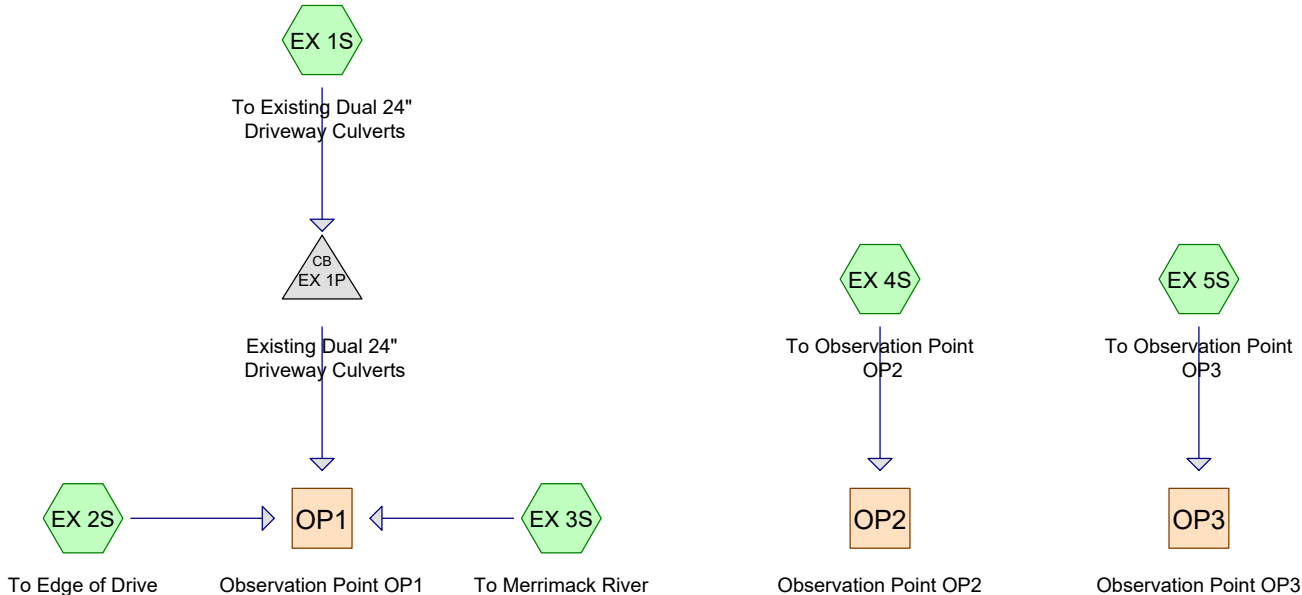
## **Section 1.1: Existing Conditions**

Routing Diagram

Area and Soils Listings

2-, 10-, 25- and 50-year Storm Nodes







**12916EX01A**

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Page 2

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
5.044	39	>75% Grass cover, Good HSG A (EX 1S, EX 2S)
6.718	61	>75% Grass cover, Good HSG B (EX 1S, EX 2S, EX 3S, EX 4S, EX 5S)
0.006	76	Gravel roads HSG A (EX 3S)
0.325	85	Gravel roads HSG B (EX 1S, EX 3S, EX 5S)
0.003	98	Paved parking HSG B (EX 3S)
0.064	98	Roofs HSG B (EX 3S)
1.464	30	Woods, Good HSG A (EX 1S, EX 2S)
2.983	55	Woods, Good HSG B (EX 1S, EX 2S, EX 3S, EX 4S)
0.204	77	Woods, Good HSG D (EX 3S)
<b>16.812</b>	<b>51</b>	<b>TOTAL AREA</b>

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Page 3

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
6.515	HSG A	EX 1S, EX 2S, EX 3S
10.093	HSG B	EX 1S, EX 2S, EX 3S, EX 4S, EX 5S
0.000	HSG C	
0.204	HSG D	EX 3S
0.000	Other	
<b>16.812</b>		<b>TOTAL AREA</b>

# Attachment "E"

**12916EX01A**

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Type III 24-hr 2-Year Rainfall=2.93"

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Page 4

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

**Subcatchment EX 1S: To Existing Dual 24"** Runoff Area=199,853 sf 0.00% Impervious Runoff Depth=0.00"  
Flow Length=445' Slope=0.0603 '/' Tc=21.4 min CN=37 Runoff=0.00 cfs 0.000 af

**Subcatchment EX 2S: To Edge of Drive** Runoff Area=153,830 sf 0.00% Impervious Runoff Depth=0.04"  
Flow Length=548' Slope=0.0358 '/' Tc=25.0 min CN=47 Runoff=0.02 cfs 0.011 af

**Subcatchment EX 3S: To Merrimack River** Runoff Area=253,002 sf 1.15% Impervious Runoff Depth=0.31"  
Flow Length=983' Slope=0.2154 '/' Tc=11.7 min CN=60 Runoff=0.86 cfs 0.149 af

**Subcatchment EX 4S: To Observation Point** Runoff Area=54,314 sf 0.00% Impervious Runoff Depth=0.31"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=0.18 cfs 0.032 af

**Subcatchment EX 5S: To Observation Point** Runoff Area=71,342 sf 0.00% Impervious Runoff Depth=0.34"  
Flow Length=206' Slope=0.0146 '/' Tc=12.6 min CN=61 Runoff=0.28 cfs 0.046 af

**Reach OP1: Observation Point OP1**

Inflow=0.86 cfs 0.161 af  
Outflow=0.86 cfs 0.161 af

**Reach OP2: Observation Point OP2**

Inflow=0.18 cfs 0.032 af  
Outflow=0.18 cfs 0.032 af

**Reach OP3: Observation Point OP3**

Inflow=0.28 cfs 0.046 af  
Outflow=0.28 cfs 0.046 af

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Peak Elev=113.52' Inflow=0.00 cfs 0.000 af  
Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 16.812 ac Runoff Volume = 0.239 af Average Runoff Depth = 0.17"**  
**99.60% Pervious = 16.745 ac 0.40% Impervious = 0.067 ac**

# Attachment "E"

**12916EX01A**

Type III 24-hr 10-Year Rainfall=4.42"

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Page 5

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

**Subcatchment EX 1S: To Existing Dual 24"** Runoff Area=199,853 sf 0.00% Impervious Runoff Depth=0.06"  
Flow Length=445' Slope=0.0603 '/' Tc=21.4 min CN=37 Runoff=0.03 cfs 0.022 af

**Subcatchment EX 2S: To Edge of Drive** Runoff Area=153,830 sf 0.00% Impervious Runoff Depth=0.35"  
Flow Length=548' Slope=0.0358 '/' Tc=25.0 min CN=47 Runoff=0.40 cfs 0.103 af

**Subcatchment EX 3S: To Merrimack River** Runoff Area=253,002 sf 1.15% Impervious Runoff Depth=0.98"  
Flow Length=983' Slope=0.2154 '/' Tc=11.7 min CN=60 Runoff=4.60 cfs 0.473 af

**Subcatchment EX 4S: To Observation Point** Runoff Area=54,314 sf 0.00% Impervious Runoff Depth=0.98"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=0.98 cfs 0.102 af

**Subcatchment EX 5S: To Observation Point** Runoff Area=71,342 sf 0.00% Impervious Runoff Depth=1.03"  
Flow Length=206' Slope=0.0146 '/' Tc=12.6 min CN=61 Runoff=1.37 cfs 0.141 af

**Reach OP1: Observation Point OP1**

Inflow=4.63 cfs 0.597 af  
Outflow=4.63 cfs 0.597 af

**Reach OP2: Observation Point OP2**

Inflow=0.98 cfs 0.102 af  
Outflow=0.98 cfs 0.102 af

**Reach OP3: Observation Point OP3**

Inflow=1.37 cfs 0.141 af  
Outflow=1.37 cfs 0.141 af

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Peak Elev=113.66' Inflow=0.03 cfs 0.022 af  
Outflow=0.03 cfs 0.022 af

**Total Runoff Area = 16.812 ac Runoff Volume = 0.840 af Average Runoff Depth = 0.60"**  
**99.60% Pervious = 16.745 ac 0.40% Impervious = 0.067 ac**

# Attachment "E"

**12916EX01A**

Type III 24-hr 25-Year Rainfall=5.58"

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Page 6

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

**Subcatchment EX 1S: To Existing Dual 24"** Runoff Area=199,853 sf 0.00% Impervious Runoff Depth=0.25"  
Flow Length=445' Slope=0.0603 '/' Tc=21.4 min CN=37 Runoff=0.19 cfs 0.094 af

**Subcatchment EX 2S: To Edge of Drive** Runoff Area=153,830 sf 0.00% Impervious Runoff Depth=0.76"  
Flow Length=548' Slope=0.0358 '/' Tc=25.0 min CN=47 Runoff=1.28 cfs 0.223 af

**Subcatchment EX 3S: To Merrimack River** Runoff Area=253,002 sf 1.15% Impervious Runoff Depth=1.65"  
Flow Length=983' Slope=0.2154 '/' Tc=11.7 min CN=60 Runoff=8.60 cfs 0.800 af

**Subcatchment EX 4S: To Observation Point** Runoff Area=54,314 sf 0.00% Impervious Runoff Depth=1.65"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=1.82 cfs 0.172 af

**Subcatchment EX 5S: To Observation Point** Runoff Area=71,342 sf 0.00% Impervious Runoff Depth=1.73"  
Flow Length=206' Slope=0.0146 '/' Tc=12.6 min CN=61 Runoff=2.50 cfs 0.236 af

**Reach OP1: Observation Point OP1**

Inflow=8.95 cfs 1.117 af  
Outflow=8.95 cfs 1.117 af

**Reach OP2: Observation Point OP2**

Inflow=1.82 cfs 0.172 af  
Outflow=1.82 cfs 0.172 af

**Reach OP3: Observation Point OP3**

Inflow=2.50 cfs 0.236 af  
Outflow=2.50 cfs 0.236 af

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Peak Elev=113.81' Inflow=0.19 cfs 0.094 af  
Outflow=0.19 cfs 0.094 af

**Total Runoff Area = 16.812 ac Runoff Volume = 1.525 af Average Runoff Depth = 1.09"**  
**99.60% Pervious = 16.745 ac 0.40% Impervious = 0.067 ac**

# Attachment "E"

**12916EX01A**

Type III 24-hr 50-Year Rainfall=6.66"

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Page 7

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

**Subcatchment EX 1S: To Existing Dual 24"** Runoff Area=199,853 sf 0.00% Impervious Runoff Depth=0.52"  
Flow Length=445' Slope=0.0603 '/' Tc=21.4 min CN=37 Runoff=0.82 cfs 0.200 af

**Subcatchment EX 2S: To Edge of Drive** Runoff Area=153,830 sf 0.00% Impervious Runoff Depth=1.24"  
Flow Length=548' Slope=0.0358 '/' Tc=25.0 min CN=47 Runoff=2.47 cfs 0.364 af

**Subcatchment EX 3S: To Merrimack River** Runoff Area=253,002 sf 1.15% Impervious Runoff Depth=2.37"  
Flow Length=983' Slope=0.2154 '/' Tc=11.7 min CN=60 Runoff=12.79 cfs 1.145 af

**Subcatchment EX 4S: To Observation Point** Runoff Area=54,314 sf 0.00% Impervious Runoff Depth=2.37"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=2.71 cfs 0.246 af

**Subcatchment EX 5S: To Observation Point** Runoff Area=71,342 sf 0.00% Impervious Runoff Depth=2.46"  
Flow Length=206' Slope=0.0146 '/' Tc=12.6 min CN=61 Runoff=3.67 cfs 0.336 af

**Reach OP1: Observation Point OP1**

Inflow=13.93 cfs 1.709 af  
Outflow=13.93 cfs 1.709 af

**Reach OP2: Observation Point OP2**

Inflow=2.71 cfs 0.246 af  
Outflow=2.71 cfs 0.246 af

**Reach OP3: Observation Point OP3**

Inflow=3.67 cfs 0.336 af  
Outflow=3.67 cfs 0.336 af

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Peak Elev=114.03' Inflow=0.82 cfs 0.200 af  
Outflow=0.82 cfs 0.200 af

**Total Runoff Area = 16.812 ac Runoff Volume = 2.290 af Average Runoff Depth = 1.63"**  
**99.60% Pervious = 16.745 ac 0.40% Impervious = 0.067 ac**

## **Section 1.2: Existing Conditions**

25- and 50-year Storm Full Summary



12916EX01A

Type III 24-hr 25-Year Rainfall=5.58"

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Page 1

**Summary for Subcatchment EX 1S: To Existing Dual 24" Driveway Culverts**

Runoff = 0.19 cfs @ 12.72 hrs, Volume= 0.094 af, Depth= 0.25"

Routed to Pond EX 1P : Existing Dual 24" Driveway Culverts

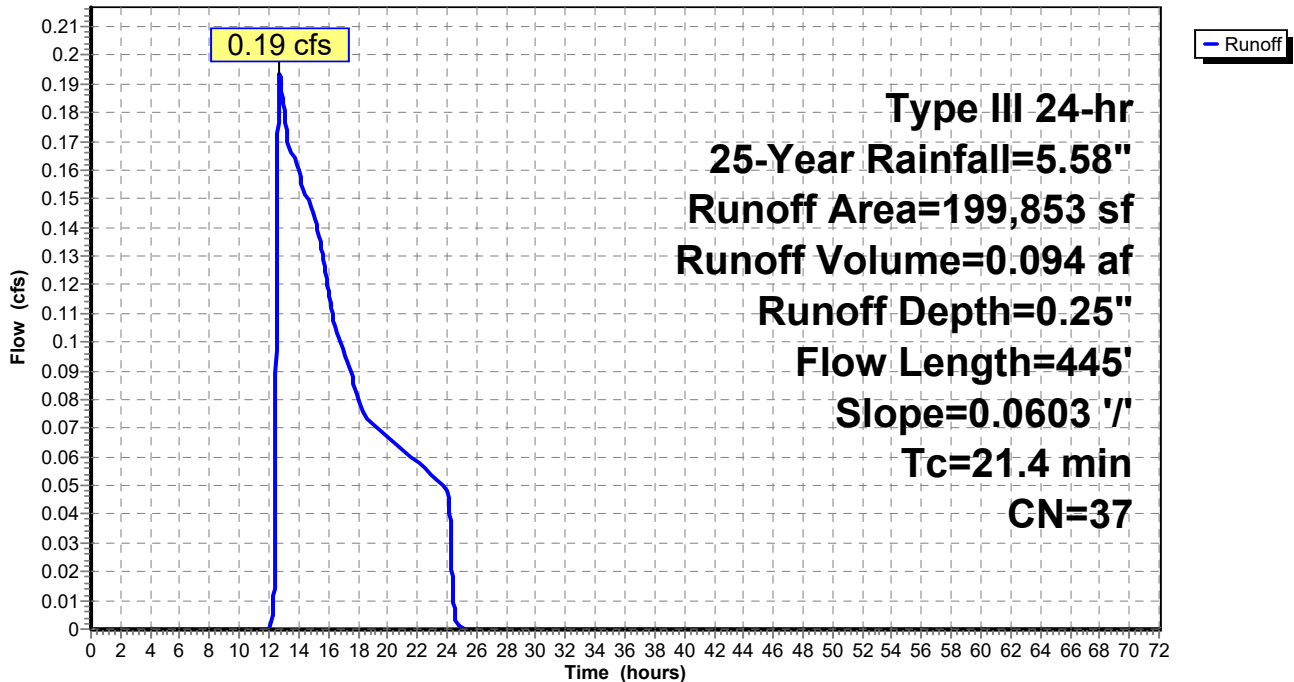
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
48	55	Woods, Good HSG B
49,970	30	Woods, Good HSG A
118	85	Gravel roads HSG B
143,438	39	>75% Grass cover, Good HSG A
6,279	61	>75% Grass cover, Good HSG B
199,853	37	Weighted Average
199,853		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	445	0.0603	0.35		Lag/CN Method,

**Subcatchment EX 1S: To Existing Dual 24" Driveway Culverts**

Hydrograph



12916EX01A

Type III 24-hr 25-Year Rainfall=5.58"

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Page 2

**Summary for Subcatchment EX 2S: To Edge of Drive**

Runoff = 1.28 cfs @ 12.48 hrs, Volume= 0.223 af, Depth= 0.76"  
 Routed to Reach OP1 : Observation Point OP1

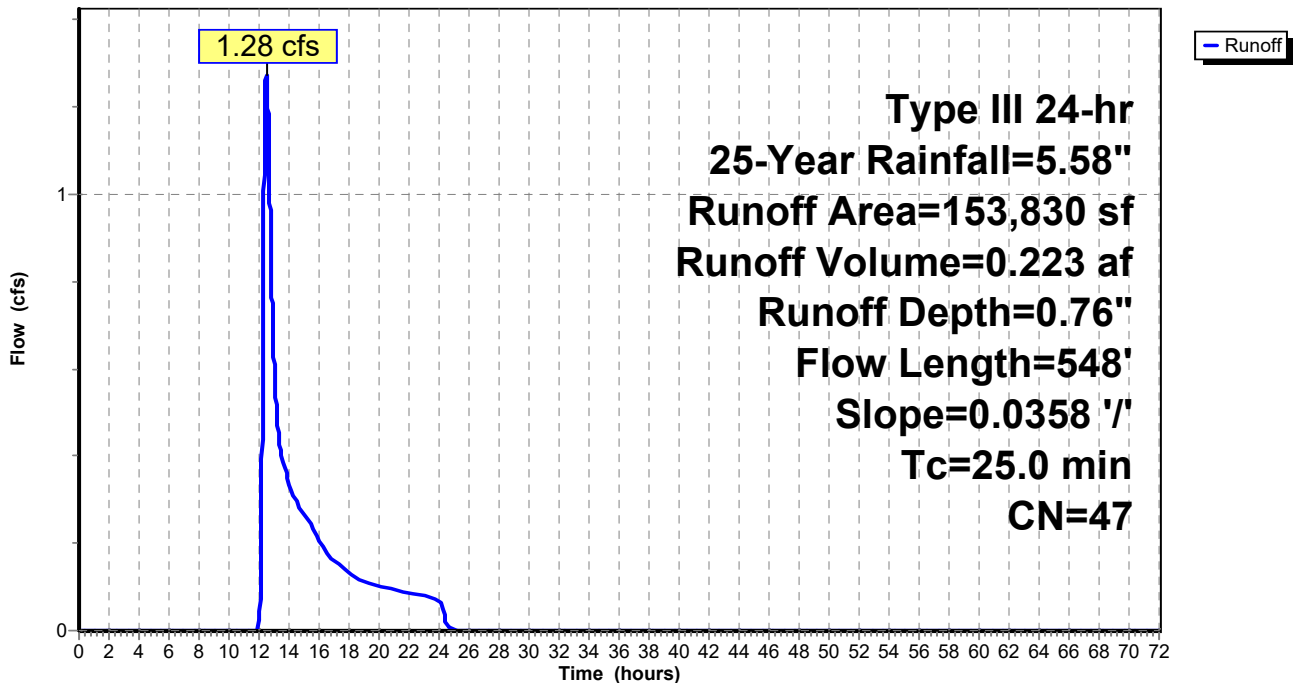
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
2,496	55	Woods, Good HSG B
13,808	30	Woods, Good HSG A
76,291	39	>75% Grass cover, Good HSG A
61,235	61	>75% Grass cover, Good HSG B
153,830	47	Weighted Average
153,830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0	548	0.0358	0.37		Lag/CN Method,

**Subcatchment EX 2S: To Edge of Drive**

Hydrograph



12916EX01A

Type III 24-hr 25-Year Rainfall=5.58"

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Page 3

**Summary for Subcatchment EX 3S: To Merrimack River**

Runoff = 8.60 cfs @ 12.18 hrs, Volume= 0.800 af, Depth= 1.65"  
 Routed to Reach OP1 : Observation Point OP1

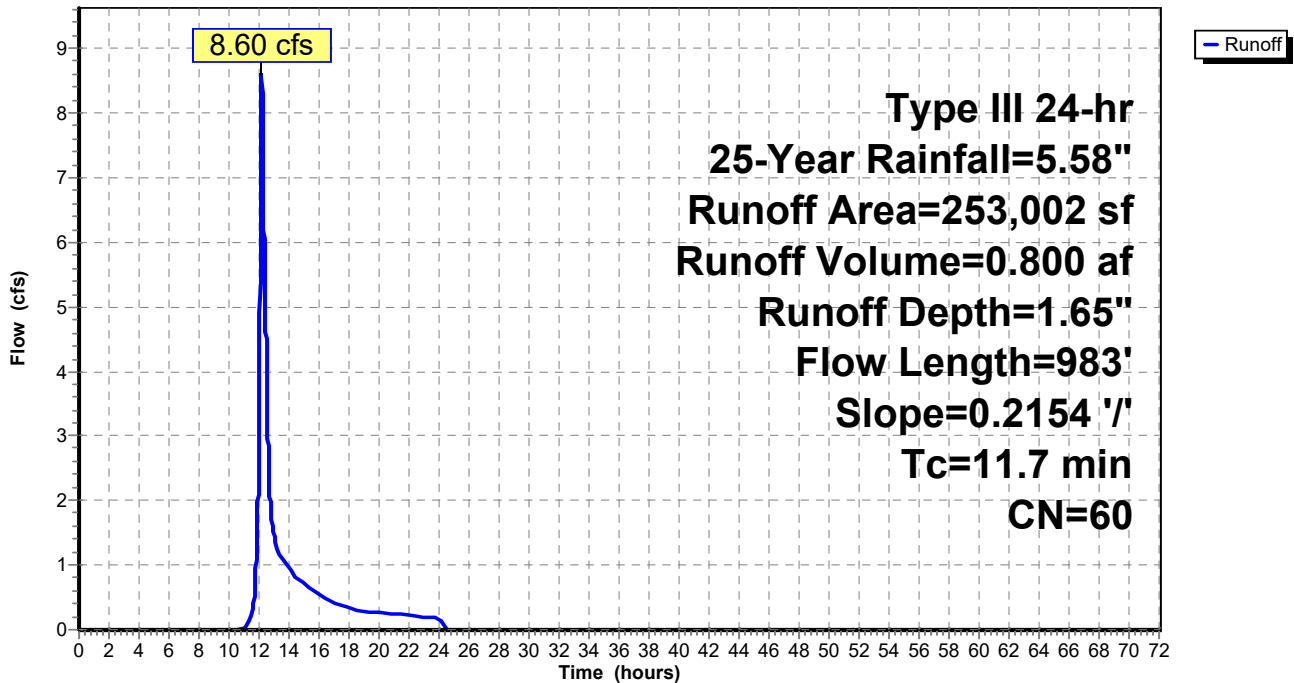
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
271	76	Gravel roads HSG A
8,907	77	Woods, Good HSG D
122,589	55	Woods, Good HSG B
111	98	Paved parking HSG B
12,553	85	Gravel roads HSG B
2,802	98	Roofs HSG B
105,769	61	>75% Grass cover, Good HSG B
253,002	60	Weighted Average
250,089		98.85% Pervious Area
2,913		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	983	0.2154	1.40		Lag/CN Method,

**Subcatchment EX 3S: To Merrimack River**

Hydrograph



12916EX01A

Type III 24-hr 25-Year Rainfall=5.58"

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Page 4

**Summary for Subcatchment EX 4S: To Observation Point OP2**

Runoff = 1.82 cfs @ 12.18 hrs, Volume= 0.172 af, Depth= 1.65"  
 Routed to Reach OP2 : Observation Point OP2

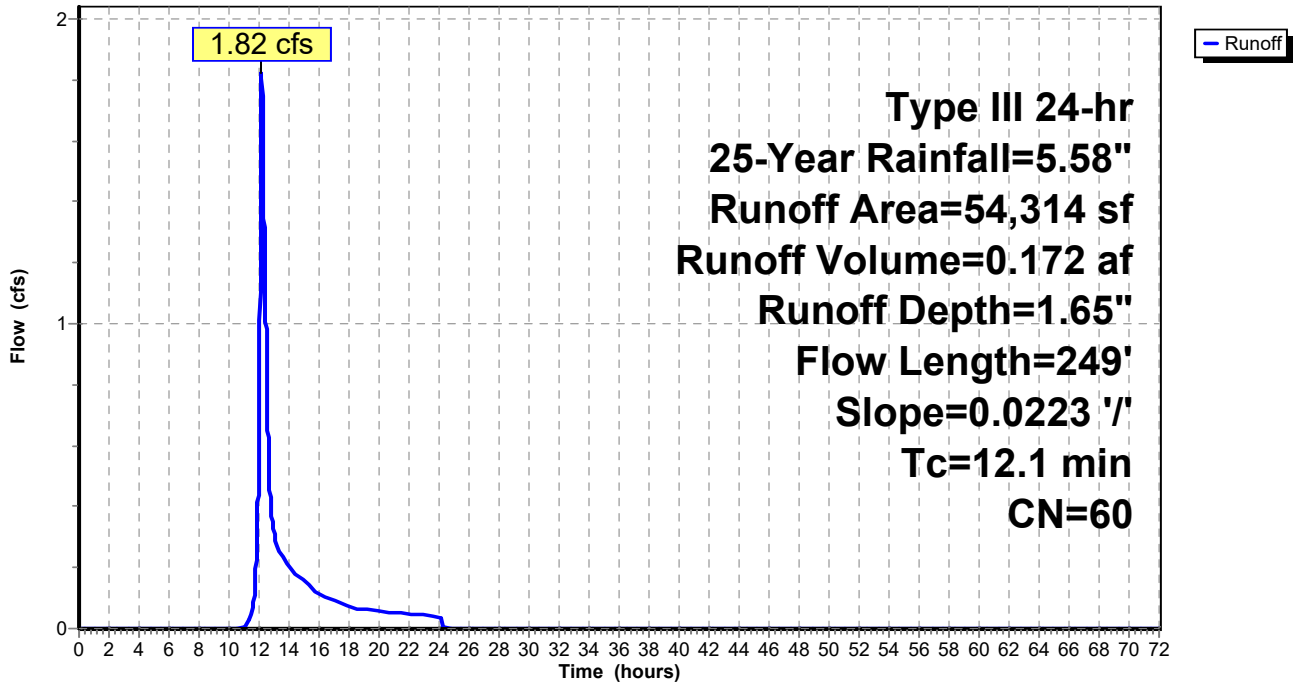
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
4,801	55	Woods, Good HSG B
49,513	61	>75% Grass cover, Good HSG B
54,314	60	Weighted Average
54,314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	249	0.0223	0.34		Lag/CN Method,

**Subcatchment EX 4S: To Observation Point OP2**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 5

**Summary for Subcatchment EX 5S: To Observation Point OP3**

Runoff = 2.50 cfs @ 12.19 hrs, Volume= 0.236 af, Depth= 1.73"  
 Routed to Reach OP3 : Observation Point OP3

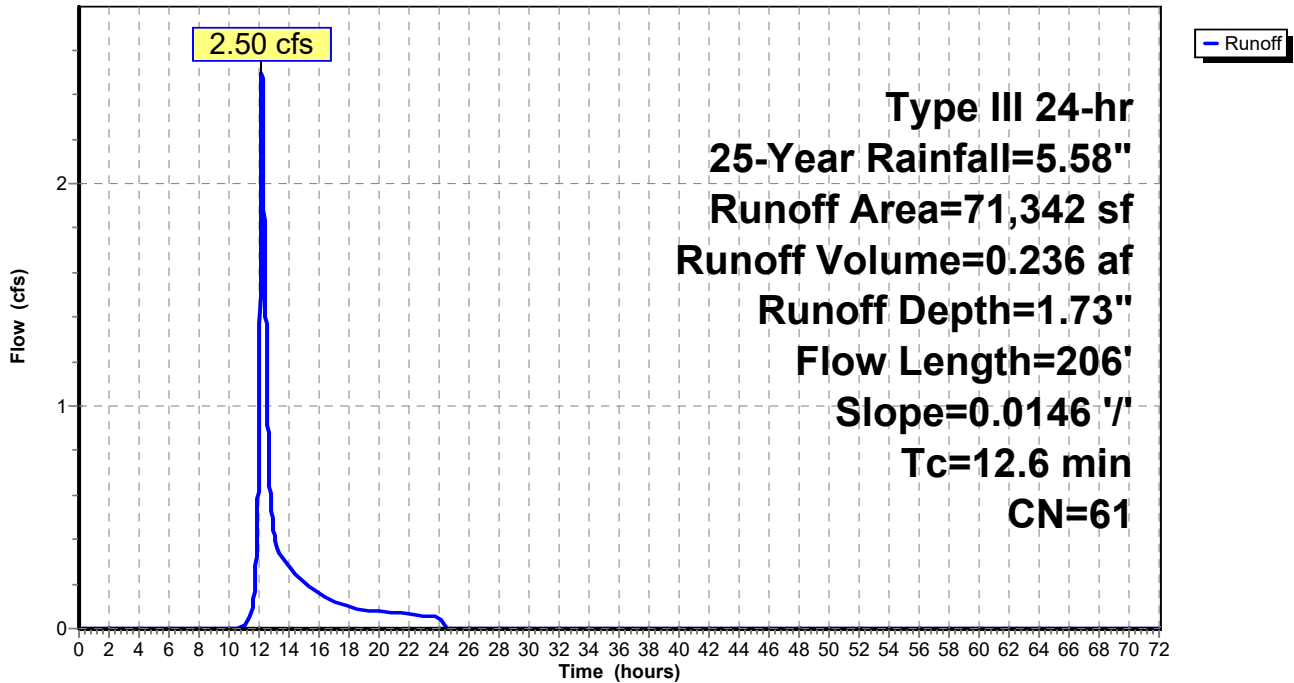
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
1,481	85	Gravel roads HSG B
69,861	61	>75% Grass cover, Good HSG B
71,342	61	Weighted Average
71,342		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	206	0.0146	0.27		Lag/CN Method,

**Subcatchment EX 5S: To Observation Point OP3**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 6

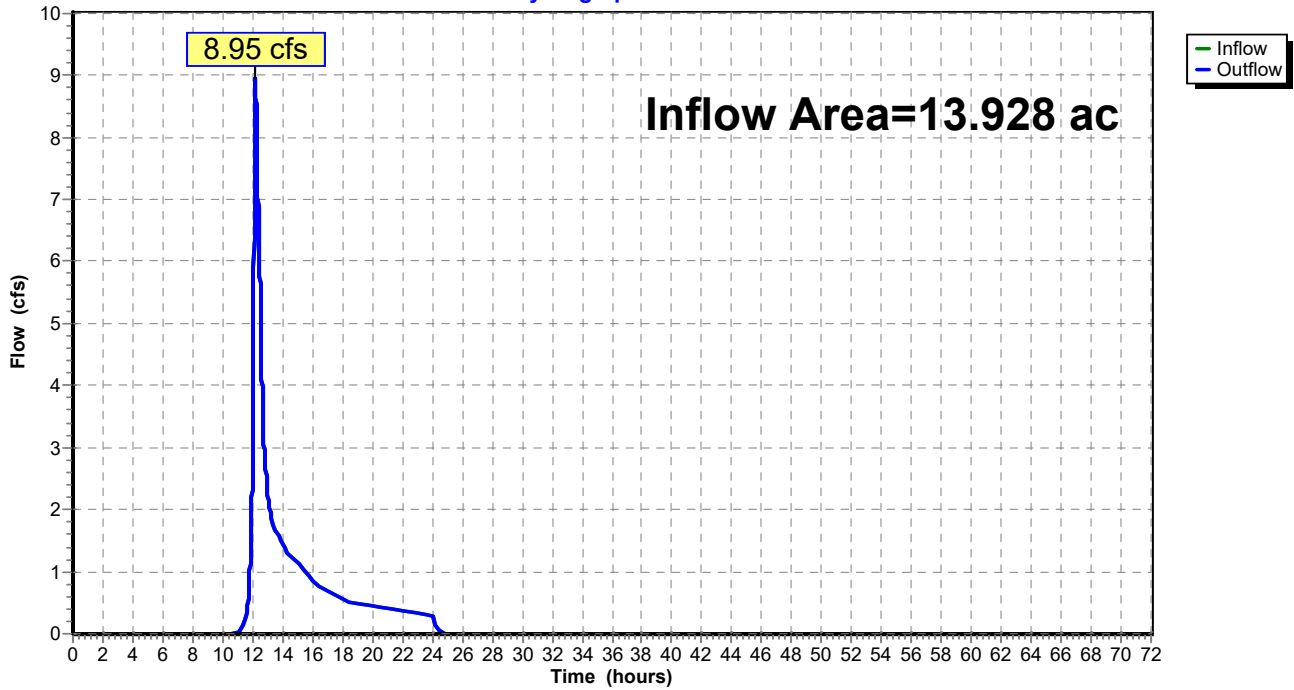
Summary for Reach OP1: Observation Point OP1

Inflow Area = 13.928 ac, 0.48% Impervious, Inflow Depth = 0.96" for 25-Year event  
Inflow = 8.95 cfs @ 12.18 hrs, Volume= 1.117 af  
Outflow = 8.95 cfs @ 12.18 hrs, Volume= 1.117 af, Atten= 0%, Lag= 0.0 min

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

Reach OP1: Observation Point OP1

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 7

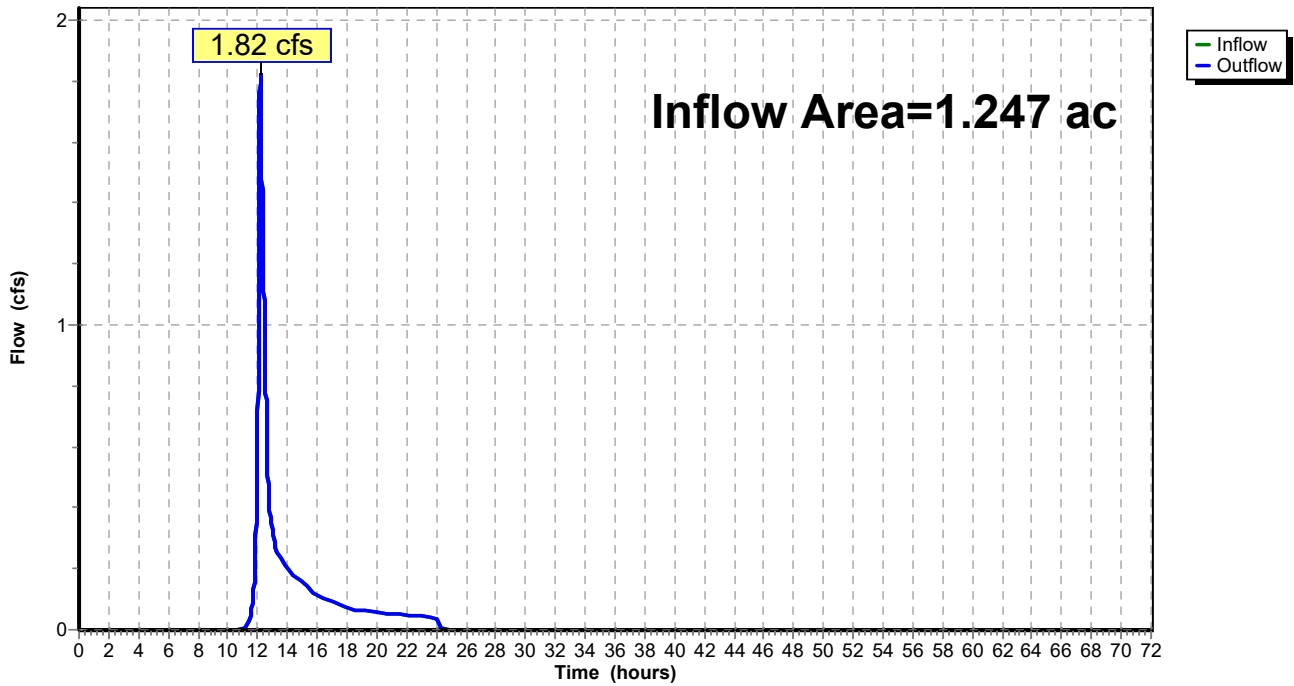
Summary for Reach OP2: Observation Point OP2

Inflow Area = 1.247 ac, 0.00% Impervious, Inflow Depth = 1.65" for 25-Year event  
Inflow = 1.82 cfs @ 12.18 hrs, Volume= 0.172 af  
Outflow = 1.82 cfs @ 12.18 hrs, Volume= 0.172 af, Atten= 0%, Lag= 0.0 min

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

Reach OP2: Observation Point OP2

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 8

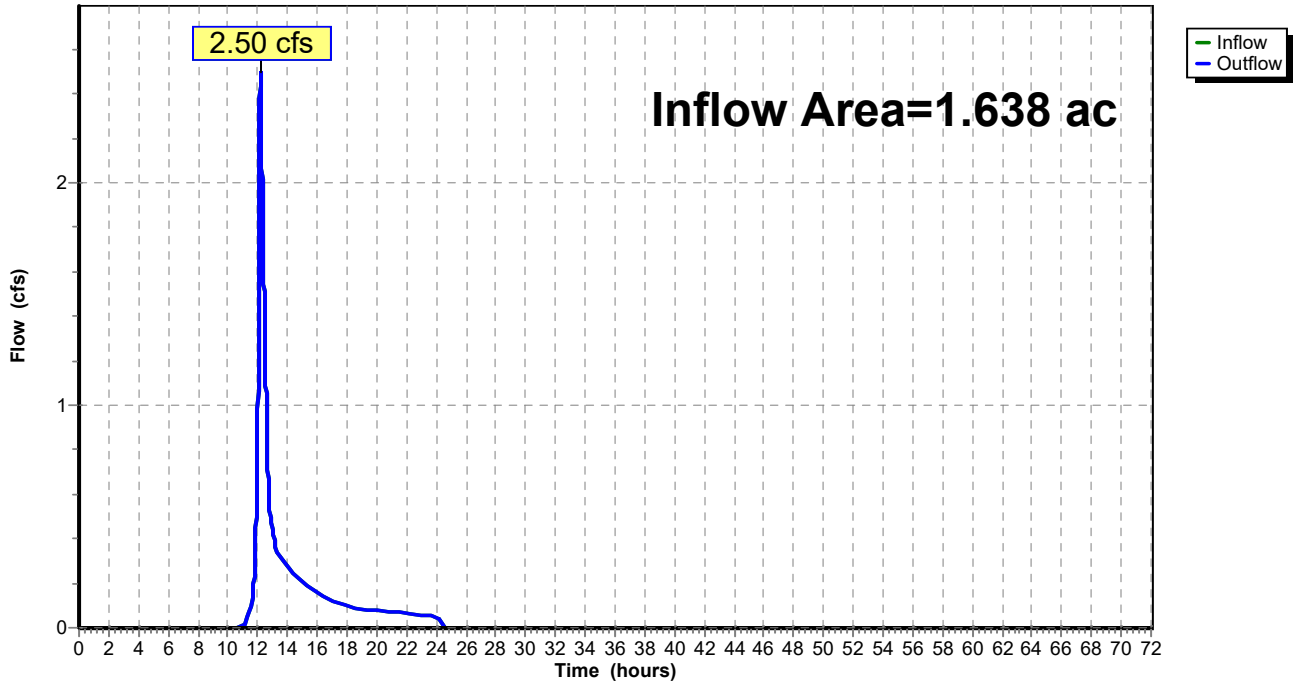
Summary for Reach OP3: Observation Point OP3

Inflow Area = 1.638 ac, 0.00% Impervious, Inflow Depth = 1.73" for 25-Year event  
Inflow = 2.50 cfs @ 12.19 hrs, Volume= 0.236 af  
Outflow = 2.50 cfs @ 12.19 hrs, Volume= 0.236 af, Atten= 0%, Lag= 0.0 min

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

Reach OP3: Observation Point OP3

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 9

**Summary for Pond EX 1P: Existing Dual 24" Driveway Culverts**

Inflow Area = 4.588 ac, 0.00% Impervious, Inflow Depth = 0.25" for 25-Year event  
 Inflow = 0.19 cfs @ 12.72 hrs, Volume= 0.094 af  
 Outflow = 0.19 cfs @ 12.72 hrs, Volume= 0.094 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.19 cfs @ 12.72 hrs, Volume= 0.094 af  
 Routed to Reach OP1 : Observation Point OP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 113.81' @ 12.72 hrs

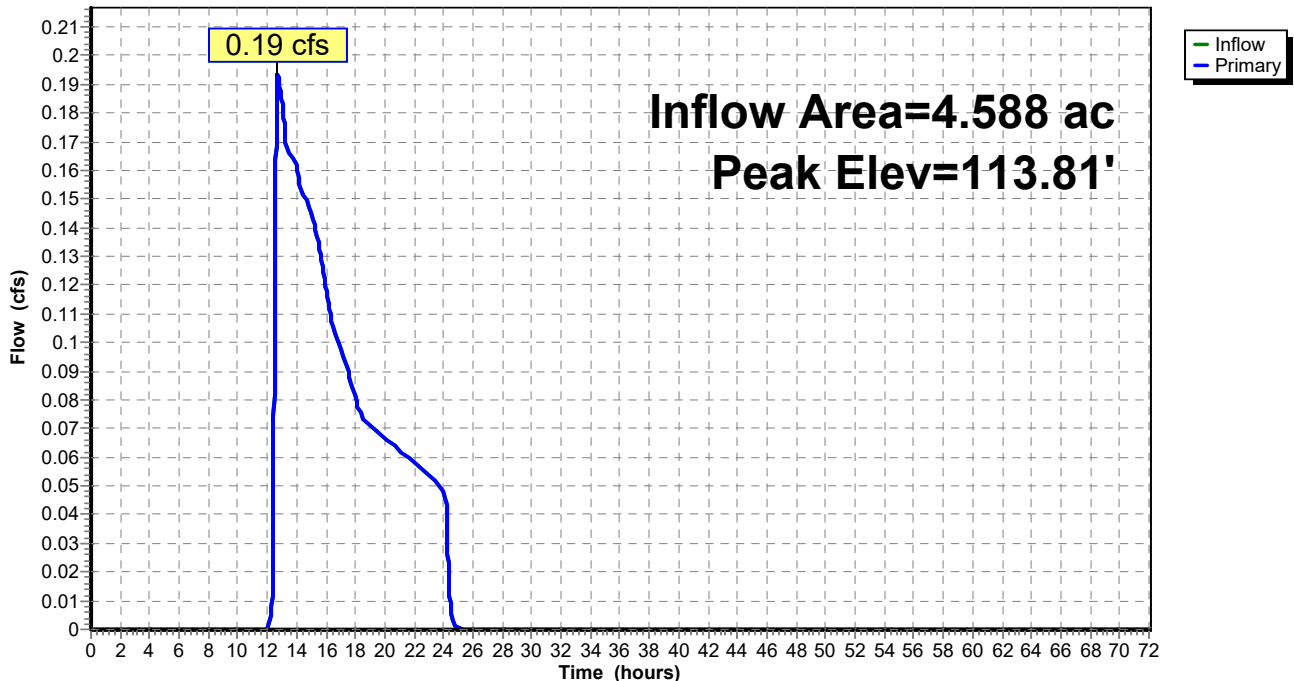
Device	Routing	Invert	Outlet Devices
#1	Primary	113.73'	<b>24.0" Round 24" CMP Driveway Culvert (North)</b> L= 55.7' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 113.73' / 113.49' S= 0.0043 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	113.52'	<b>24.0" Round 24" CMP Driveway Culvert (South)</b> L= 55.5' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 113.52' / 113.37' S= 0.0027 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=0.19 cfs @ 12.72 hrs HW=113.81' TW=0.00' (Dynamic Tailwater)

- 1=24" CMP Driveway Culvert (North) (Barrel Controls 0.01 cfs @ 0.48 fps)
- 2=24" CMP Driveway Culvert (South) (Barrel Controls 0.18 cfs @ 0.95 fps)

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 10

**Summary for Subcatchment EX 1S: To Existing Dual 24" Driveway Culverts**

Runoff = 0.82 cfs @ 12.57 hrs, Volume= 0.200 af, Depth= 0.52"

Routed to Pond EX 1P : Existing Dual 24" Driveway Culverts

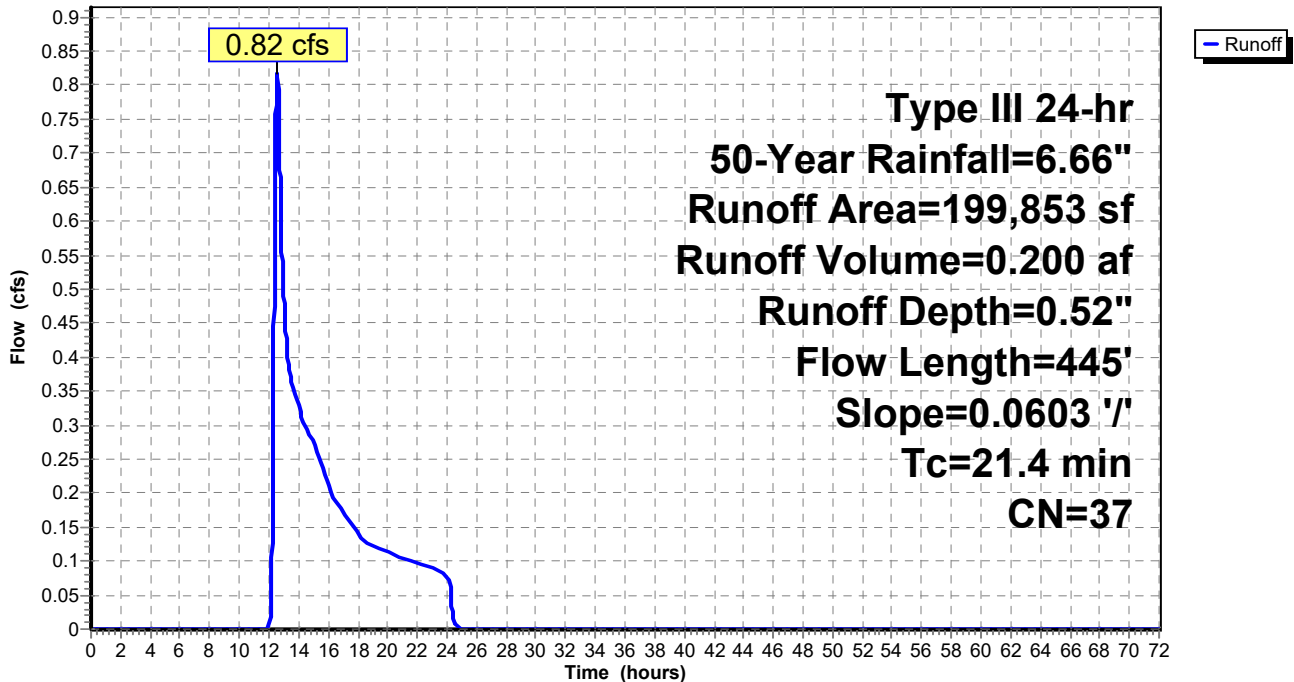
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
48	55	Woods, Good HSG B
49,970	30	Woods, Good HSG A
118	85	Gravel roads HSG B
143,438	39	>75% Grass cover, Good HSG A
6,279	61	>75% Grass cover, Good HSG B
199,853	37	Weighted Average
199,853		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.4	445	0.0603	0.35		Lag/CN Method,

**Subcatchment EX 1S: To Existing Dual 24" Driveway Culverts**

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 11

**Summary for Subcatchment EX 2S: To Edge of Drive**

Runoff = 2.47 cfs @ 12.42 hrs, Volume= 0.364 af, Depth= 1.24"  
 Routed to Reach OP1 : Observation Point OP1

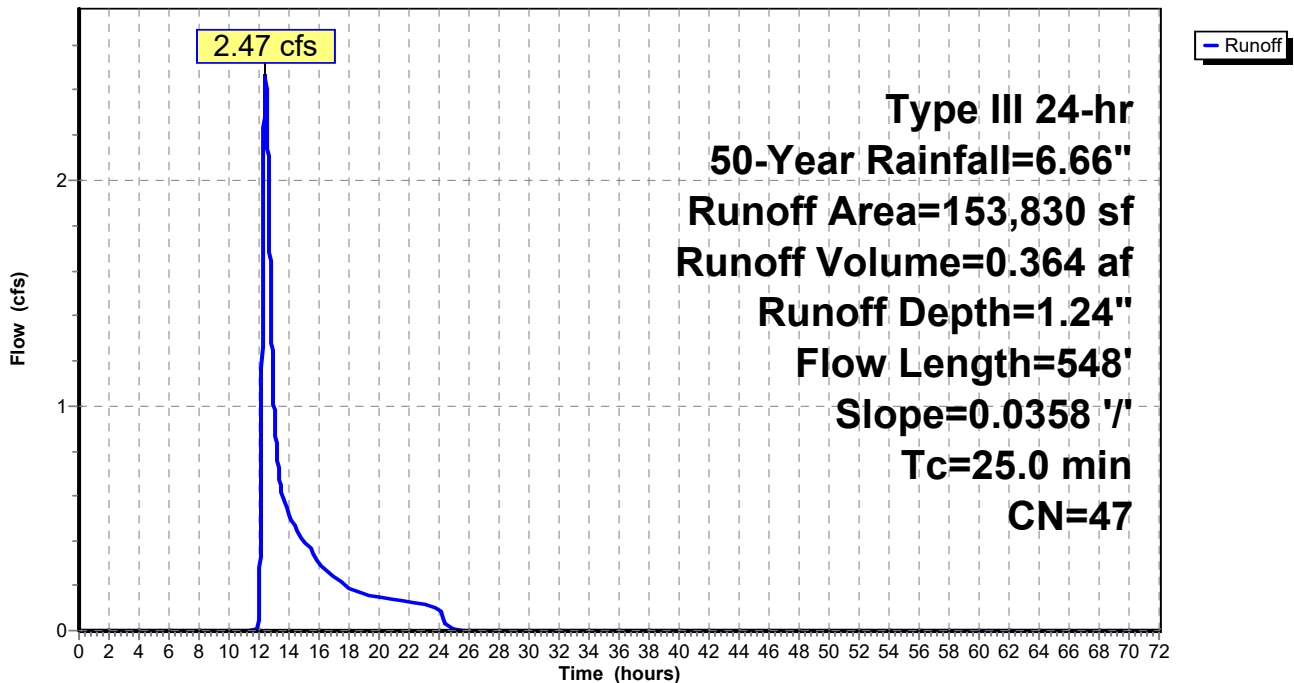
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
2,496	55	Woods, Good HSG B
13,808	30	Woods, Good HSG A
76,291	39	>75% Grass cover, Good HSG A
61,235	61	>75% Grass cover, Good HSG B
153,830	47	Weighted Average
153,830		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.0	548	0.0358	0.37		Lag/CN Method,

**Subcatchment EX 2S: To Edge of Drive**

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 12

**Summary for Subcatchment EX 3S: To Merrimack River**

Runoff = 12.79 cfs @ 12.17 hrs, Volume= 1.145 af, Depth= 2.37"  
 Routed to Reach OP1 : Observation Point OP1

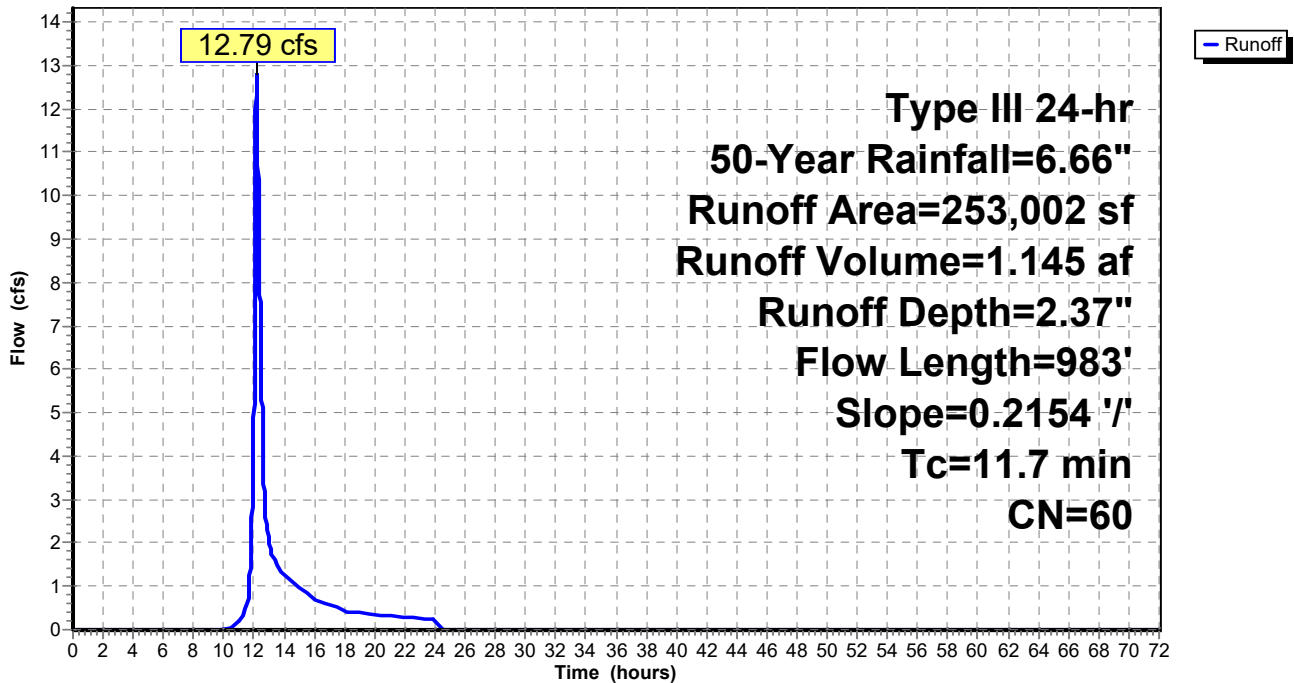
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
271	76	Gravel roads HSG A
8,907	77	Woods, Good HSG D
122,589	55	Woods, Good HSG B
111	98	Paved parking HSG B
12,553	85	Gravel roads HSG B
2,802	98	Roofs HSG B
105,769	61	>75% Grass cover, Good HSG B
253,002	60	Weighted Average
250,089		98.85% Pervious Area
2,913		1.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.7	983	0.2154	1.40		Lag/CN Method,

**Subcatchment EX 3S: To Merrimack River**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 13

**Summary for Subcatchment EX 4S: To Observation Point OP2**

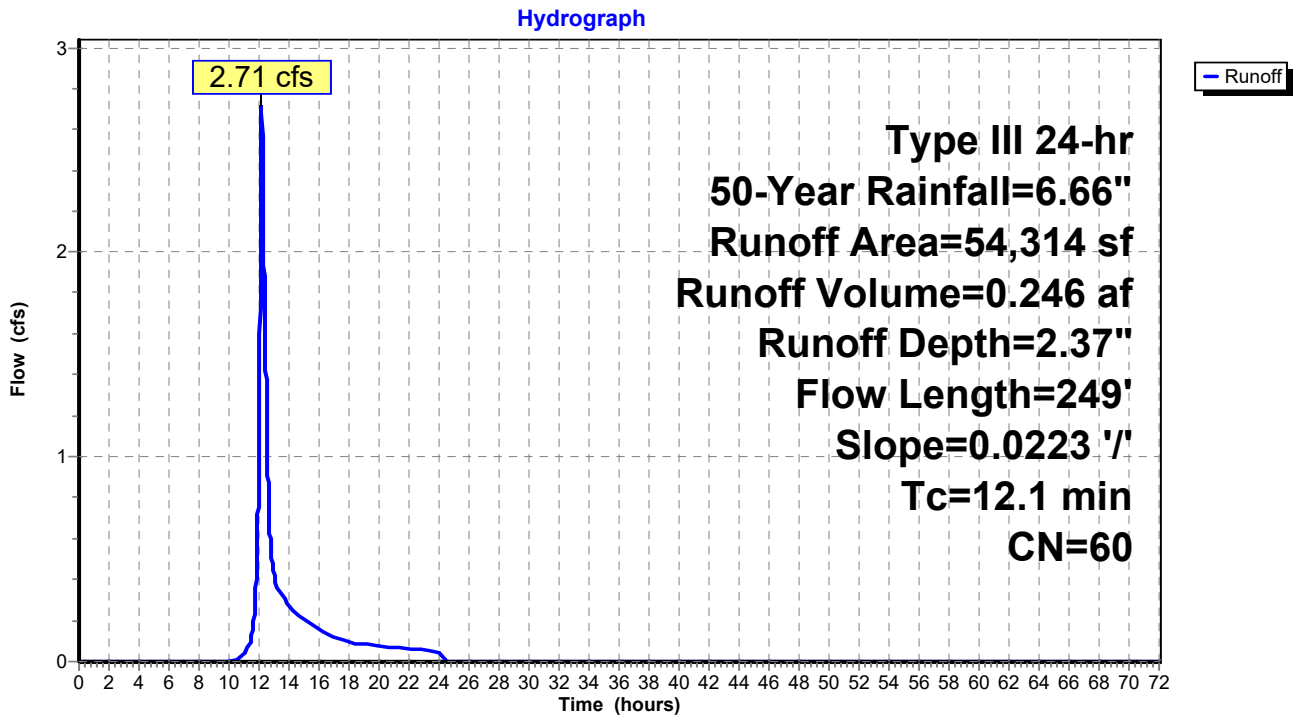
Runoff = 2.71 cfs @ 12.17 hrs, Volume= 0.246 af, Depth= 2.37"  
 Routed to Reach OP2 : Observation Point OP2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
4,801	55	Woods, Good HSG B
49,513	61	>75% Grass cover, Good HSG B
54,314	60	Weighted Average
54,314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	249	0.0223	0.34		Lag/CN Method,

**Subcatchment EX 4S: To Observation Point OP2**



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 14

**Summary for Subcatchment EX 5S: To Observation Point OP3**

Runoff = 3.67 cfs @ 12.18 hrs, Volume= 0.336 af, Depth= 2.46"  
 Routed to Reach OP3 : Observation Point OP3

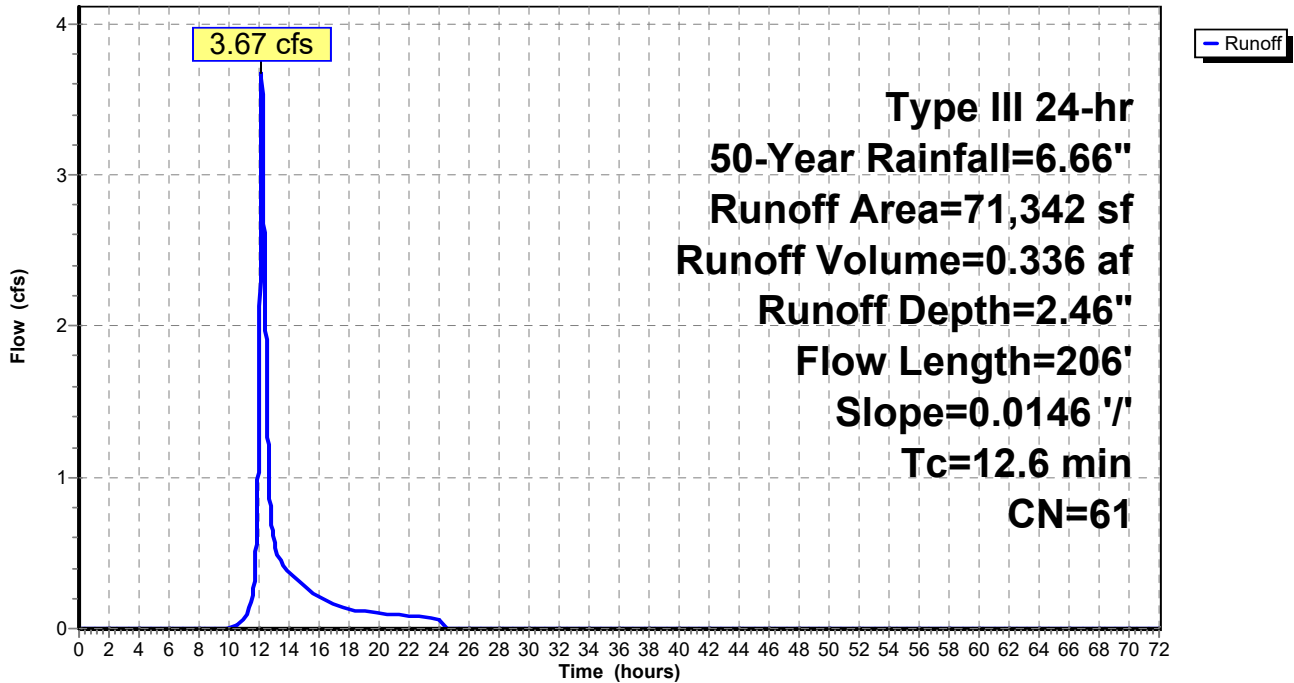
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
1,481	85	Gravel roads HSG B
69,861	61	>75% Grass cover, Good HSG B
71,342	61	Weighted Average
71,342		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	206	0.0146	0.27		Lag/CN Method,

**Subcatchment EX 5S: To Observation Point OP3**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 15

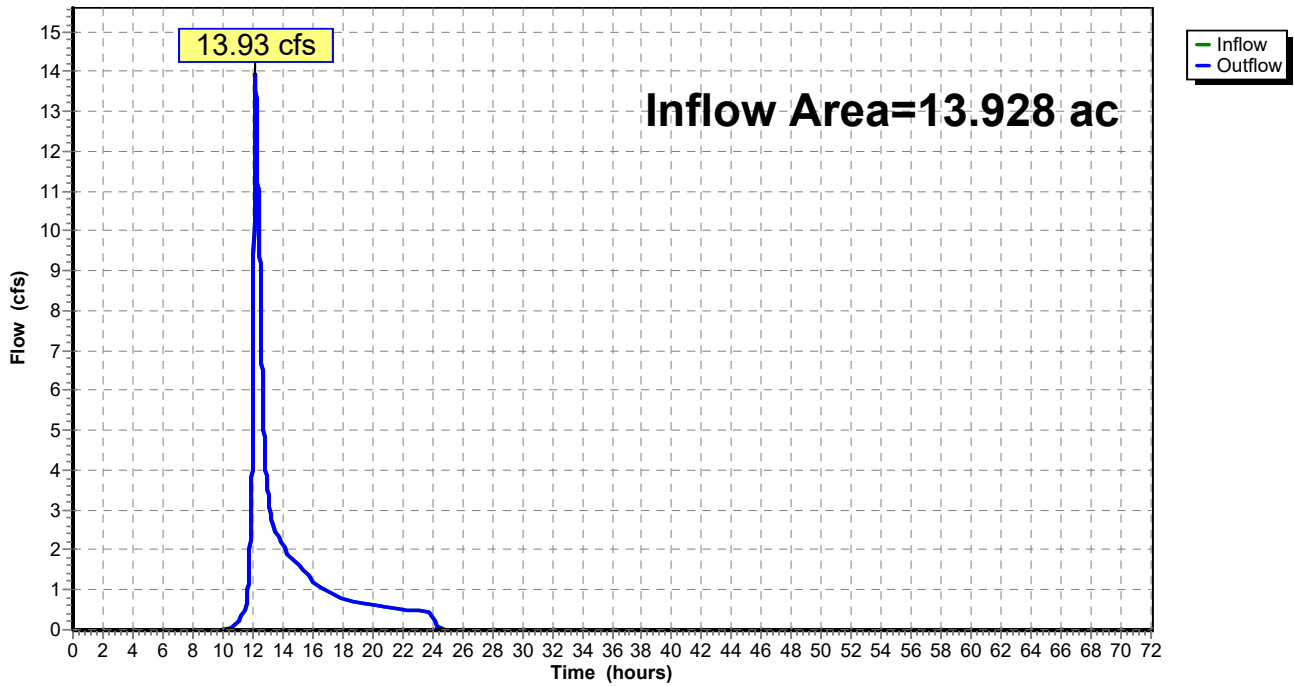
Summary for Reach OP1: Observation Point OP1

Inflow Area = 13.928 ac, 0.48% Impervious, Inflow Depth = 1.47" for 50-Year event  
Inflow = 13.93 cfs @ 12.18 hrs, Volume= 1.709 af  
Outflow = 13.93 cfs @ 12.18 hrs, Volume= 1.709 af, Atten= 0%, Lag= 0.0 min

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

Reach OP1: Observation Point OP1

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 16

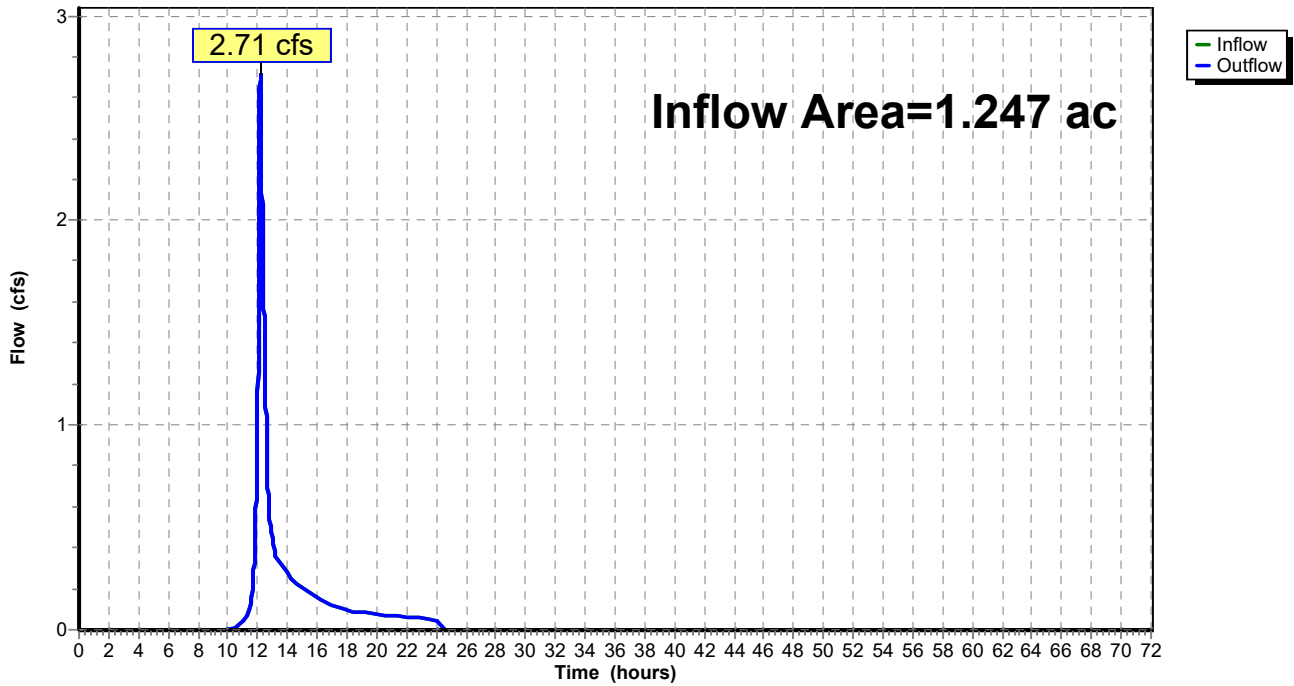
Summary for Reach OP2: Observation Point OP2

Inflow Area = 1.247 ac, 0.00% Impervious, Inflow Depth = 2.37" for 50-Year event  
Inflow = 2.71 cfs @ 12.17 hrs, Volume= 0.246 af  
Outflow = 2.71 cfs @ 12.17 hrs, Volume= 0.246 af, Atten= 0%, Lag= 0.0 min

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

Reach OP2: Observation Point OP2

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 17

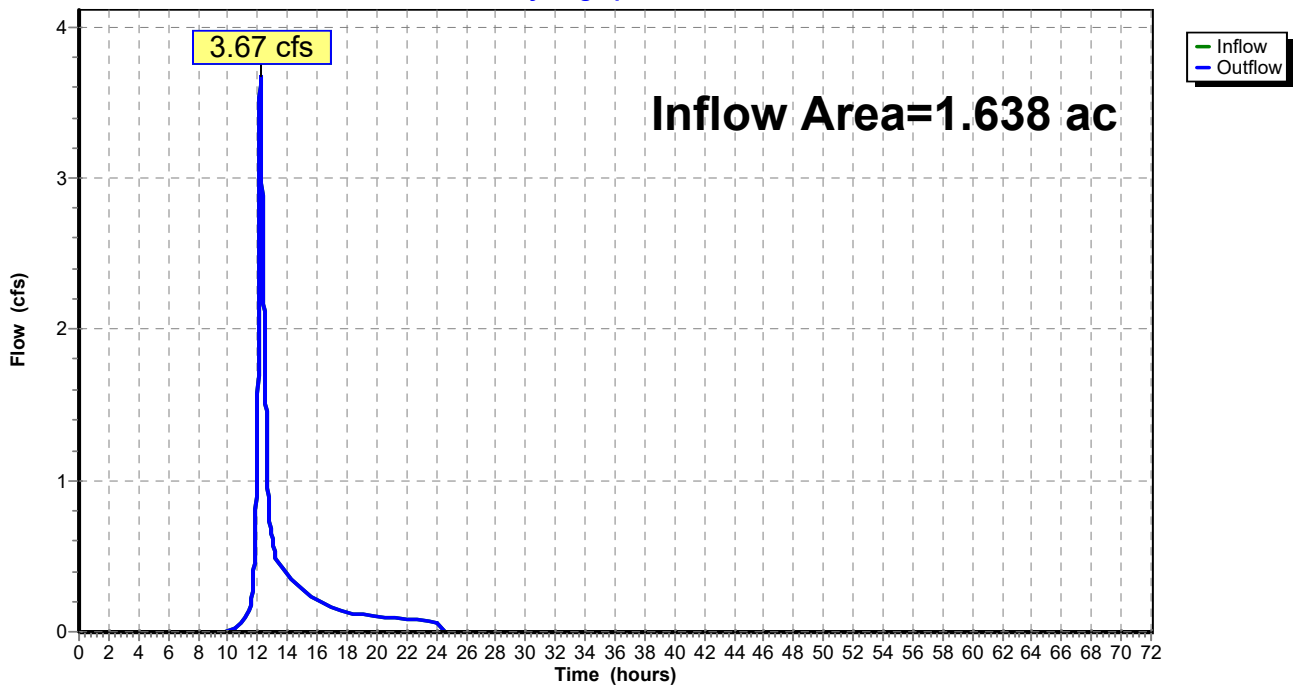
### Summary for Reach OP3: Observation Point OP3

Inflow Area = 1.638 ac, 0.00% Impervious, Inflow Depth = 2.46" for 50-Year event  
Inflow = 3.67 cfs @ 12.18 hrs, Volume= 0.336 af  
Outflow = 3.67 cfs @ 12.18 hrs, Volume= 0.336 af, Atten= 0%, Lag= 0.0 min

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

### Reach OP3: Observation Point OP3

Hydrograph



12916EX01A

Type III 24-hr 50-Year Rainfall=6.66"

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Page 18

**Summary for Pond EX 1P: Existing Dual 24" Driveway Culverts**

Inflow Area = 4.588 ac, 0.00% Impervious, Inflow Depth = 0.52" for 50-Year event  
 Inflow = 0.82 cfs @ 12.57 hrs, Volume= 0.200 af  
 Outflow = 0.82 cfs @ 12.57 hrs, Volume= 0.200 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.82 cfs @ 12.57 hrs, Volume= 0.200 af  
 Routed to Reach OP1 : Observation Point OP1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 114.03' @ 12.57 hrs

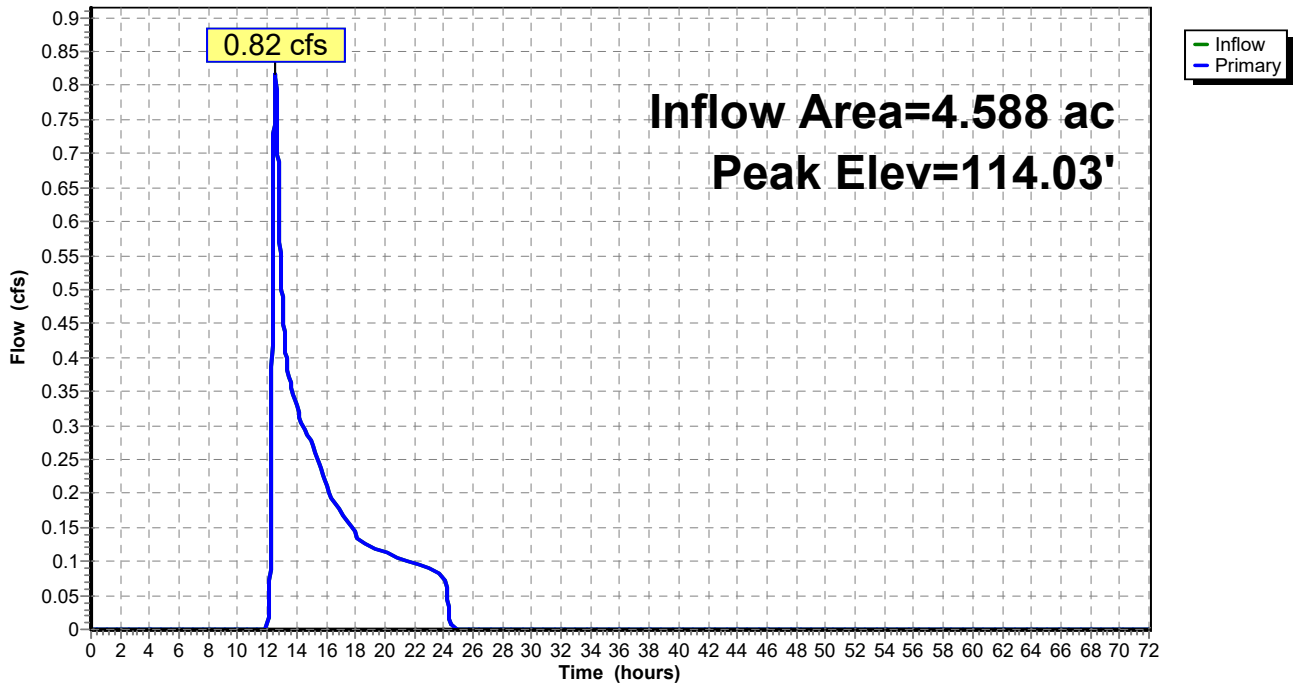
Device	Routing	Invert	Outlet Devices
#1	Primary	113.73'	<b>24.0" Round 24" CMP Driveway Culvert (North)</b> L= 55.7' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 113.73' / 113.49' S= 0.0043 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#2	Primary	113.52'	<b>24.0" Round 24" CMP Driveway Culvert (South)</b> L= 55.5' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 113.52' / 113.37' S= 0.0027 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf

Primary OutFlow Max=0.82 cfs @ 12.57 hrs HW=114.03' TW=0.00' (Dynamic Tailwater)

- 1=24" CMP Driveway Culvert (North) (Barrel Controls 0.22 cfs @ 1.14 fps)
- 2=24" CMP Driveway Culvert (South) (Barrel Controls 0.59 cfs @ 1.42 fps)

**Pond EX 1P: Existing Dual 24" Driveway Culverts**

Hydrograph



## **Section 2.1: Developed Conditions**

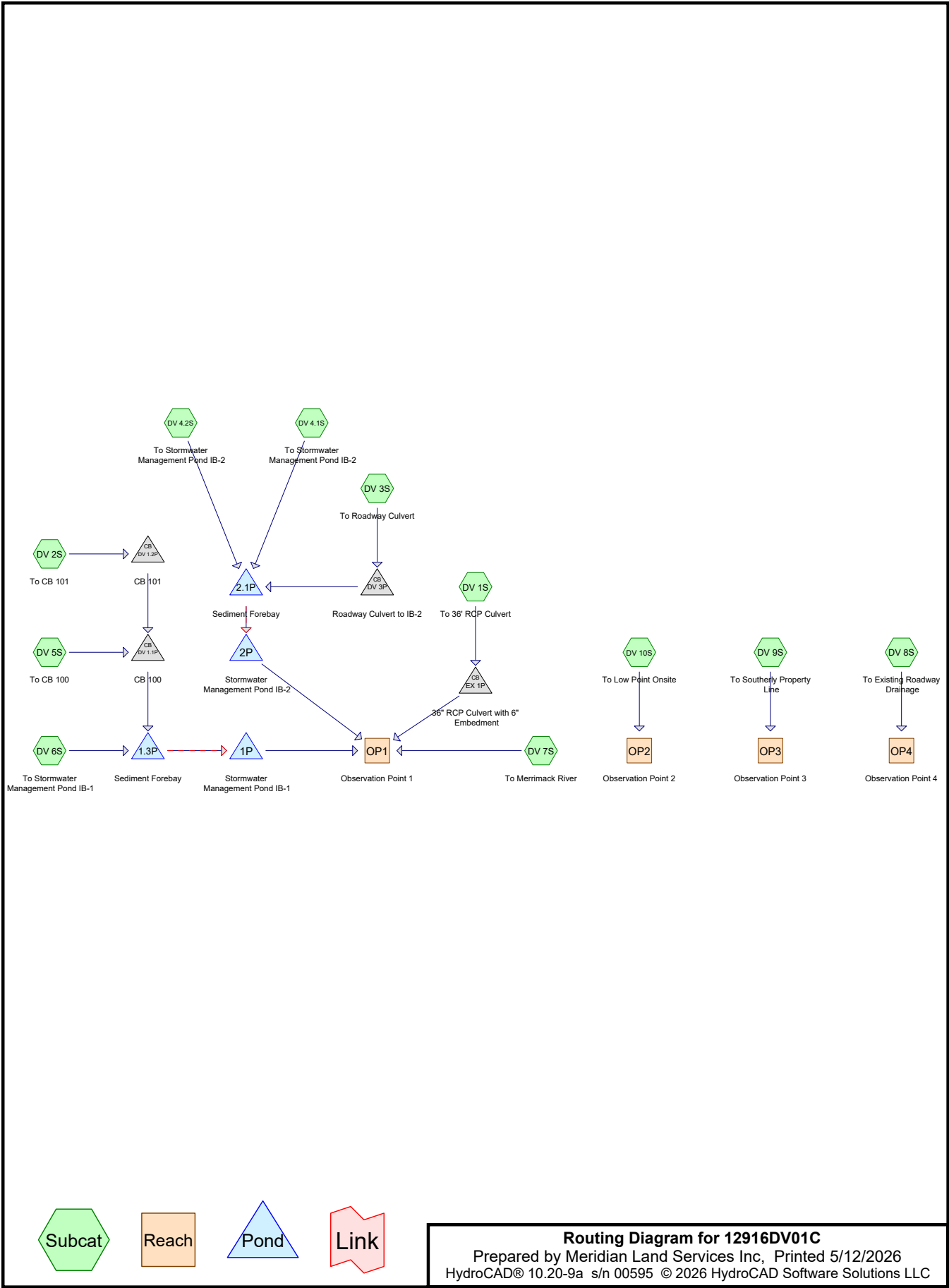
Routing Diagram

Area and Soils Listings

2-, 10-, 25- and 50-year Storm Nodes

50-Year Frozen Ground Conditions





**Routing Diagram for 12916DV01C**  
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**12916DV01C**

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Page 2

**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
5.038	39	>75% Grass cover, Good HSG A (DV 1S, DV 2S, DV 3S)
6.374	61	>75% Grass cover, Good HSG B (DV 10S, DV 1S, DV 2S, DV 3S, DV 4.1S, DV 4.2S, DV 5S, DV 6S, DV 7S, DV 8S, DV 9S)
0.031	98	Paved parking HSG A (DV 2S, DV 5S)
0.696	98	Paved parking HSG B (DV 2S, DV 4.1S, DV 4.2S, DV 5S, DV 7S, DV 8S)
0.058	98	Roofs HSG B (DV 7S)
1.446	30	Woods, Good HSG A (DV 1S, DV 2S, DV 3S)
2.965	55	Woods, Good HSG B (DV 10S, DV 1S, DV 3S, DV 5S, DV 7S)
0.204	77	Woods, Good HSG D (DV 7S)
<b>16.812</b>	<b>53</b>	<b>TOTAL AREA</b>

**12916DV01C**

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Page 3

**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
6.515	HSG A	DV 1S, DV 2S, DV 3S, DV 5S
10.093	HSG B	DV 10S, DV 1S, DV 2S, DV 3S, DV 4.1S, DV 4.2S, DV 5S, DV 6S, DV 7S, DV 8S, DV 9S
0.000	HSG C	
0.204	HSG D	DV 7S
0.000	Other	
<b>16.812</b>		<b>TOTAL AREA</b>

# Attachment "E"

12916DV01C

Type III 24-hr 2-Year Rainfall=2.93"

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Page 4

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

**Subcatchment DV 10S: To Low Point Onsite** Runoff Area=53,526 sf 0.00% Impervious Runoff Depth=0.31"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=0.18 cfs 0.032 af

**Subcatchment DV 1S: To 36' RCP Culvert** Runoff Area=210,528 sf 0.00% Impervious Runoff Depth=0.00"  
Flow Length=442' Slope=0.0580 '/' Tc=20.5 min CN=39 Runoff=0.00 cfs 0.000 af

**Subcatchment DV 2S: To CB 101** Runoff Area=77,511 sf 5.06% Impervious Runoff Depth=0.00"  
Flow Length=620' Slope=0.0409 '/' Tc=30.2 min CN=41 Runoff=0.00 cfs 0.000 af

**Subcatchment DV 3S: To Roadway Culvert** Runoff Area=40,352 sf 0.00% Impervious Runoff Depth=0.10"  
Flow Length=297' Slope=0.0339 '/' Tc=14.2 min CN=51 Runoff=0.01 cfs 0.007 af

**Subcatchment DV 4.1S: To Stormwater** Runoff Area=10,360 sf 45.31% Impervious Runoff Depth=1.08"  
Flow Length=129' Slope=0.0296 '/' Tc=6.0 min CN=78 Runoff=0.29 cfs 0.021 af

**Subcatchment DV 4.2S: To Stormwater** Runoff Area=10,056 sf 57.47% Impervious Runoff Depth=1.32"  
Flow Length=117' Slope=0.0383 '/' Tc=6.0 min CN=82 Runoff=0.36 cfs 0.025 af

**Subcatchment DV 5S: To CB 100** Runoff Area=7,304 sf 67.03% Impervious Runoff Depth=1.60"  
Flow Length=198' Slope=0.0825 '/' Tc=6.0 min CN=86 Runoff=0.32 cfs 0.022 af

**Subcatchment DV 6S: To Stormwater** Runoff Area=3,657 sf 0.00% Impervious Runoff Depth=0.34"  
Slope=0.0092 '/' Tc=0.0 min CN=61 Runoff=0.02 cfs 0.002 af

**Subcatchment DV 7S: To Merrimack River** Runoff Area=246,411 sf 3.75% Impervious Runoff Depth=0.31"  
Flow Length=943' Slope=0.2190 '/' Tc=11.2 min CN=60 Runoff=0.84 cfs 0.145 af

**Subcatchment DV 8S: To Existing Roadway** Runoff Area=9,851 sf 57.88% Impervious Runoff Depth=1.32"  
Flow Length=186' Slope=0.0164 '/' Tc=6.1 min CN=82 Runoff=0.35 cfs 0.025 af

**Subcatchment DV 9S: To Southerly** Runoff Area=62,781 sf 0.00% Impervious Runoff Depth=0.34"  
Flow Length=206' Slope=0.0140 '/' Tc=12.8 min CN=61 Runoff=0.25 cfs 0.041 af

**Reach OP1: Observation Point 1** Inflow=0.84 cfs 0.145 af  
Outflow=0.84 cfs 0.145 af

**Reach OP2: Observation Point 2** Inflow=0.18 cfs 0.032 af  
Outflow=0.18 cfs 0.032 af

**Reach OP3: Observation Point 3** Inflow=0.25 cfs 0.041 af  
Outflow=0.25 cfs 0.041 af

**Reach OP4: Observation Point 4** Inflow=0.35 cfs 0.025 af  
Outflow=0.35 cfs 0.025 af

**Pond 1.3P: Sediment Forebay** Peak Elev=119.68' Storage=64 cf Inflow=0.33 cfs 0.025 af  
Primary=0.31 cfs 0.025 af Secondary=0.00 cfs 0.000 af Outflow=0.31 cfs 0.025 af

**12916DV01C**

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Type III 24-hr 2-Year Rainfall=2.93"

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Page 5

**Pond 1P: Stormwater Management Pond IB-1** Peak Elev=119.68' Storage=567 cf Inflow=0.31 cfs 0.025 af  
Discarded=0.01 cfs 0.025 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.025 af

**Pond 2.1P: Sediment Forebay** Peak Elev=122.01' Storage=66 cf Inflow=0.65 cfs 0.054 af  
Primary=0.63 cfs 0.054 af Secondary=0.00 cfs 0.000 af Outflow=0.63 cfs 0.054 af

**Pond 2P: Stormwater Management Pond IB-2** Peak Elev=122.01' Storage=633 cf Inflow=0.63 cfs 0.054 af  
Discarded=0.08 cfs 0.054 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.054 af

**Pond DV 1.1P: CB 100** Peak Elev=119.75' Inflow=0.32 cfs 0.022 af  
15.0" Round Culvert n=0.013 L=84.0' S=0.0054 '/ Outflow=0.32 cfs 0.022 af

**Pond DV 1.2P: CB 101** Peak Elev=119.75' Inflow=0.00 cfs 0.000 af  
15.0" Round Culvert n=0.013 L=18.5' S=0.0054 '/ Outflow=0.00 cfs 0.000 af

**Pond DV 3P: Roadway Culvert to IB-2** Peak Elev=122.02' Inflow=0.01 cfs 0.007 af  
15.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/ Outflow=0.01 cfs 0.007 af

**Pond EX 1P: 36" RCP Culvert with 6" Embedment** Peak Elev=116.00' Inflow=0.00 cfs 0.000 af  
36.0" Round Culvert w/ 6.0" inside fill n=0.011 L=70.2' S=0.0051 '/ Outflow=0.00 cfs 0.000 af

**Total Runoff Area = 16.812 ac Runoff Volume = 0.322 af Average Runoff Depth = 0.23"**  
**95.33% Pervious = 16.026 ac 4.67% Impervious = 0.786 ac**

# Attachment "E"

12916DV01C

Type III 24-hr 10-Year Rainfall=4.42"

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Page 6

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

**Subcatchment DV 10S: To Low Point Onsite** Runoff Area=53,526 sf 0.00% Impervious Runoff Depth=0.98"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=0.96 cfs 0.100 af

**Subcatchment DV 1S: To 36' RCP Culvert** Runoff Area=210,528 sf 0.00% Impervious Runoff Depth=0.10"  
Flow Length=442' Slope=0.0580 '/' Tc=20.5 min CN=39 Runoff=0.06 cfs 0.040 af

**Subcatchment DV 2S: To CB 101** Runoff Area=77,511 sf 5.06% Impervious Runoff Depth=0.15"  
Flow Length=620' Slope=0.0409 '/' Tc=30.2 min CN=41 Runoff=0.04 cfs 0.022 af

**Subcatchment DV 3S: To Roadway Culvert** Runoff Area=40,352 sf 0.00% Impervious Runoff Depth=0.52"  
Flow Length=297' Slope=0.0339 '/' Tc=14.2 min CN=51 Runoff=0.24 cfs 0.040 af

**Subcatchment DV 4.1S: To Stormwater** Runoff Area=10,360 sf 45.31% Impervious Runoff Depth=2.23"  
Flow Length=129' Slope=0.0296 '/' Tc=6.0 min CN=78 Runoff=0.62 cfs 0.044 af

**Subcatchment DV 4.2S: To Stormwater** Runoff Area=10,056 sf 57.47% Impervious Runoff Depth=2.57"  
Flow Length=117' Slope=0.0383 '/' Tc=6.0 min CN=82 Runoff=0.69 cfs 0.049 af

**Subcatchment DV 5S: To CB 100** Runoff Area=7,304 sf 67.03% Impervious Runoff Depth=2.93"  
Flow Length=198' Slope=0.0825 '/' Tc=6.0 min CN=86 Runoff=0.57 cfs 0.041 af

**Subcatchment DV 6S: To Stormwater** Runoff Area=3,657 sf 0.00% Impervious Runoff Depth=1.03"  
Slope=0.0092 '/' Tc=0.0 min CN=61 Runoff=0.11 cfs 0.007 af

**Subcatchment DV 7S: To Merrimack River** Runoff Area=246,411 sf 3.75% Impervious Runoff Depth=0.98"  
Flow Length=943' Slope=0.2190 '/' Tc=11.2 min CN=60 Runoff=4.55 cfs 0.460 af

**Subcatchment DV 8S: To Existing Roadway** Runoff Area=9,851 sf 57.88% Impervious Runoff Depth=2.57"  
Flow Length=186' Slope=0.0164 '/' Tc=6.1 min CN=82 Runoff=0.68 cfs 0.048 af

**Subcatchment DV 9S: To Southerly** Runoff Area=62,781 sf 0.00% Impervious Runoff Depth=1.03"  
Flow Length=206' Slope=0.0140 '/' Tc=12.8 min CN=61 Runoff=1.20 cfs 0.124 af

**Reach OP1: Observation Point 1** Inflow=4.55 cfs 0.500 af  
Outflow=4.55 cfs 0.500 af

**Reach OP2: Observation Point 2** Inflow=0.96 cfs 0.100 af  
Outflow=0.96 cfs 0.100 af

**Reach OP3: Observation Point 3** Inflow=1.20 cfs 0.124 af  
Outflow=1.20 cfs 0.124 af

**Reach OP4: Observation Point 4** Inflow=0.68 cfs 0.048 af  
Outflow=0.68 cfs 0.048 af

**Pond 1.3P: Sediment Forebay** Peak Elev=120.96' Storage=347 cf Inflow=0.64 cfs 0.070 af  
Primary=0.57 cfs 0.070 af Secondary=0.00 cfs 0.000 af Outflow=0.57 cfs 0.070 af

# Attachment "E"

**12916DV01C**

Type III 24-hr 10-Year Rainfall=4.42"

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Page 7

**Pond 1P: Stormwater Management Pond IB-1** Peak Elev=120.96' Storage=1,924 cf Inflow=0.57 cfs 0.070 af  
Discarded=0.02 cfs 0.068 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.068 af

**Pond 2.1P: Sediment Forebay** Peak Elev=122.78' Storage=289 cf Inflow=1.36 cfs 0.133 af  
Primary=1.27 cfs 0.109 af Secondary=0.10 cfs 0.024 af Outflow=1.27 cfs 0.133 af

**Pond 2P: Stormwater Management Pond IB-2** Peak Elev=122.78' Storage=2,404 cf Inflow=1.27 cfs 0.133 af  
Discarded=0.10 cfs 0.133 af Primary=0.00 cfs 0.000 af Outflow=0.10 cfs 0.133 af

**Pond DV 1.1P: CB 100** Peak Elev=120.96' Inflow=0.57 cfs 0.063 af  
15.0" Round Culvert n=0.013 L=84.0' S=0.0054 '/ Outflow=0.57 cfs 0.063 af

**Pond DV 1.2P: CB 101** Peak Elev=120.95' Inflow=0.04 cfs 0.022 af  
15.0" Round Culvert n=0.013 L=18.5' S=0.0054 '/ Outflow=0.04 cfs 0.022 af

**Pond DV 3P: Roadway Culvert to IB-2** Peak Elev=122.78' Inflow=0.24 cfs 0.040 af  
15.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/ Outflow=0.24 cfs 0.040 af

**Pond EX 1P: 36" RCP Culvert with 6" Embedment** Peak Elev=116.04' Inflow=0.06 cfs 0.040 af  
36.0" Round Culvert w/ 6.0" inside fill n=0.011 L=70.2' S=0.0051 '/ Outflow=0.06 cfs 0.040 af

**Total Runoff Area = 16.812 ac Runoff Volume = 0.976 af Average Runoff Depth = 0.70"**  
**95.33% Pervious = 16.026 ac 4.67% Impervious = 0.786 ac**

# Attachment "E"

12916DV01C

Type III 24-hr 25-Year Rainfall=5.58"

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Page 8

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

**Subcatchment DV 10S: To Low Point Onsite** Runoff Area=53,526 sf 0.00% Impervious Runoff Depth=1.65"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=1.79 cfs 0.169 af

**Subcatchment DV 1S: To 36' RCP Culvert** Runoff Area=210,528 sf 0.00% Impervious Runoff Depth=0.33"  
Flow Length=442' Slope=0.0580 '/' Tc=20.5 min CN=39 Runoff=0.42 cfs 0.134 af

**Subcatchment DV 2S: To CB 101** Runoff Area=77,511 sf 5.06% Impervious Runoff Depth=0.43"  
Flow Length=620' Slope=0.0409 '/' Tc=30.2 min CN=41 Runoff=0.22 cfs 0.063 af

**Subcatchment DV 3S: To Roadway Culvert** Runoff Area=40,352 sf 0.00% Impervious Runoff Depth=1.01"  
Flow Length=297' Slope=0.0339 '/' Tc=14.2 min CN=51 Runoff=0.64 cfs 0.078 af

**Subcatchment DV 4.1S: To Stormwater** Runoff Area=10,360 sf 45.31% Impervious Runoff Depth=3.21"  
Flow Length=129' Slope=0.0296 '/' Tc=6.0 min CN=78 Runoff=0.90 cfs 0.064 af

**Subcatchment DV 4.2S: To Stormwater** Runoff Area=10,056 sf 57.47% Impervious Runoff Depth=3.60"  
Flow Length=117' Slope=0.0383 '/' Tc=6.0 min CN=82 Runoff=0.97 cfs 0.069 af

**Subcatchment DV 5S: To CB 100** Runoff Area=7,304 sf 67.03% Impervious Runoff Depth=4.01"  
Flow Length=198' Slope=0.0825 '/' Tc=6.0 min CN=86 Runoff=0.77 cfs 0.056 af

**Subcatchment DV 6S: To Stormwater** Runoff Area=3,657 sf 0.00% Impervious Runoff Depth=1.73"  
Slope=0.0092 '/' Tc=0.0 min CN=61 Runoff=0.20 cfs 0.012 af

**Subcatchment DV 7S: To Merrimack River** Runoff Area=246,411 sf 3.75% Impervious Runoff Depth=1.65"  
Flow Length=943' Slope=0.2190 '/' Tc=11.2 min CN=60 Runoff=8.50 cfs 0.779 af

**Subcatchment DV 8S: To Existing Roadway** Runoff Area=9,851 sf 57.88% Impervious Runoff Depth=3.60"  
Flow Length=186' Slope=0.0164 '/' Tc=6.1 min CN=82 Runoff=0.95 cfs 0.068 af

**Subcatchment DV 9S: To Southerly** Runoff Area=62,781 sf 0.00% Impervious Runoff Depth=1.73"  
Flow Length=206' Slope=0.0140 '/' Tc=12.8 min CN=61 Runoff=2.19 cfs 0.208 af

**Reach OP1: Observation Point 1** Inflow=8.50 cfs 0.991 af  
Outflow=8.50 cfs 0.991 af

**Reach OP2: Observation Point 2** Inflow=1.79 cfs 0.169 af  
Outflow=1.79 cfs 0.169 af

**Reach OP3: Observation Point 3** Inflow=2.19 cfs 0.208 af  
Outflow=2.19 cfs 0.208 af

**Reach OP4: Observation Point 4** Inflow=0.95 cfs 0.068 af  
Outflow=0.95 cfs 0.068 af

**Pond 1.3P: Sediment Forebay** Peak Elev=121.52' Storage=559 cf Inflow=0.89 cfs 0.131 af  
Primary=0.78 cfs 0.069 af Secondary=0.20 cfs 0.062 af Outflow=0.78 cfs 0.131 af

# Attachment "E"

**12916DV01C**

Type III 24-hr 25-Year Rainfall=5.58"

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Page 9

**Pond 1P: Stormwater Management Pond IB-1** Peak Elev=121.52' Storage=2,661 cf Inflow=0.78 cfs 0.131 af  
Discarded=0.02 cfs 0.079 af Primary=0.11 cfs 0.038 af Outflow=0.13 cfs 0.117 af

**Pond 2.1P: Sediment Forebay** Peak Elev=123.05' Storage=388 cf Inflow=2.17 cfs 0.211 af  
Primary=1.98 cfs 0.089 af Secondary=0.82 cfs 0.122 af Outflow=1.98 cfs 0.210 af

**Pond 2P: Stormwater Management Pond IB-2** Peak Elev=123.05' Storage=3,105 cf Inflow=1.98 cfs 0.210 af  
Discarded=0.10 cfs 0.169 af Primary=0.42 cfs 0.041 af Outflow=0.52 cfs 0.210 af

**Pond DV 1.1P: CB 100** Peak Elev=121.52' Inflow=0.77 cfs 0.119 af  
15.0" Round Culvert n=0.013 L=84.0' S=0.0054 '/ Outflow=0.77 cfs 0.119 af

**Pond DV 1.2P: CB 101** Peak Elev=121.52' Inflow=0.22 cfs 0.063 af  
15.0" Round Culvert n=0.013 L=18.5' S=0.0054 '/ Outflow=0.22 cfs 0.063 af

**Pond DV 3P: Roadway Culvert to IB-2** Peak Elev=123.05' Inflow=0.64 cfs 0.078 af  
15.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/ Outflow=0.64 cfs 0.078 af

**Pond EX 1P: 36" RCP Culvert with 6" Embedment** Peak Elev=116.15' Inflow=0.42 cfs 0.134 af  
36.0" Round Culvert w/ 6.0" inside fill n=0.011 L=70.2' S=0.0051 '/ Outflow=0.42 cfs 0.134 af

**Total Runoff Area = 16.812 ac Runoff Volume = 1.700 af Average Runoff Depth = 1.21"**  
**95.33% Pervious = 16.026 ac 4.67% Impervious = 0.786 ac**

# Attachment "E"

12916DV01C

Type III 24-hr 50-Year Rainfall=6.66"

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Page 10

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

**Subcatchment DV 10S: To Low Point Onsite** Runoff Area=53,526 sf 0.00% Impervious Runoff Depth=2.37"  
Flow Length=249' Slope=0.0223 '/' Tc=12.1 min CN=60 Runoff=2.68 cfs 0.242 af

**Subcatchment DV 1S: To 36' RCP Culvert** Runoff Area=210,528 sf 0.00% Impervious Runoff Depth=0.65"  
Flow Length=442' Slope=0.0580 '/' Tc=20.5 min CN=39 Runoff=1.29 cfs 0.262 af

**Subcatchment DV 2S: To CB 101** Runoff Area=77,511 sf 5.06% Impervious Runoff Depth=0.79"  
Flow Length=620' Slope=0.0409 '/' Tc=30.2 min CN=41 Runoff=0.57 cfs 0.117 af

**Subcatchment DV 3S: To Roadway Culvert** Runoff Area=40,352 sf 0.00% Impervious Runoff Depth=1.57"  
Flow Length=297' Slope=0.0339 '/' Tc=14.2 min CN=51 Runoff=1.12 cfs 0.121 af

**Subcatchment DV 4.1S: To Stormwater** Runoff Area=10,360 sf 45.31% Impervious Runoff Depth=4.17"  
Flow Length=129' Slope=0.0296 '/' Tc=6.0 min CN=78 Runoff=1.16 cfs 0.083 af

**Subcatchment DV 4.2S: To Stormwater** Runoff Area=10,056 sf 57.47% Impervious Runoff Depth=4.60"  
Flow Length=117' Slope=0.0383 '/' Tc=6.0 min CN=82 Runoff=1.23 cfs 0.088 af

**Subcatchment DV 5S: To CB 100** Runoff Area=7,304 sf 67.03% Impervious Runoff Depth=5.04"  
Flow Length=198' Slope=0.0825 '/' Tc=6.0 min CN=86 Runoff=0.96 cfs 0.070 af

**Subcatchment DV 6S: To Stormwater** Runoff Area=3,657 sf 0.00% Impervious Runoff Depth=2.46"  
Slope=0.0092 '/' Tc=0.0 min CN=61 Runoff=0.29 cfs 0.017 af

**Subcatchment DV 7S: To Merrimack River** Runoff Area=246,411 sf 3.75% Impervious Runoff Depth=2.37"  
Flow Length=943' Slope=0.2190 '/' Tc=11.2 min CN=60 Runoff=12.66 cfs 1.115 af

**Subcatchment DV 8S: To Existing Roadway** Runoff Area=9,851 sf 57.88% Impervious Runoff Depth=4.60"  
Flow Length=186' Slope=0.0164 '/' Tc=6.1 min CN=82 Runoff=1.20 cfs 0.087 af

**Subcatchment DV 9S: To Southerly** Runoff Area=62,781 sf 0.00% Impervious Runoff Depth=2.46"  
Flow Length=206' Slope=0.0140 '/' Tc=12.8 min CN=61 Runoff=3.22 cfs 0.295 af

**Reach OP1: Observation Point 1** Inflow=12.87 cfs 1.594 af  
Outflow=12.87 cfs 1.594 af

**Reach OP2: Observation Point 2** Inflow=2.68 cfs 0.242 af  
Outflow=2.68 cfs 0.242 af

**Reach OP3: Observation Point 3** Inflow=3.22 cfs 0.295 af  
Outflow=3.22 cfs 0.295 af

**Reach OP4: Observation Point 4** Inflow=1.20 cfs 0.087 af  
Outflow=1.20 cfs 0.087 af

**Pond 1.3P: Sediment Forebay** Peak Elev=121.55' Storage=573 cf Inflow=1.14 cfs 0.204 af  
Primary=0.97 cfs 0.070 af Secondary=0.50 cfs 0.133 af Outflow=0.97 cfs 0.204 af

# Attachment "E"

**12916DV01C**

Type III 24-hr 50-Year Rainfall=6.66"

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Page 11

**Pond 1P: Stormwater Management Pond IB-1** Peak Elev=121.55' Storage=2,705 cf Inflow=0.97 cfs 0.204 af  
Discarded=0.02 cfs 0.080 af Primary=0.47 cfs 0.109 af Outflow=0.49 cfs 0.189 af

**Pond 2.1P: Sediment Forebay** Peak Elev=123.12' Storage=416 cf Inflow=3.05 cfs 0.292 af  
Primary=2.74 cfs 0.094 af Secondary=1.81 cfs 0.196 af Outflow=2.74 cfs 0.291 af

**Pond 2P: Stormwater Management Pond IB-2** Peak Elev=123.12' Storage=3,296 cf Inflow=2.74 cfs 0.291 af  
Discarded=0.10 cfs 0.184 af Primary=1.67 cfs 0.107 af Outflow=1.77 cfs 0.291 af

**Pond DV 1.1P: CB 100** Peak Elev=121.56' Inflow=0.97 cfs 0.187 af  
15.0" Round Culvert n=0.013 L=84.0' S=0.0054 '/ Outflow=0.97 cfs 0.187 af

**Pond DV 1.2P: CB 101** Peak Elev=121.56' Inflow=0.57 cfs 0.117 af  
15.0" Round Culvert n=0.013 L=18.5' S=0.0054 '/ Outflow=0.57 cfs 0.117 af

**Pond DV 3P: Roadway Culvert to IB-2** Peak Elev=123.15' Inflow=1.12 cfs 0.121 af  
15.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/ Outflow=1.12 cfs 0.121 af

**Pond EX 1P: 36" RCP Culvert with 6" Embedment** Peak Elev=116.30' Inflow=1.29 cfs 0.262 af  
36.0" Round Culvert w/ 6.0" inside fill n=0.011 L=70.2' S=0.0051 '/ Outflow=1.29 cfs 0.262 af

**Total Runoff Area = 16.812 ac Runoff Volume = 2.498 af Average Runoff Depth = 1.78"**  
**95.33% Pervious = 16.026 ac 4.67% Impervious = 0.786 ac**





12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 1

**Summary for Subcatchment DV 10S: To Low Point Onsite**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 7.92 cfs @ 12.16 hrs, Volume= 0.791 af, Depth= 7.72"  
 Routed to Reach OP2 : Observation Point 2

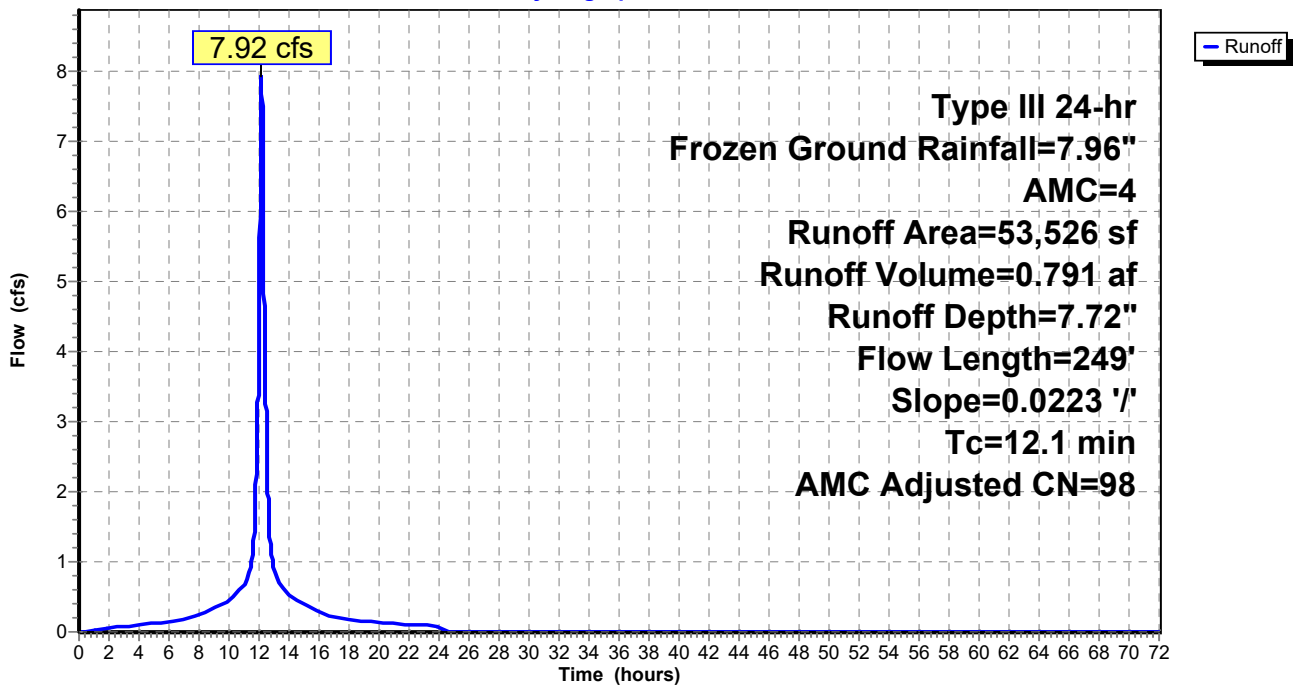
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
4,801	55		Woods, Good HSG B
48,725	61		>75% Grass cover, Good HSG B
53,526	60	98	Weighted Average, AMC Adjusted
53,526			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	249	0.0223	0.34		Lag/CN Method,

**Subcatchment DV 10S: To Low Point Onsite**

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 2

**Summary for Subcatchment DV 1S: To 36' RCP Culvert**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 25.53 cfs @ 12.27 hrs, Volume= 3.109 af, Depth= 7.72"  
 Routed to Pond EX 1P : 36" RCP Culvert with 6" Embedment

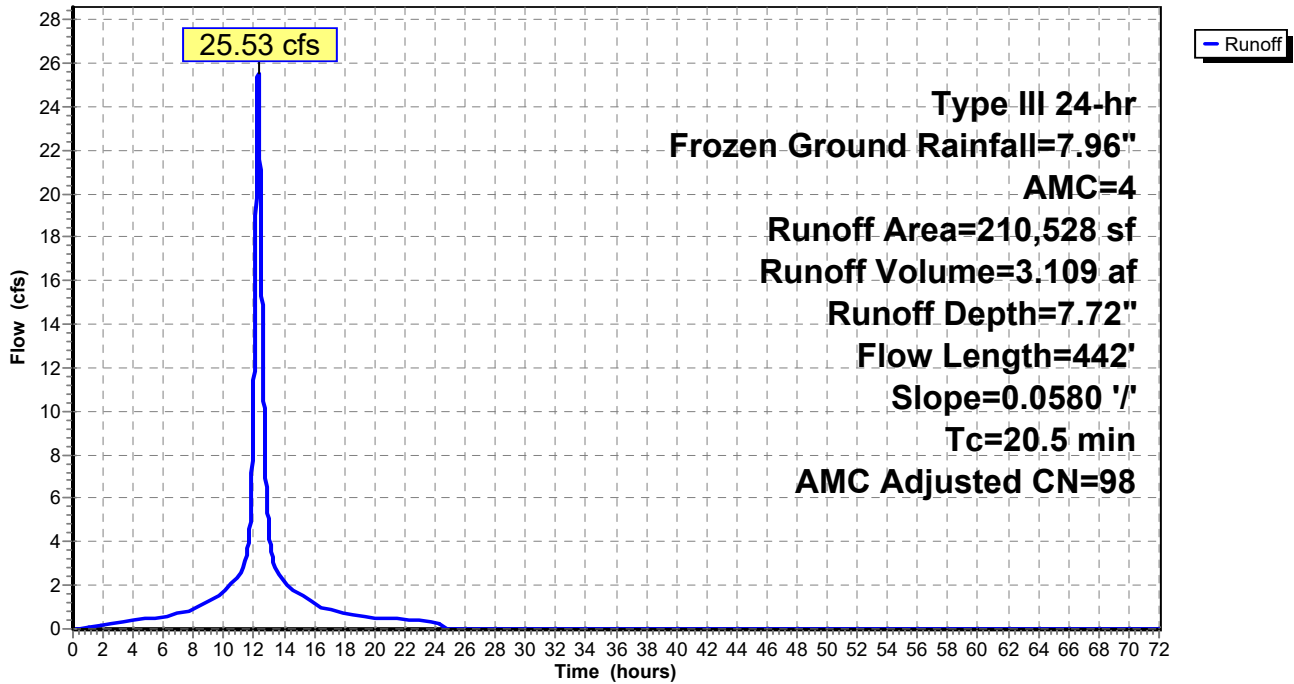
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
48	55		Woods, Good HSG B
49,416	30		Woods, Good HSG A
143,858	39		>75% Grass cover, Good HSG A
17,206	61		>75% Grass cover, Good HSG B
210,528	39	98	Weighted Average, AMC Adjusted
210,528			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	442	0.0580	0.36		Lag/CN Method,

**Subcatchment DV 1S: To 36' RCP Culvert**

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 3

Summary for Subcatchment DV 2S: To CB 101

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Runoff = 7.97 cfs @ 12.38 hrs, Volume= 1.145 af, Depth= 7.72"  
 Routed to Pond DV 1.2P : CB 101

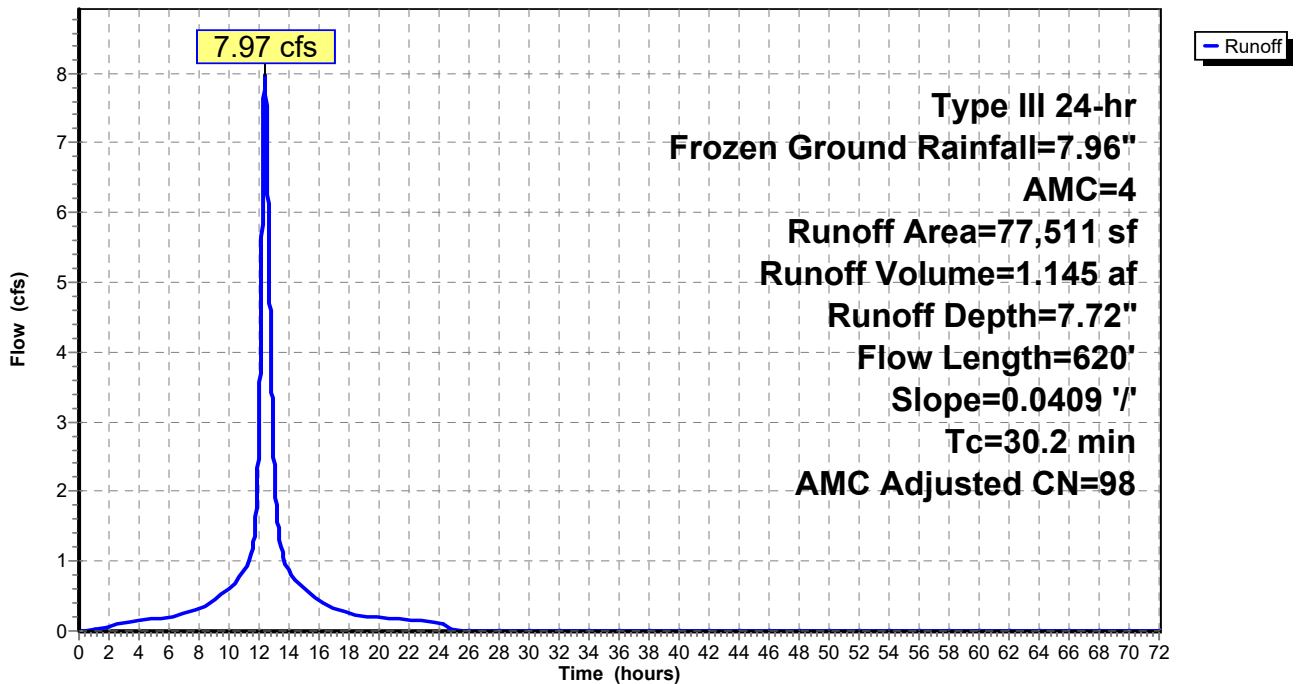
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
1,196	98		Paved parking HSG A
2,723	98		Paved parking HSG B
12,398	30		Woods, Good HSG A
58,940	39		>75% Grass cover, Good HSG A
2,254	61		>75% Grass cover, Good HSG B
77,511	41	98	Weighted Average, AMC Adjusted
73,592			94.94% Pervious Area
3,919			5.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	620	0.0409	0.34		Lag/CN Method,

Subcatchment DV 2S: To CB 101

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 4

**Summary for Subcatchment DV 3S: To Roadway Culvert**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 5.65 cfs @ 12.19 hrs, Volume= 0.596 af, Depth= 7.72"  
 Routed to Pond DV 3P : Roadway Culvert to IB-2

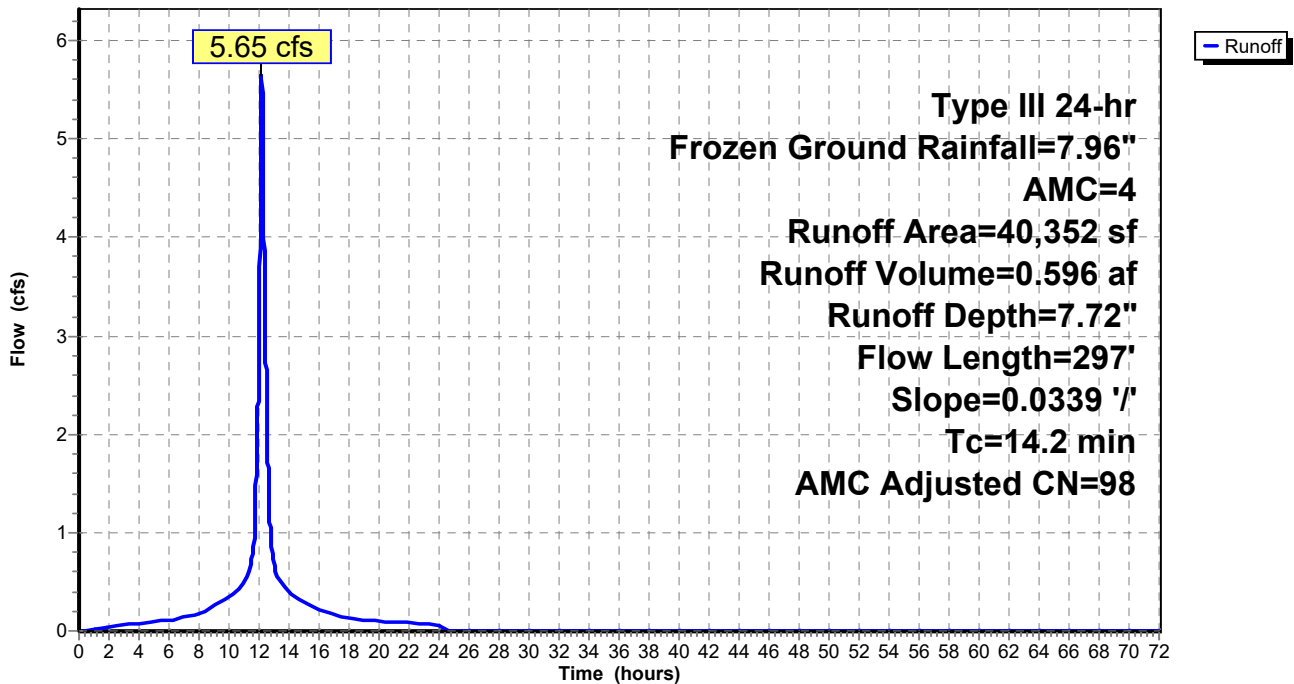
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
1,155	30		Woods, Good HSG A
2,496	55		Woods, Good HSG B
16,638	39		>75% Grass cover, Good HSG A
20,063	61		>75% Grass cover, Good HSG B
40,352	51	98	Weighted Average, AMC Adjusted
40,352			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	297	0.0339	0.35		Lag/CN Method,

**Subcatchment DV 3S: To Roadway Culvert**

Hydrograph



**12916DV01C**

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 5

## Summary for Subcatchment DV 4.1S: To Stormwater Management Pond IB-2

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.86 cfs @ 12.08 hrs, Volume= 0.153 af, Depth= 7.72"  
 Routed to Pond 2.1P : Sediment Forebay

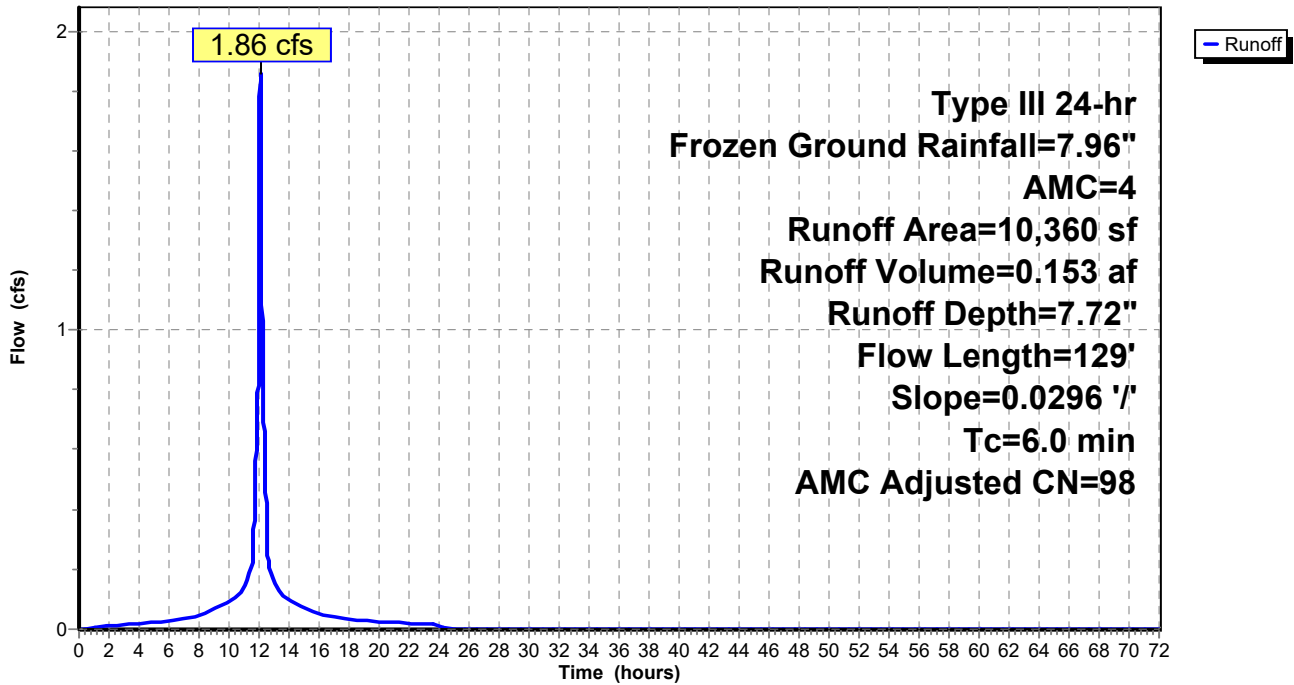
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
4,694	98		Paved parking HSG B
5,666	61		>75% Grass cover, Good HSG B
10,360	78	98	Weighted Average, AMC Adjusted
5,666			54.69% Pervious Area
4,694			45.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	129	0.0296	0.56		<b>Lag/CN Method,</b>
3.8	129	Total, Increased to minimum Tc = 6.0 min			

## Subcatchment DV 4.1S: To Stormwater Management Pond IB-2

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 6

**Summary for Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.80 cfs @ 12.08 hrs, Volume= 0.149 af, Depth= 7.72"  
 Routed to Pond 2.1P : Sediment Forebay

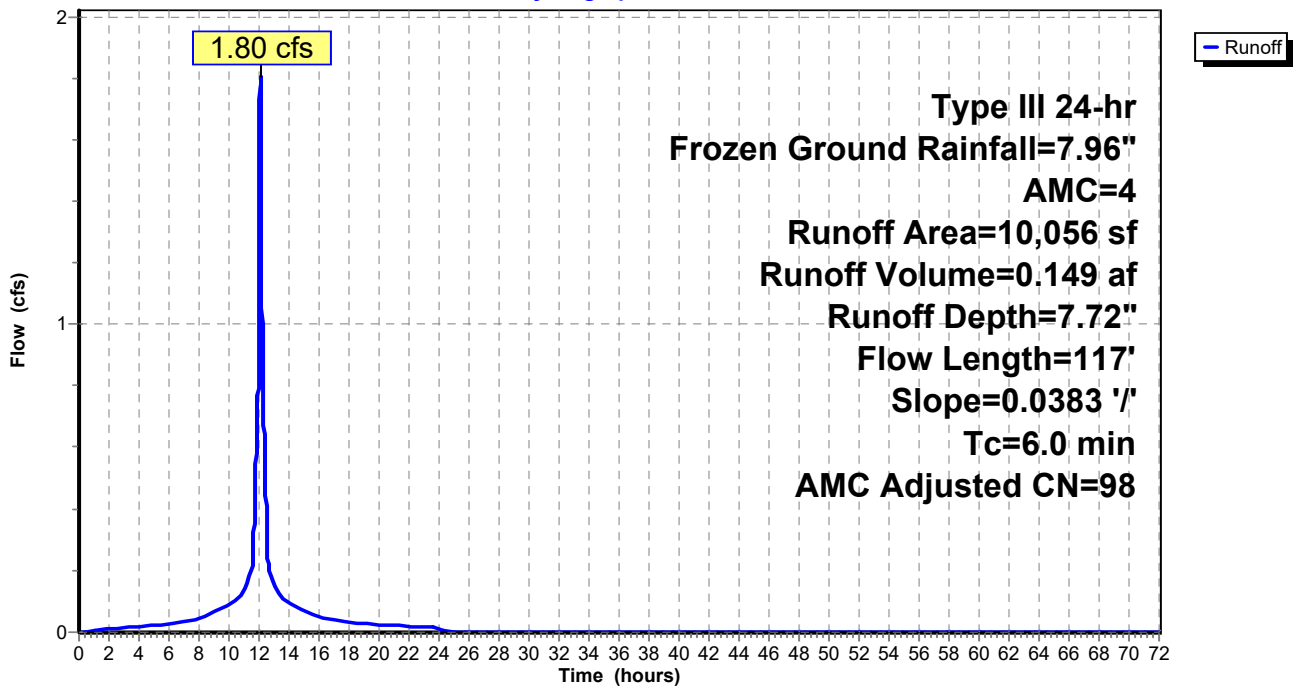
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
5,779	98		Paved parking HSG B
4,277	61		>75% Grass cover, Good HSG B
10,056	82	98	Weighted Average, AMC Adjusted
4,277			42.53% Pervious Area
5,779			57.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	117	0.0383	0.71		Lag/CN Method,
2.7	117	Total, Increased to minimum Tc = 6.0 min			

**Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 7

Summary for Subcatchment DV 5S: To CB 100

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.31 cfs @ 12.08 hrs, Volume= 0.108 af, Depth= 7.72"  
 Routed to Pond DV 1.1P : CB 100

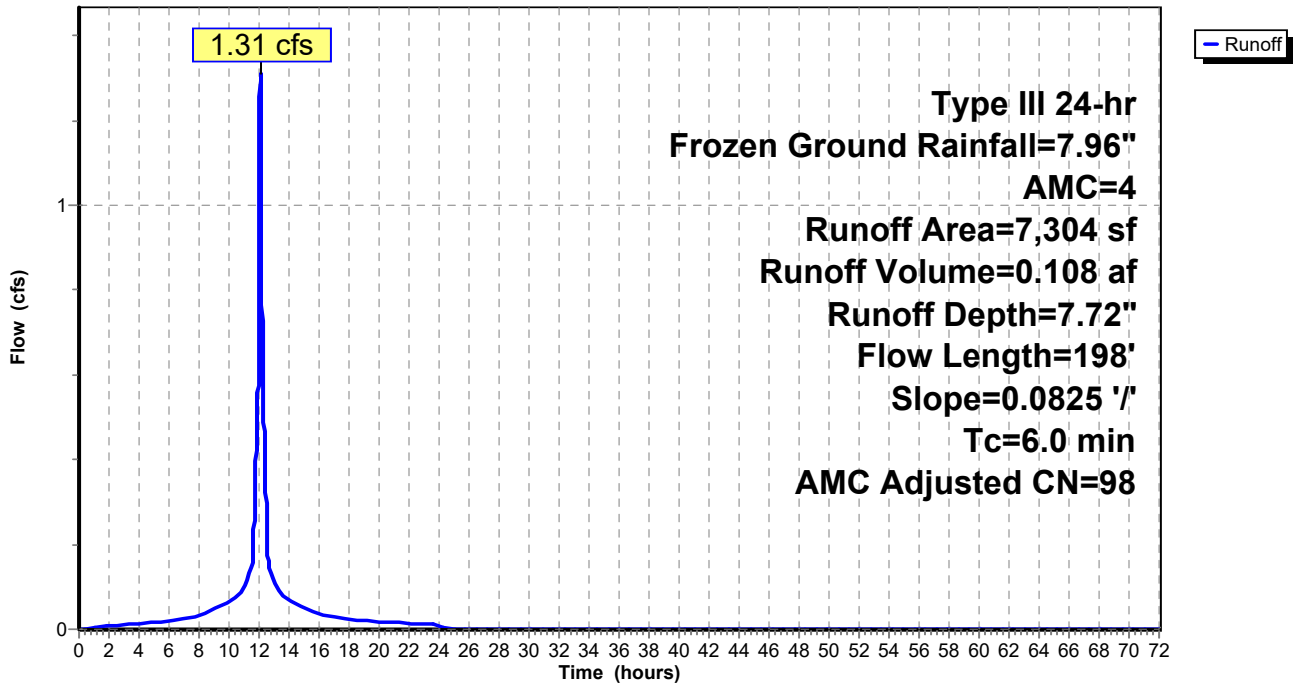
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
174	98		Paved parking HSG A
4,722	98		Paved parking HSG B
11	55		Woods, Good HSG B
2,397	61		>75% Grass cover, Good HSG B
7,304	86	98	Weighted Average, AMC Adjusted
2,408			32.97% Pervious Area
4,896			67.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	198	0.0825	1.33		Lag/CN Method,
2.5	198	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV 5S: To CB 100

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 8

**Summary for Subcatchment DV 6S: To Stormwater Management Pond IB-1**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.80 cfs @ 12.00 hrs, Volume= 0.054 af, Depth= 7.72"  
 Routed to Pond 1.3P : Sediment Forebay

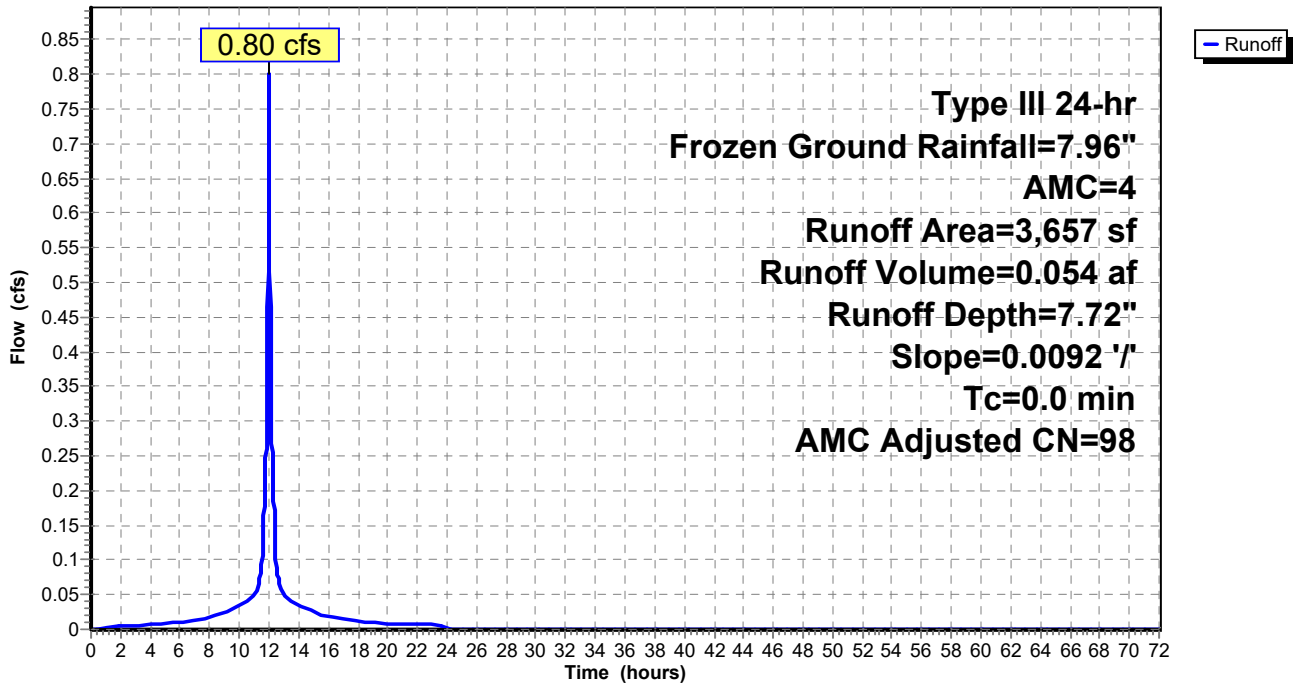
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
3,657	61		>75% Grass cover, Good HSG B
3,657	61	98	Weighted Average, AMC Adjusted
3,657			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0092			Lag/CN Method,

**Subcatchment DV 6S: To Stormwater Management Pond IB-1**

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 9

Summary for Subcatchment DV 7S: To Merrimack River

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Runoff = 37.43 cfs @ 12.15 hrs, Volume= 3.639 af, Depth= 7.72"  
 Routed to Reach OP1 : Observation Point 1

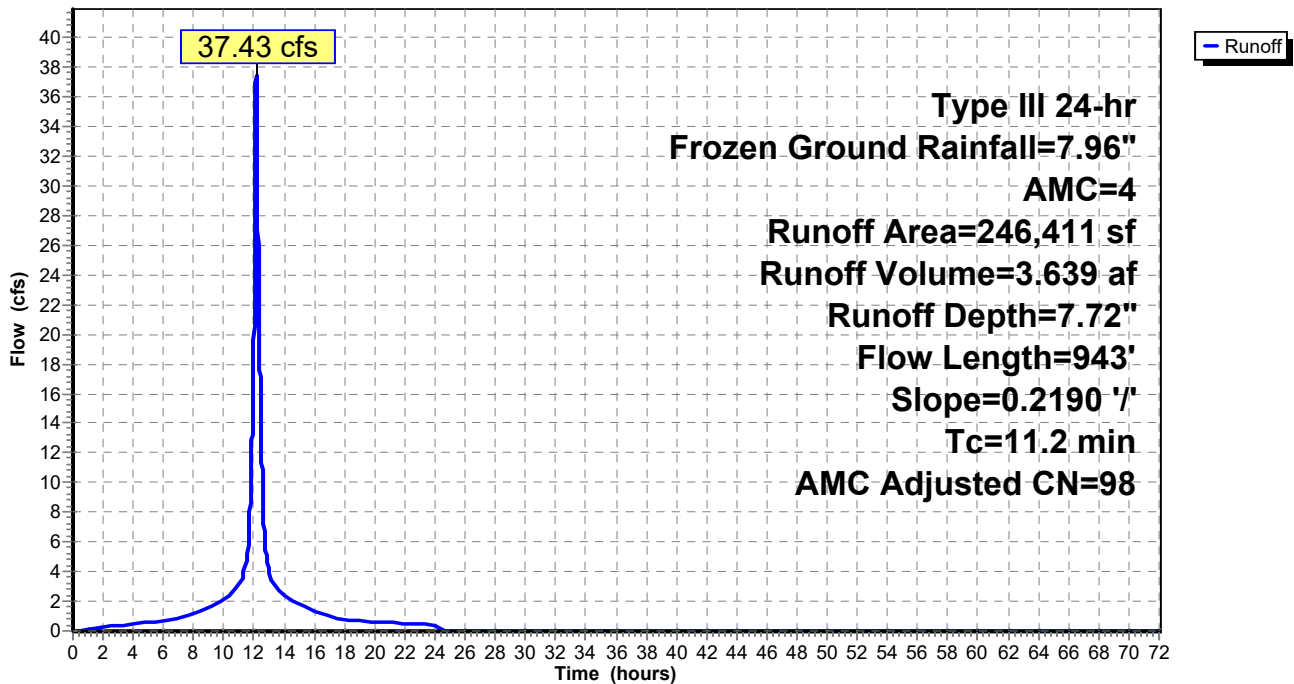
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
8,907	77		Woods, Good HSG D
6,702	98		Paved parking HSG B
2,533	98		Roofs HSG B
121,783	55		Woods, Good HSG B
106,486	61		>75% Grass cover, Good HSG B
246,411	60	98	Weighted Average, AMC Adjusted
237,176			96.25% Pervious Area
9,235			3.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	943	0.2190	1.40		Lag/CN Method,

Subcatchment DV 7S: To Merrimack River

Hydrograph



**12916DV01C**

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 10

## Summary for Subcatchment DV 8S: To Existing Roadway Drainage

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.76 cfs @ 12.08 hrs, Volume= 0.145 af, Depth= 7.72"  
 Routed to Reach OP4 : Observation Point 4

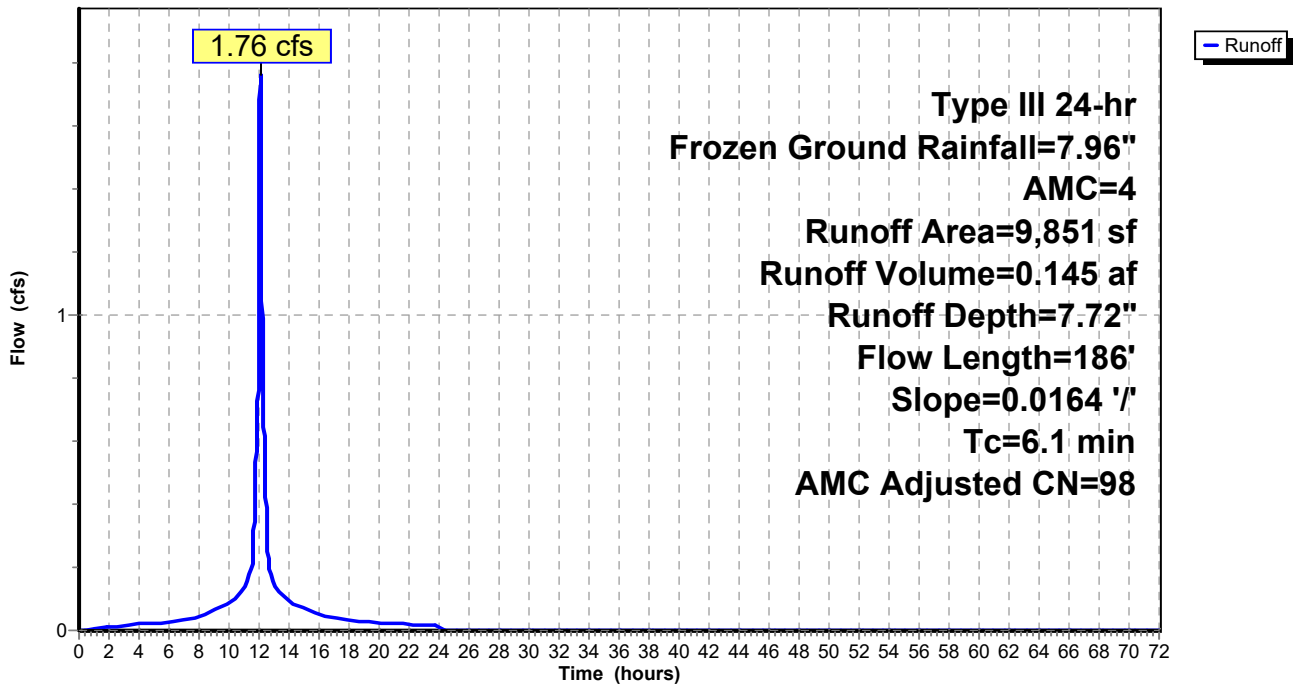
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
5,702	98		Paved parking HSG B
4,149	61		>75% Grass cover, Good HSG B
9,851	82	98	Weighted Average, AMC Adjusted
4,149			42.12% Pervious Area
5,702			57.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	186	0.0164	0.51		<b>Lag/CN Method,</b>

## Subcatchment DV 8S: To Existing Roadway Drainage

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 11

**Summary for Subcatchment DV 9S: To Southerly Property Line**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 9.12 cfs @ 12.17 hrs, Volume= 0.927 af, Depth= 7.72"  
 Routed to Reach OP3 : Observation Point 3

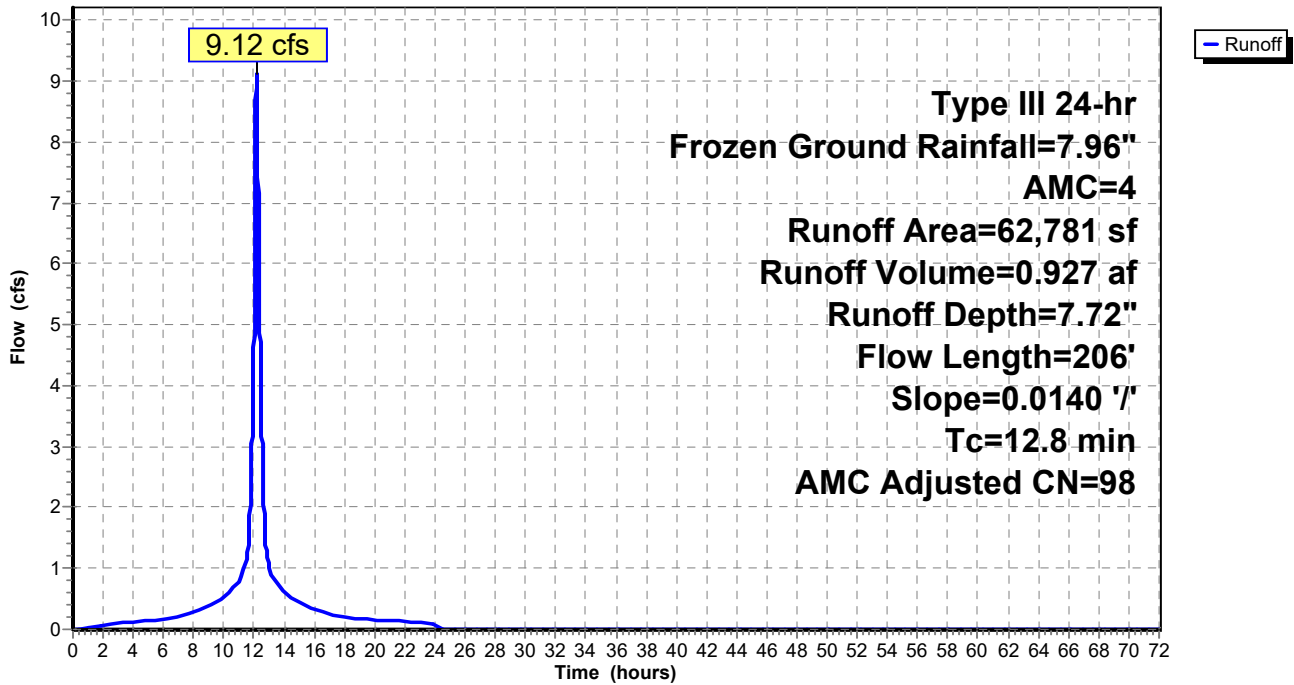
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

Area (sf)	CN	Adj	Description
62,781	61		>75% Grass cover, Good HSG B
62,781	61	98	Weighted Average, AMC Adjusted
62,781			100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	206	0.0140	0.27		Lag/CN Method,

**Subcatchment DV 9S: To Southerly Property Line**

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 12

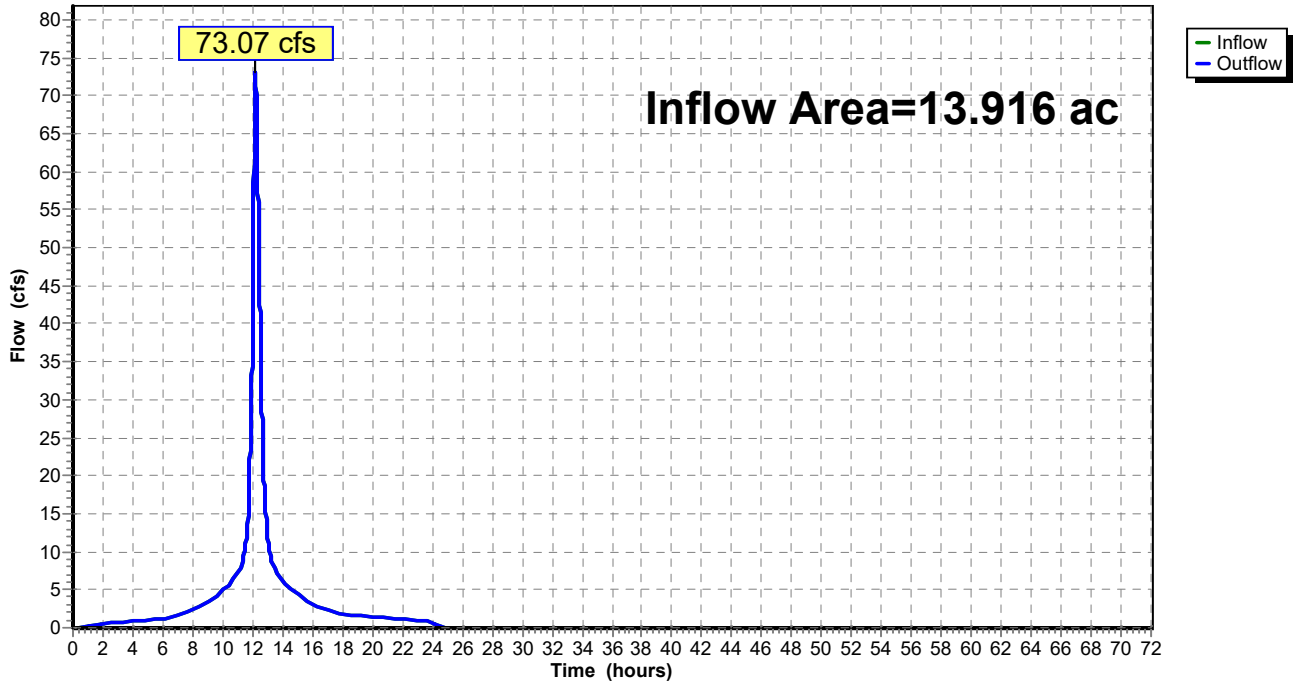
Summary for Reach OP1: Observation Point 1

Inflow Area = 13.916 ac, 4.71% Impervious, Inflow Depth = 7.41" for Frozen Ground event  
Inflow = 73.07 cfs @ 12.18 hrs, Volume= 8.592 af  
Outflow = 73.07 cfs @ 12.18 hrs, Volume= 8.592 af, Atten= 0%, Lag= 0.0 min

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

Reach OP1: Observation Point 1

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 13

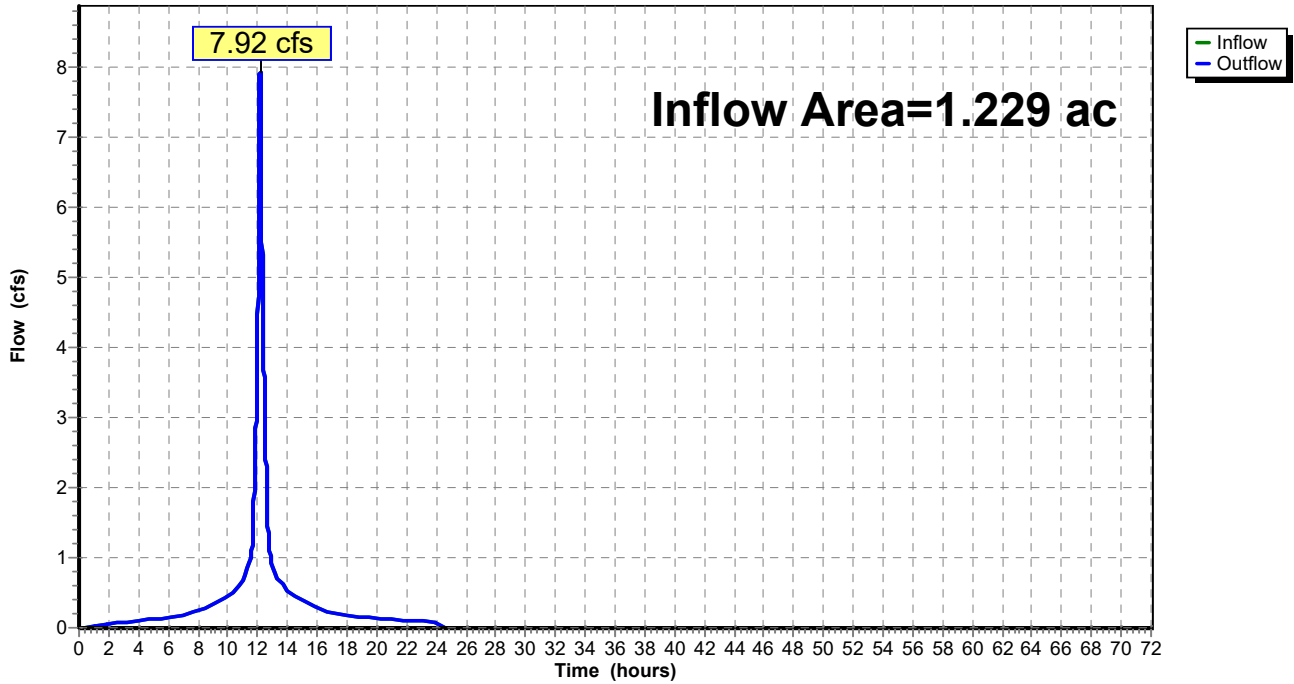
Summary for Reach OP2: Observation Point 2

Inflow Area = 1.229 ac, 0.00% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
Inflow = 7.92 cfs @ 12.16 hrs, Volume= 0.791 af  
Outflow = 7.92 cfs @ 12.16 hrs, Volume= 0.791 af, Atten= 0%, Lag= 0.0 min

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

Reach OP2: Observation Point 2

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 14

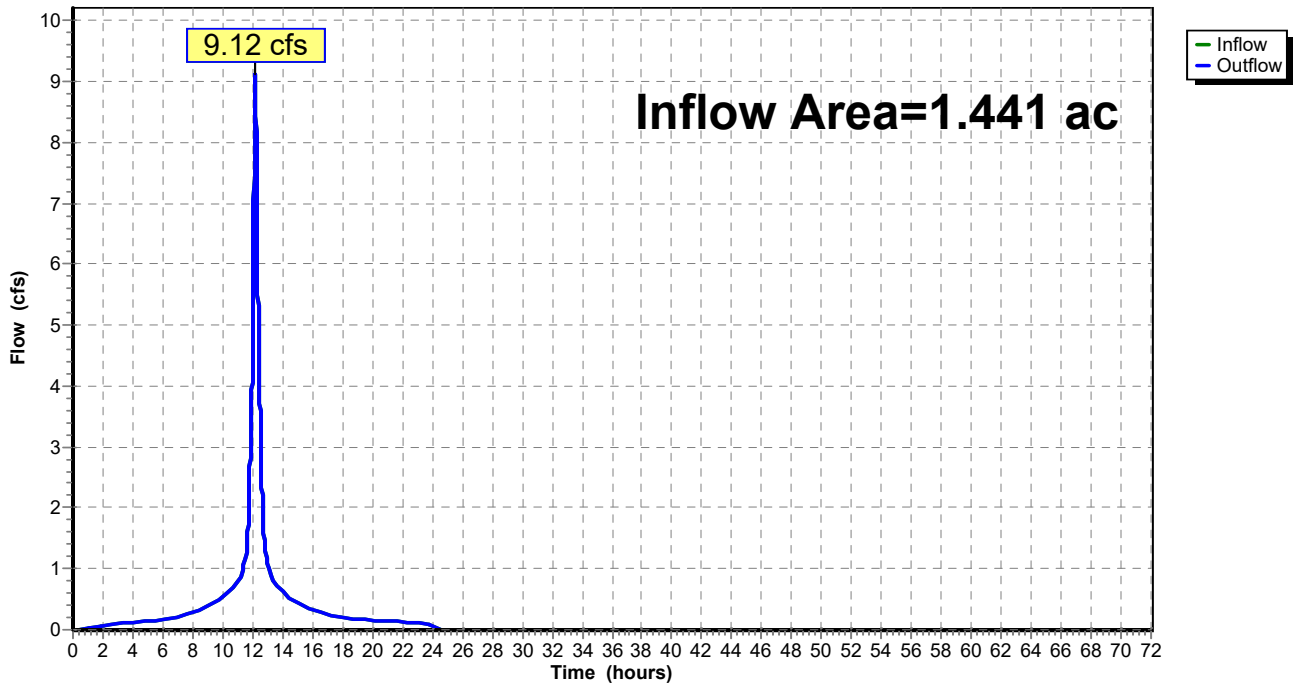
### Summary for Reach OP3: Observation Point 3

Inflow Area = 1.441 ac, 0.00% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
Inflow = 9.12 cfs @ 12.17 hrs, Volume= 0.927 af  
Outflow = 9.12 cfs @ 12.17 hrs, Volume= 0.927 af, Atten= 0%, Lag= 0.0 min

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

### Reach OP3: Observation Point 3

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 15

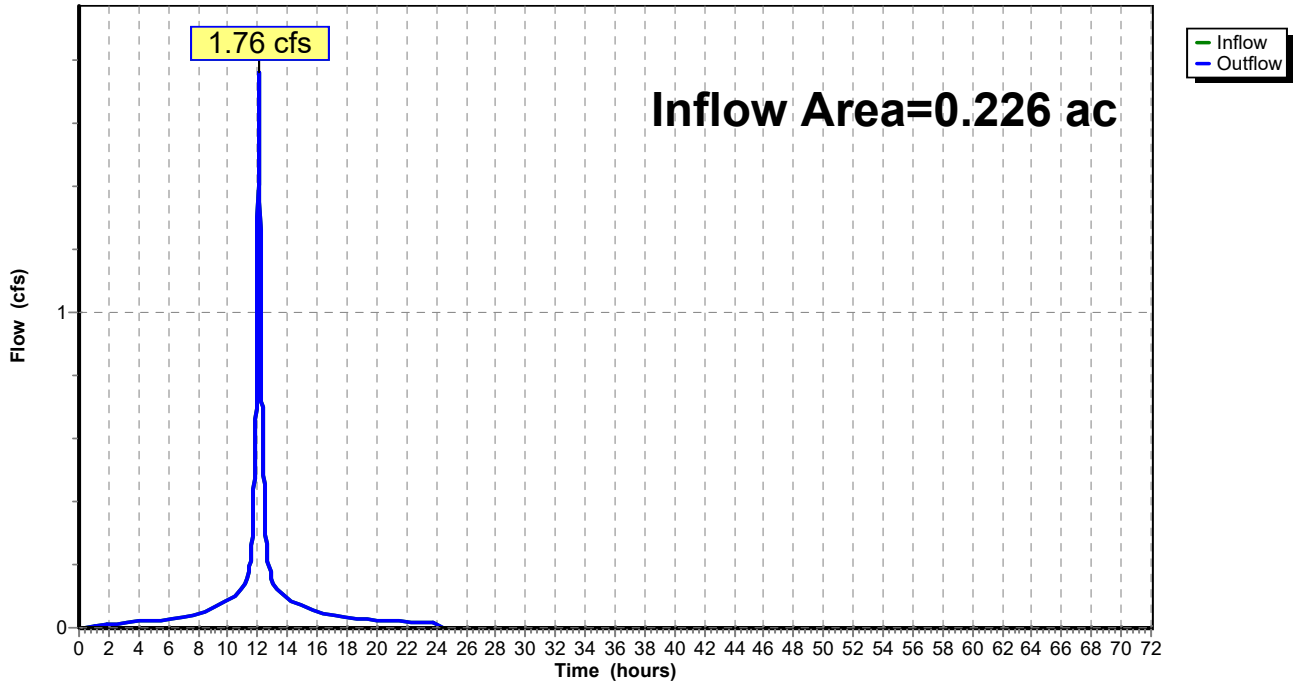
Summary for Reach OP4: Observation Point 4

Inflow Area = 0.226 ac, 57.88% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
Inflow = 1.76 cfs @ 12.08 hrs, Volume= 0.145 af  
Outflow = 1.76 cfs @ 12.08 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min

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

Reach OP4: Observation Point 4

Hydrograph



**12916DV01C**

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 16

**Summary for Pond 1.3P: Sediment Forebay**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 8.52 cfs @ 12.38 hrs, Volume= 1.307 af  
 Outflow = 8.51 cfs @ 12.38 hrs, Volume= 1.305 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.75 cfs @ 12.38 hrs, Volume= 0.129 af  
     Routed to Pond 1P : Stormwater Management Pond IB-1  
 Secondary = 7.76 cfs @ 12.38 hrs, Volume= 1.176 af  
     Routed to Pond 1P : Stormwater Management Pond IB-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.85' @ 12.40 hrs Surf.Area= 493 sf Storage= 713 cf

Plug-Flow detention time= 22.0 min calculated for 1.305 af (100% of inflow)  
 Center-of-Mass det. time= 21.2 min ( 781.9 - 760.7 )

Volume	Invert	Avail.Storage	Storage Description			
#1	119.00'	788 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
119.00	61	32.4	0	0	61	
121.00	337	71.6	361	361	402	
122.00	523	89.2	427	788	641	

Device	Routing	Invert	Outlet Devices										
#1	Secondary	121.00'	<b>24.2' long x 2.0' breadth Broad-Crested Rectangular Weir</b>										
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00										
			2.50 3.00 3.50										
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88										
			2.85 3.07 3.20 3.32										
#2	Primary	119.00'	<b>24.20' long x 10.00' breadth x 2.00' high Rock Fill</b>										
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%										

**Primary OutFlow** Max=0.67 cfs @ 12.38 hrs HW=121.85' TW=121.85' (Dynamic Tailwater)  
 ↑**2=Rock Fill** (Rockfill Controls 0.67 cfs @ 0.01 fps)

**Secondary OutFlow** Max=7.28 cfs @ 12.38 hrs HW=121.85' TW=121.85' (Dynamic Tailwater)  
 ↑**1=Broad-Crested Rectangular Weir** (Weir Controls 7.28 cfs @ 0.35 fps)

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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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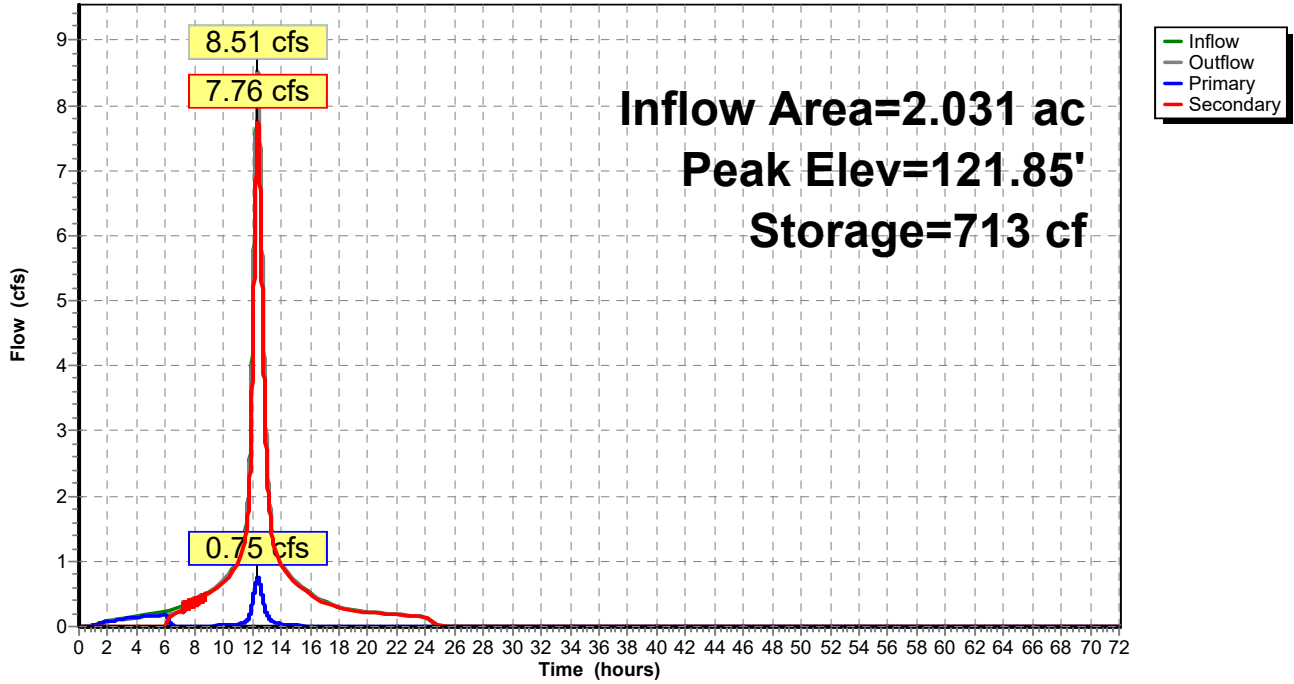
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Page 17

Pond 1.3P: Sediment Forebay

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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 18

**Summary for Pond 1P: Stormwater Management Pond IB-1**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth > 7.71" for Frozen Ground event  
 Inflow = 8.51 cfs @ 12.38 hrs, Volume= 1.305 af  
 Outflow = 8.50 cfs @ 12.39 hrs, Volume= 1.291 af, Atten= 0%, Lag= 0.6 min  
 Discarded = 0.02 cfs @ 12.39 hrs, Volume= 0.090 af  
 Primary = 8.48 cfs @ 12.39 hrs, Volume= 1.201 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.85' @ 12.39 hrs Surf.Area= 1,491 sf Storage= 3,136 cf

Plug-Flow detention time= 116.5 min calculated for 1.291 af (99% of inflow)  
 Center-of-Mass det. time= 98.5 min ( 880.4 - 781.9 )

Volume	Invert	Avail.Storage	Storage Description		
#1	119.00'	5,116 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	752	117.7	0	0	752
122.00	1,537	156.2	3,364	3,364	1,686
123.00	1,977	173.6	1,752	5,116	2,172

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	<b>0.550 in/hr Exfiltration per field test results over Surface area</b>
#2	Device 3	121.50'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	119.00'	<b>15.0" Round Culvert</b> L= 20.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.00' / 118.80' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Discarded OutFlow** Max=0.02 cfs @ 12.39 hrs HW=121.85' (Free Discharge)

↑**1=Exfiltration per field test results** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=8.48 cfs @ 12.39 hrs HW=121.85' TW=0.00' (Dynamic Tailwater)

↑**3=Culvert** (Passes 8.48 cfs of 8.81 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 8.48 cfs @ 1.93 fps)

12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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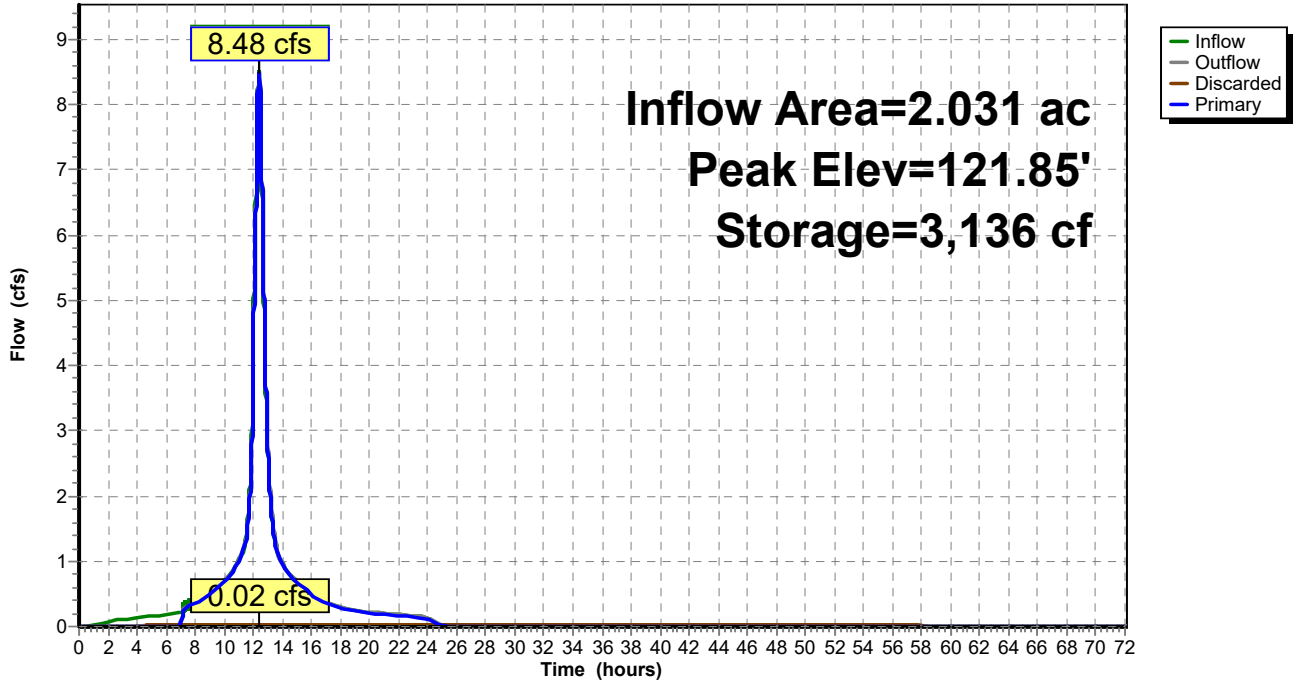
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Page 19

Pond 1P: Stormwater Management Pond IB-1

Hydrograph



**12916DV01C**

*Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4*

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Page 20

**Summary for Pond 2.1P: Sediment Forebay**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 8.32 cfs @ 12.13 hrs, Volume= 0.898 af  
 Outflow = 8.27 cfs @ 12.13 hrs, Volume= 0.897 af, Atten= 1%, Lag= 0.2 min  
 Primary = 0.62 cfs @ 12.11 hrs, Volume= 0.156 af  
     Routed to Pond 2P : Stormwater Management Pond IB-2  
 Secondary = 7.65 cfs @ 12.13 hrs, Volume= 0.741 af  
     Routed to Pond 2P : Stormwater Management Pond IB-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.34' @ 12.17 hrs Surf.Area= 431 sf Storage= 508 cf

Plug-Flow detention time= 12.6 min calculated for 0.897 af (100% of inflow)  
 Center-of-Mass det. time= 11.9 min ( 758.3 - 746.3 )

Volume	Invert	Avail.Storage	Storage Description			
#1	121.70'	579 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
121.70	191	53.9	0	0	191	
122.70	340	70.0	262	262	361	
123.50	456	80.1	317	579	496	

Device	Routing	Invert	Outlet Devices											
#1	Secondary	122.70'	<b>42.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32											
#2	Primary	121.70'	<b>42.00' long x 6.00' breadth x 1.00' high Rock Fill</b>											
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%											

**Primary OutFlow** Max=0.00 cfs @ 12.11 hrs HW=123.32' TW=123.32' (Dynamic Tailwater)  
 ↑**2=Rock Fill** ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 12.13 hrs HW=123.33' TW=123.33' (Dynamic Tailwater)  
 ↑**1=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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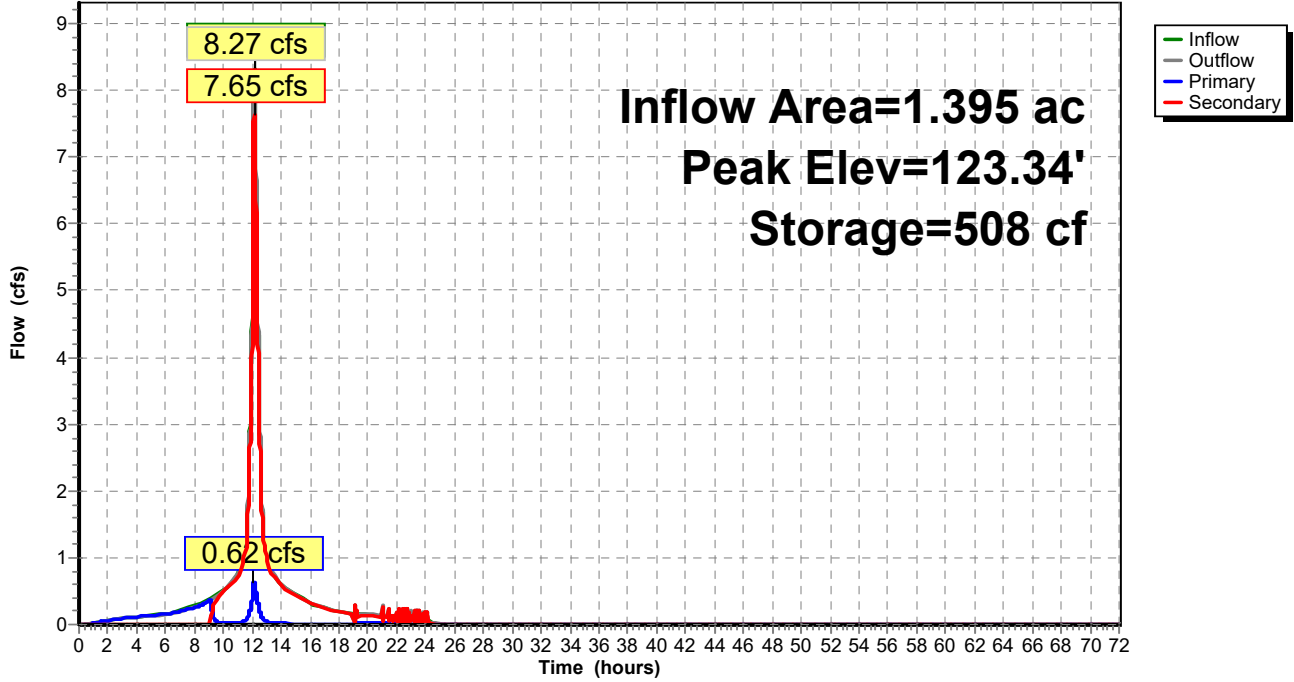
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Page 21

Pond 2.1P: Sediment Forebay

Hydrograph



**12916DV01C**

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 22

**Summary for Pond 2P: Stormwater Management Pond IB-2**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 8.27 cfs @ 12.13 hrs, Volume= 0.897 af  
 Outflow = 8.16 cfs @ 12.16 hrs, Volume= 0.897 af, Atten= 1%, Lag= 1.5 min  
 Discarded = 0.11 cfs @ 12.16 hrs, Volume= 0.255 af  
 Primary = 8.05 cfs @ 12.16 hrs, Volume= 0.642 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.34' @ 12.16 hrs Surf.Area= 2,838 sf Storage= 3,905 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 101.0 min ( 859.3 - 758.3 )

Volume	Invert	Avail.Storage	Storage Description			
#1	121.70'	4,374 cf	<b>Pond Storage (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
121.70	1,948	181.3	0	0	1,948	
122.70	2,483	205.9	2,210	2,210	2,730	
123.50	2,933	225.0	2,164	4,374	3,408	

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.70'	<b>1.650 in/hr Exfiltration per field test results over Surface area</b>
#2	Primary	118.70'	<b>15.0" Round Culvert</b> L= 50.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 118.70' / 118.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	123.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.11 cfs @ 12.16 hrs HW=123.34' (Free Discharge)

↑ **1=Exfiltration per field test results** (Exfiltration Controls 0.11 cfs)

**Primary OutFlow** Max=8.05 cfs @ 12.16 hrs HW=123.34' TW=0.00' (Dynamic Tailwater)

↑ **2=Culvert** (Passes 8.05 cfs of 11.84 cfs potential flow)

↑ **3=Orifice/Grate** (Weir Controls 8.05 cfs @ 1.90 fps)

12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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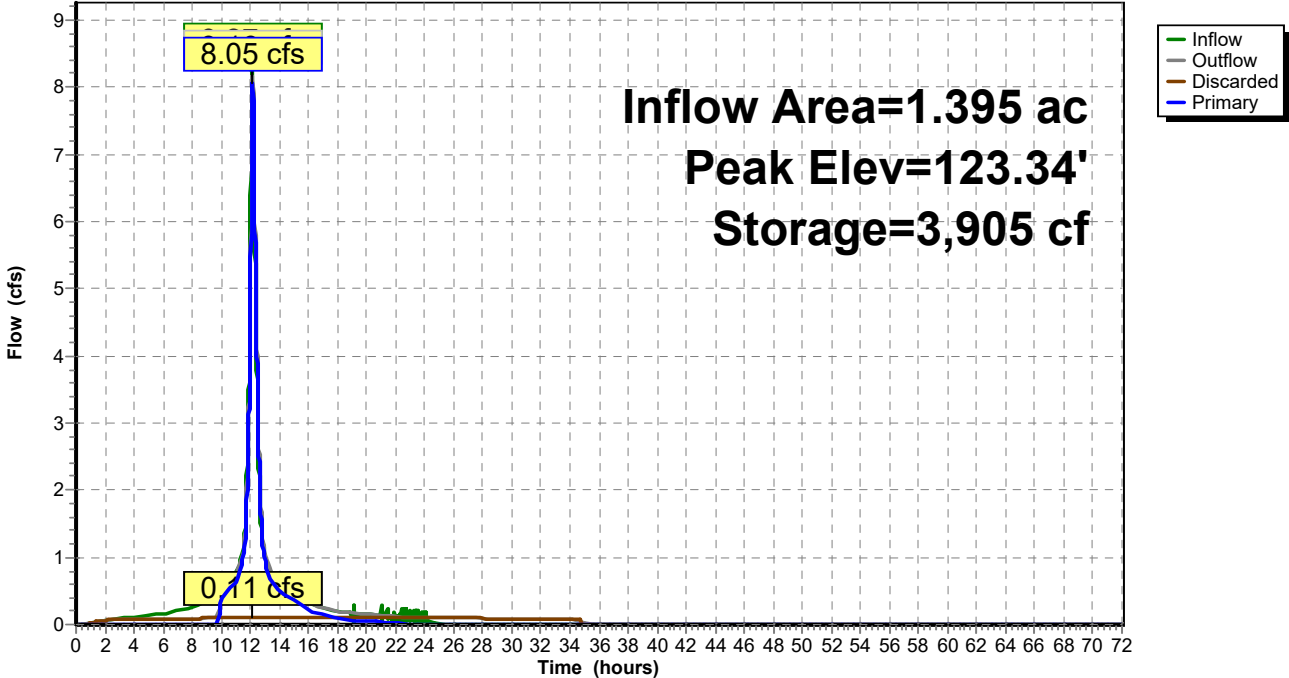
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Page 23

Pond 2P: Stormwater Management Pond IB-2

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 24

Summary for Pond DV 1.1P: CB 100

Inflow Area = 1.947 ac, 10.39% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 8.37 cfs @ 12.38 hrs, Volume= 1.253 af  
 Outflow = 8.37 cfs @ 12.38 hrs, Volume= 1.253 af, Atten= 0%, Lag= 0.0 min  
 Primary = 8.37 cfs @ 12.38 hrs, Volume= 1.253 af  
 Routed to Pond 1.3P : Sediment Forebay

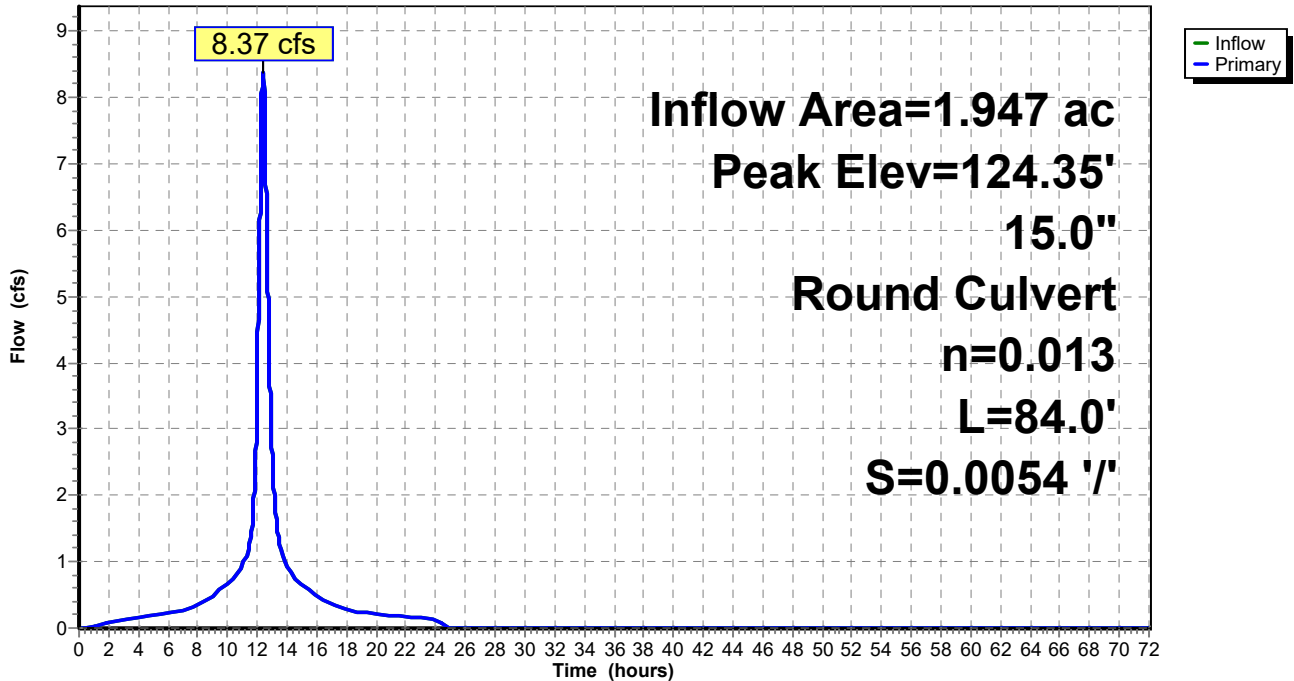
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 124.35' @ 12.38 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.45'	<b>15.0" Round Culvert</b> L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.45' / 119.00' S= 0.0054 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=8.37 cfs @ 12.38 hrs HW=124.35' TW=121.85' (Dynamic Tailwater)  
 ←1=Culvert (Outlet Controls 8.37 cfs @ 6.82 fps)

Pond DV 1.1P: CB 100

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 25

Summary for Pond DV 1.2P: CB 101

Inflow Area = 1.779 ac, 5.06% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 7.97 cfs @ 12.38 hrs, Volume= 1.145 af  
 Outflow = 7.97 cfs @ 12.38 hrs, Volume= 1.145 af, Atten= 0%, Lag= 0.0 min  
 Primary = 7.97 cfs @ 12.38 hrs, Volume= 1.145 af  
 Routed to Pond DV 1.1P : CB 100

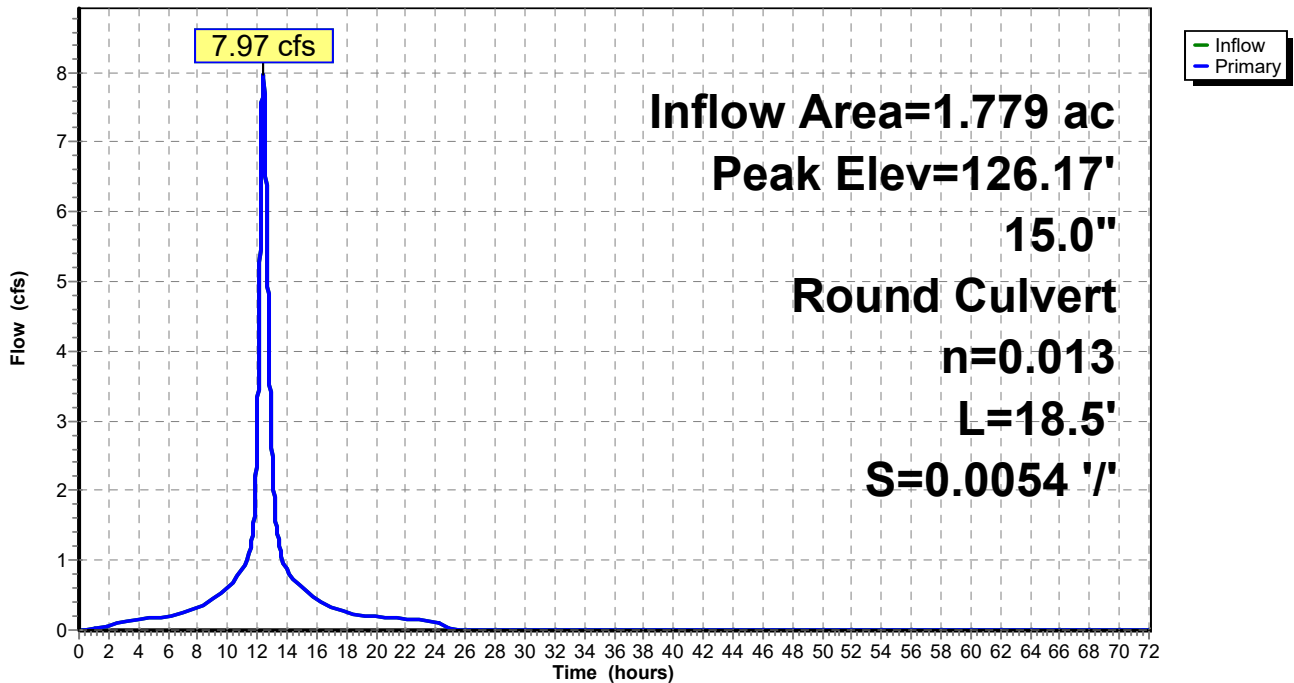
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 126.17' @ 12.39 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.65'	<b>15.0" Round Culvert</b> L= 18.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.65' / 119.55' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=7.95 cfs @ 12.38 hrs HW=126.16' TW=124.35' (Dynamic Tailwater)  
 ↑1=Culvert (Inlet Controls 7.95 cfs @ 6.48 fps)

Pond DV 1.2P: CB 101

Hydrograph



12916DV01C

Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 26

**Summary for Pond DV 3P: Roadway Culvert to IB-2**

Inflow Area = 0.926 ac, 0.00% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 5.65 cfs @ 12.19 hrs, Volume= 0.596 af  
 Outflow = 5.65 cfs @ 12.19 hrs, Volume= 0.596 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.65 cfs @ 12.19 hrs, Volume= 0.596 af  
 Routed to Pond 2.1P : Sediment Forebay

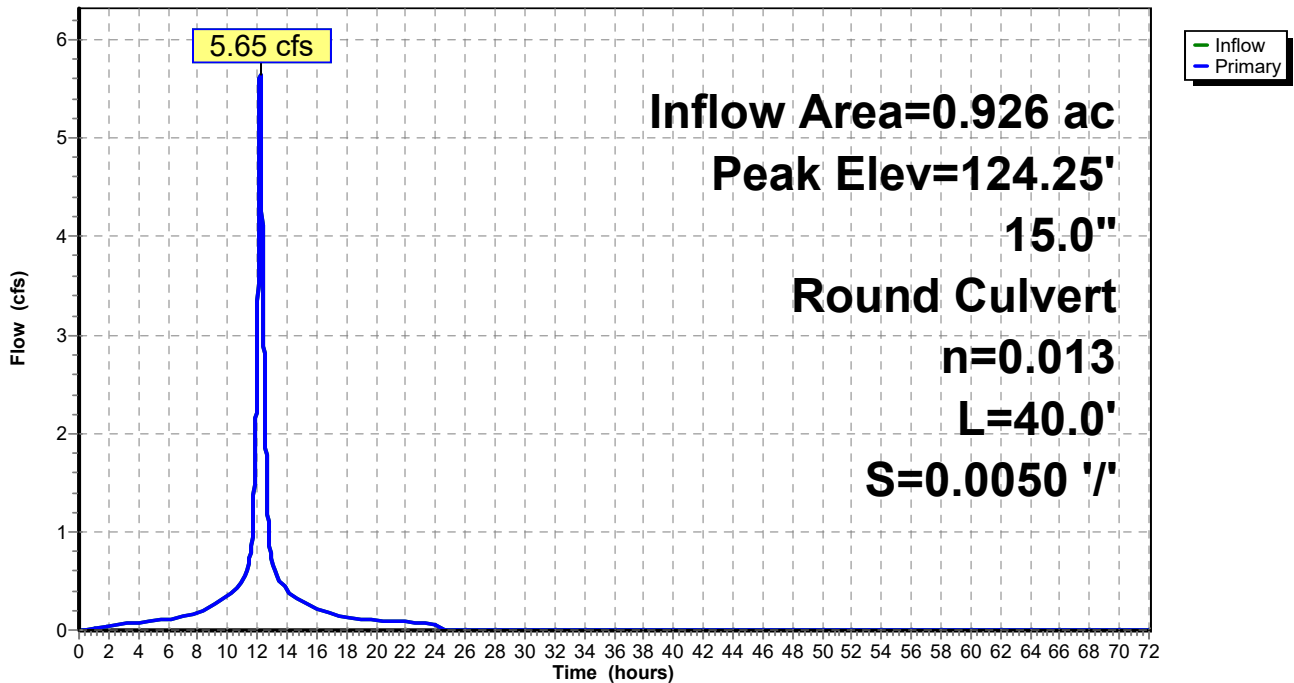
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 124.25' @ 12.19 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	121.90'	<b>15.0" Round Culvert</b> L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 121.90' / 121.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=5.65 cfs @ 12.19 hrs HW=124.25' TW=123.34' (Dynamic Tailwater)  
 ↑1=Culvert (Inlet Controls 5.65 cfs @ 4.60 fps)

**Pond DV 3P: Roadway Culvert to IB-2**

Hydrograph



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Type III 24-hr Frozen Ground Rainfall=7.96", AMC=4

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Page 27

**Summary for Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Dual 24" CMP Driveway culverts located at existing wetland crossing.

Inflow Area = 4.833 ac, 0.00% Impervious, Inflow Depth = 7.72" for Frozen Ground event  
 Inflow = 25.53 cfs @ 12.27 hrs, Volume= 3.109 af  
 Outflow = 25.53 cfs @ 12.27 hrs, Volume= 3.109 af, Atten= 0%, Lag= 0.0 min  
 Primary = 25.53 cfs @ 12.27 hrs, Volume= 3.109 af  
 Routed to Reach OP1 : Observation Point 1

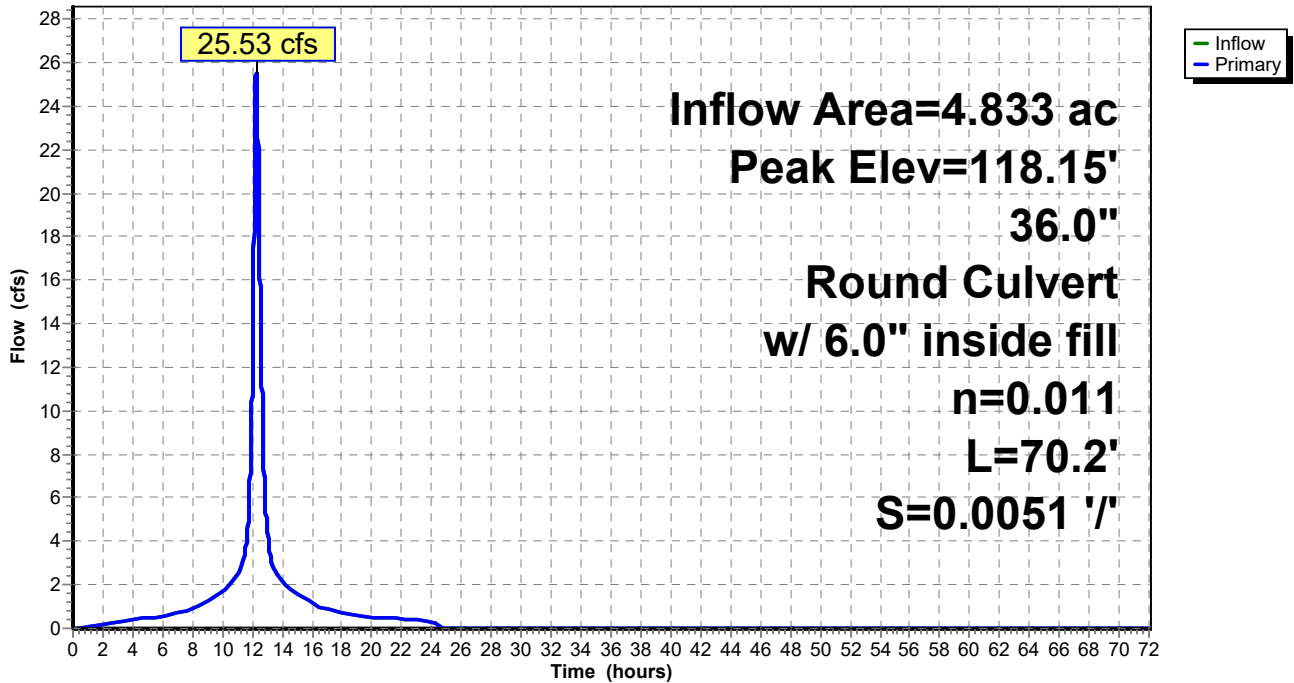
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 118.15' @ 12.27 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	116.00'	<b>36.0" Round Culvert w/ 6.0" inside fill</b> L= 70.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 115.50' / 115.14' S= 0.0051 '/ Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 6.29 sf

**Primary OutFlow** Max=25.53 cfs @ 12.27 hrs HW=118.15' TW=0.00' (Dynamic Tailwater)  
 ↳1=Culvert (Barrel Controls 25.53 cfs @ 5.61 fps)

**Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Hydrograph





## **Section 2.2: Developed Conditions**

25- and 50-year Storm Full Summary



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 1

**Summary for Subcatchment DV 10S: To Low Point Onsite**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.79 cfs @ 12.18 hrs, Volume= 0.169 af, Depth= 1.65"  
 Routed to Reach OP2 : Observation Point 2

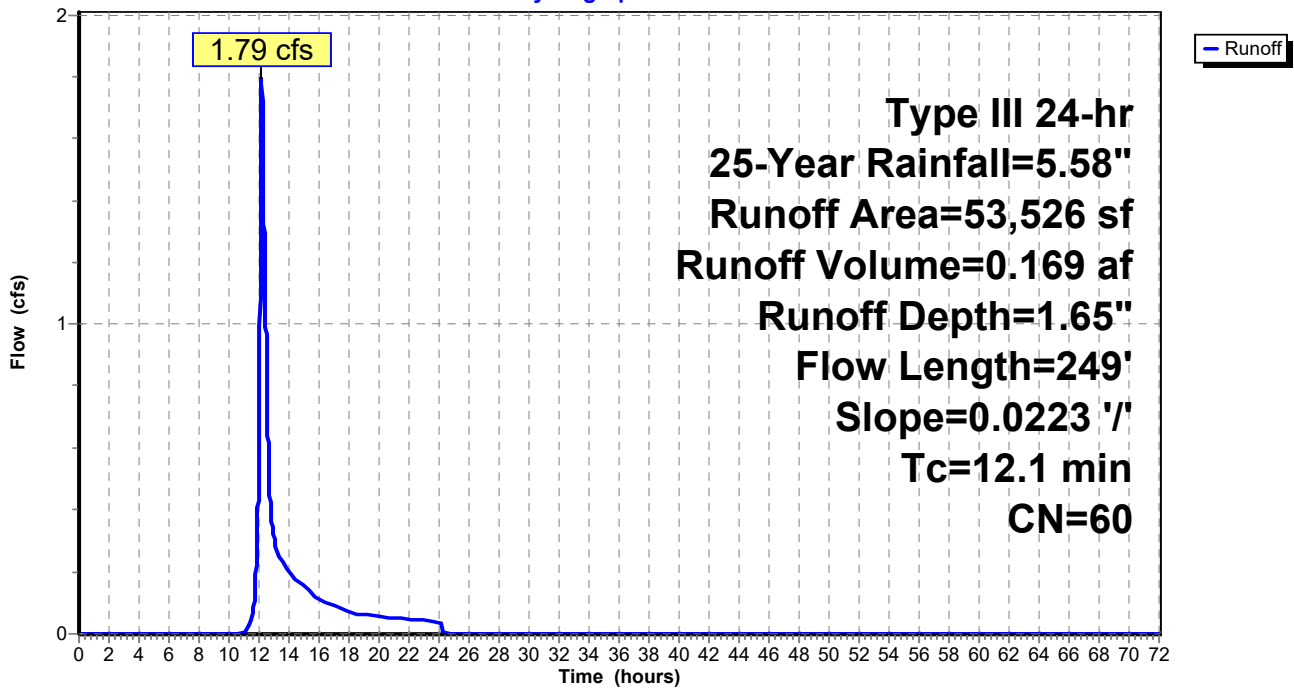
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
4,801	55	Woods, Good HSG B
48,725	61	>75% Grass cover, Good HSG B
53,526	60	Weighted Average
53,526		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	249	0.0223	0.34		Lag/CN Method,

**Subcatchment DV 10S: To Low Point Onsite**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 2

**Summary for Subcatchment DV 1S: To 36' RCP Culvert**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.42 cfs @ 12.60 hrs, Volume= 0.134 af, Depth= 0.33"  
 Routed to Pond EX 1P : 36" RCP Culvert with 6" Embedment

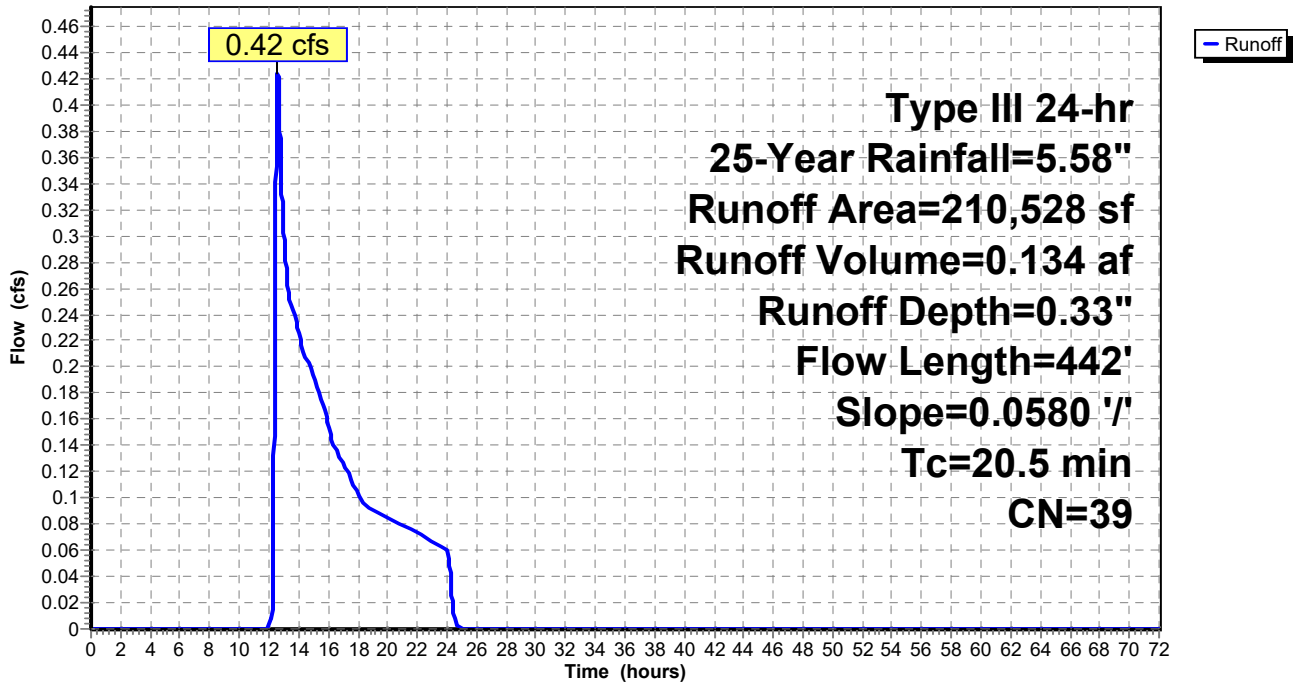
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
48	55	Woods, Good HSG B
49,416	30	Woods, Good HSG A
143,858	39	>75% Grass cover, Good HSG A
17,206	61	>75% Grass cover, Good HSG B
210,528	39	Weighted Average
210,528		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	442	0.0580	0.36		Lag/CN Method,

**Subcatchment DV 1S: To 36' RCP Culvert**

Hydrograph



12916DV01C

Type III 24-hr 25-Year Rainfall=5.58"

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Page 3

Summary for Subcatchment DV 2S: To CB 101

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.22 cfs @ 12.69 hrs, Volume= 0.063 af, Depth= 0.43"  
 Routed to Pond DV 1.2P : CB 101

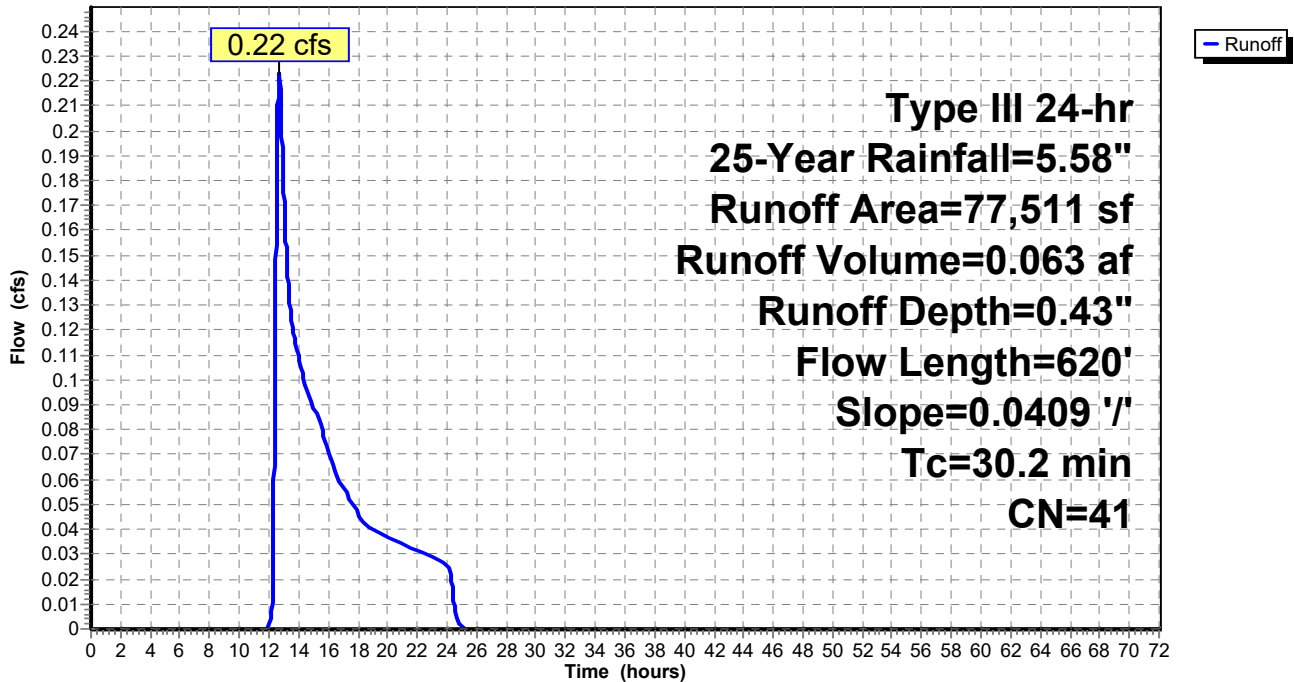
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
1,196	98	Paved parking HSG A
2,723	98	Paved parking HSG B
12,398	30	Woods, Good HSG A
58,940	39	>75% Grass cover, Good HSG A
2,254	61	>75% Grass cover, Good HSG B
77,511	41	Weighted Average
73,592		94.94% Pervious Area
3,919		5.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	620	0.0409	0.34		Lag/CN Method,

Subcatchment DV 2S: To CB 101

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 4

Summary for Subcatchment DV 3S: To Roadway Culvert

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Runoff = 0.64 cfs @ 12.24 hrs, Volume= 0.078 af, Depth= 1.01"  
 Routed to Pond DV 3P : Roadway Culvert to IB-2

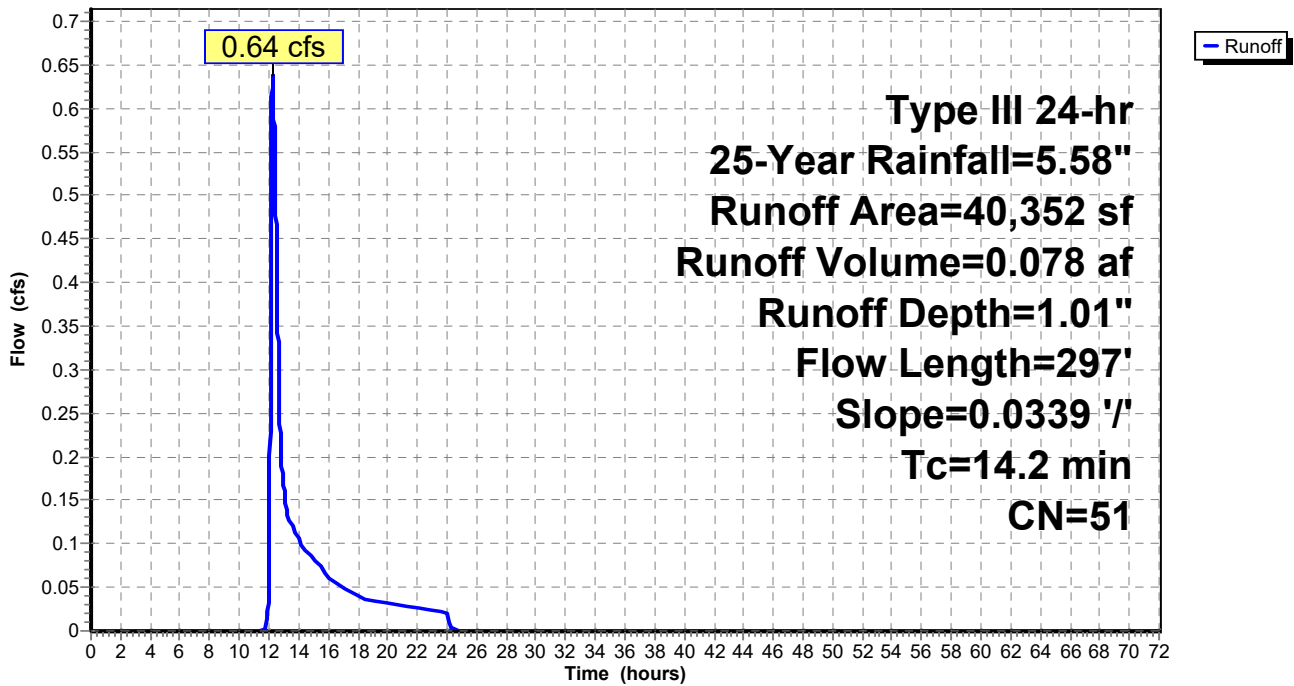
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
1,155	30	Woods, Good HSG A
2,496	55	Woods, Good HSG B
16,638	39	>75% Grass cover, Good HSG A
20,063	61	>75% Grass cover, Good HSG B
40,352	51	Weighted Average
40,352		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	297	0.0339	0.35		Lag/CN Method,

Subcatchment DV 3S: To Roadway Culvert

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 5

**Summary for Subcatchment DV 4.1S: To Stormwater Management Pond IB-2**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.064 af, Depth= 3.21"  
 Routed to Pond 2.1P : Sediment Forebay

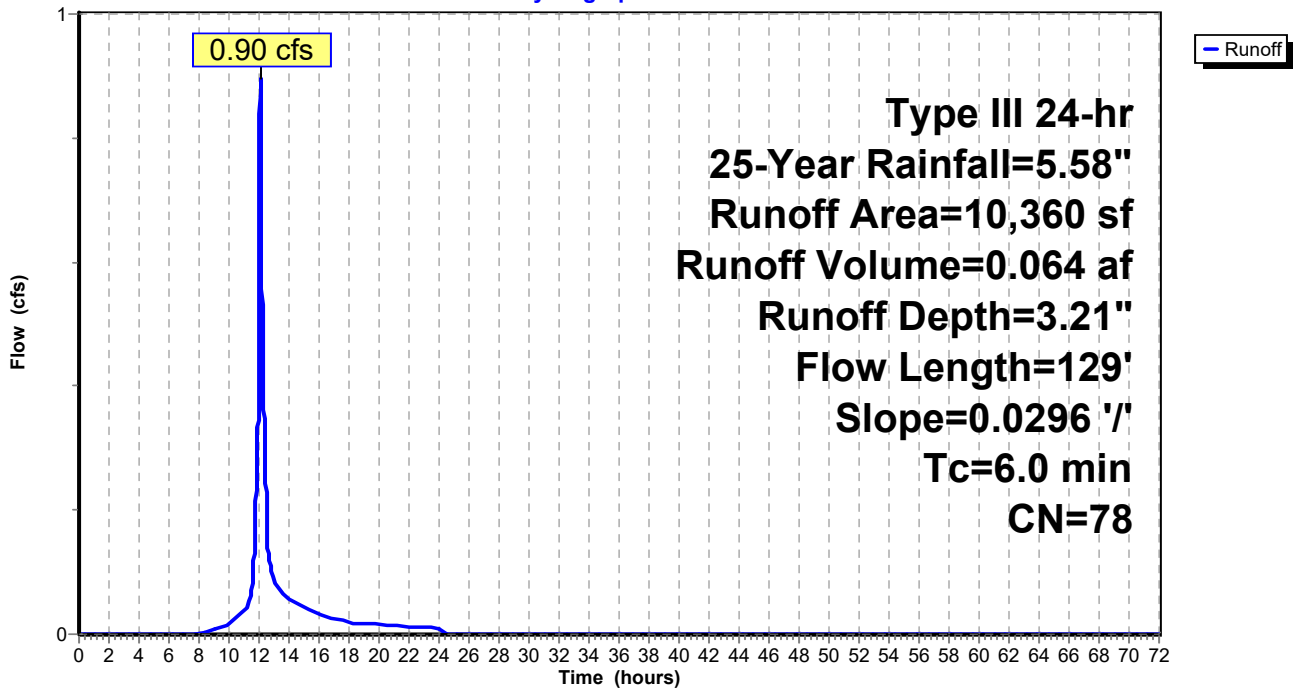
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
4,694	98	Paved parking HSG B
5,666	61	>75% Grass cover, Good HSG B
10,360	78	Weighted Average
5,666		54.69% Pervious Area
4,694		45.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	129	0.0296	0.56		Lag/CN Method,
3.8	129	Total, Increased to minimum Tc = 6.0 min			

**Subcatchment DV 4.1S: To Stormwater Management Pond IB-2**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 6

**Summary for Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

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Runoff = 0.97 cfs @ 12.09 hrs, Volume= 0.069 af, Depth= 3.60"  
 Routed to Pond 2.1P : Sediment Forebay

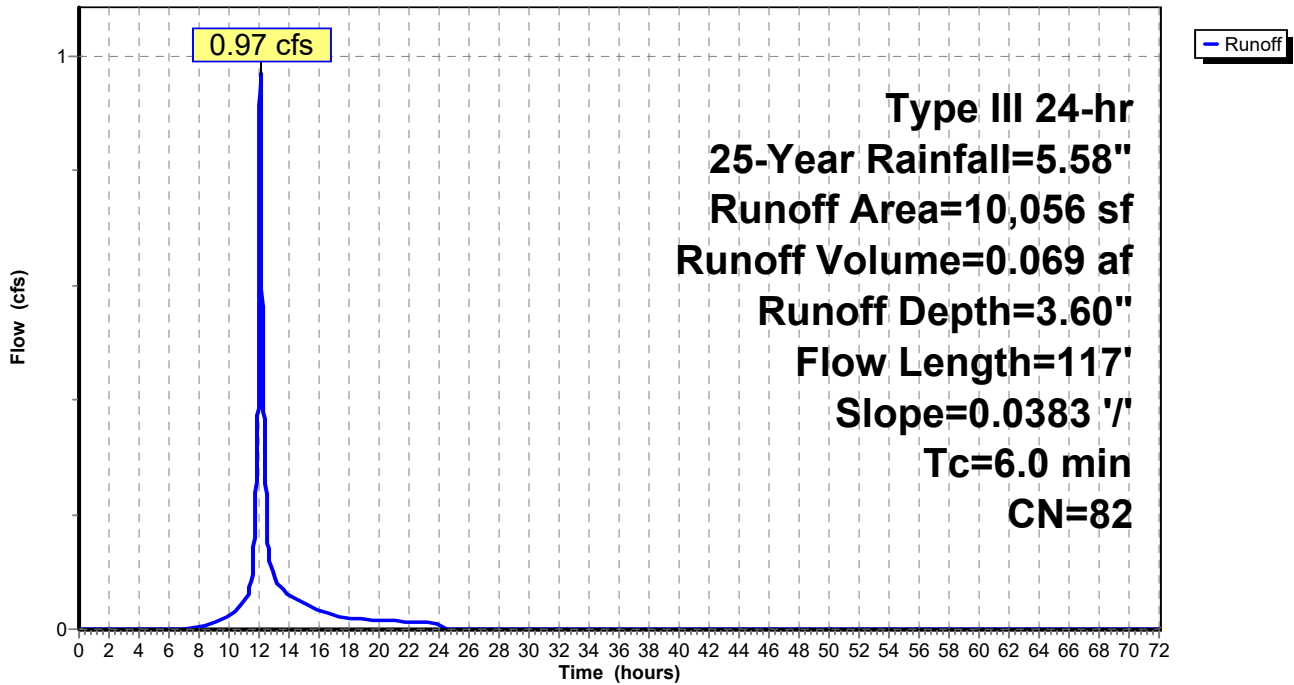
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
5,779	98	Paved parking HSG B
4,277	61	>75% Grass cover, Good HSG B
10,056	82	Weighted Average
4,277		42.53% Pervious Area
5,779		57.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	117	0.0383	0.71		Lag/CN Method,
2.7	117	Total, Increased to minimum Tc = 6.0 min			

**Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 7

Summary for Subcatchment DV 5S: To CB 100

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Runoff = 0.77 cfs @ 12.09 hrs, Volume= 0.056 af, Depth= 4.01"  
 Routed to Pond DV 1.1P : CB 100

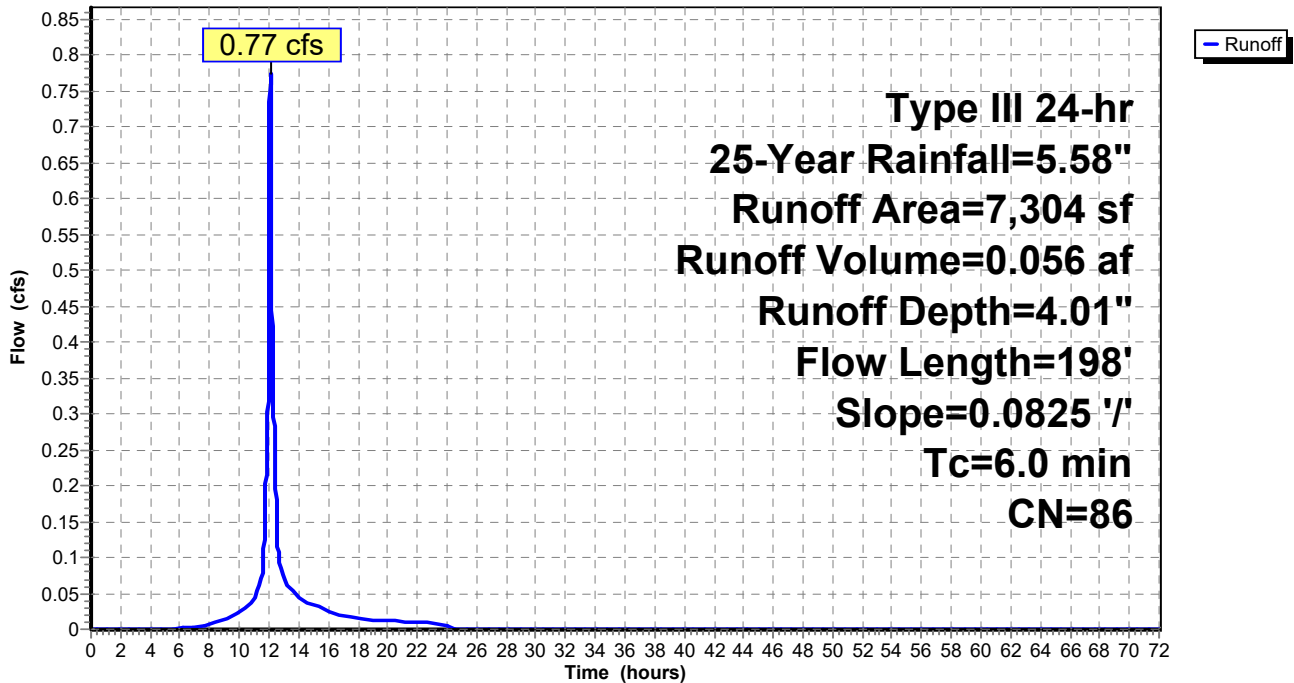
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
174	98	Paved parking HSG A
4,722	98	Paved parking HSG B
11	55	Woods, Good HSG B
2,397	61	>75% Grass cover, Good HSG B
7,304	86	Weighted Average
2,408		32.97% Pervious Area
4,896		67.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	198	0.0825	1.33		Lag/CN Method,
2.5	198	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV 5S: To CB 100

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 8

**Summary for Subcatchment DV 6S: To Stormwater Management Pond IB-1**

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Runoff = 0.20 cfs @ 12.00 hrs, Volume= 0.012 af, Depth= 1.73"  
 Routed to Pond 1.3P : Sediment Forebay

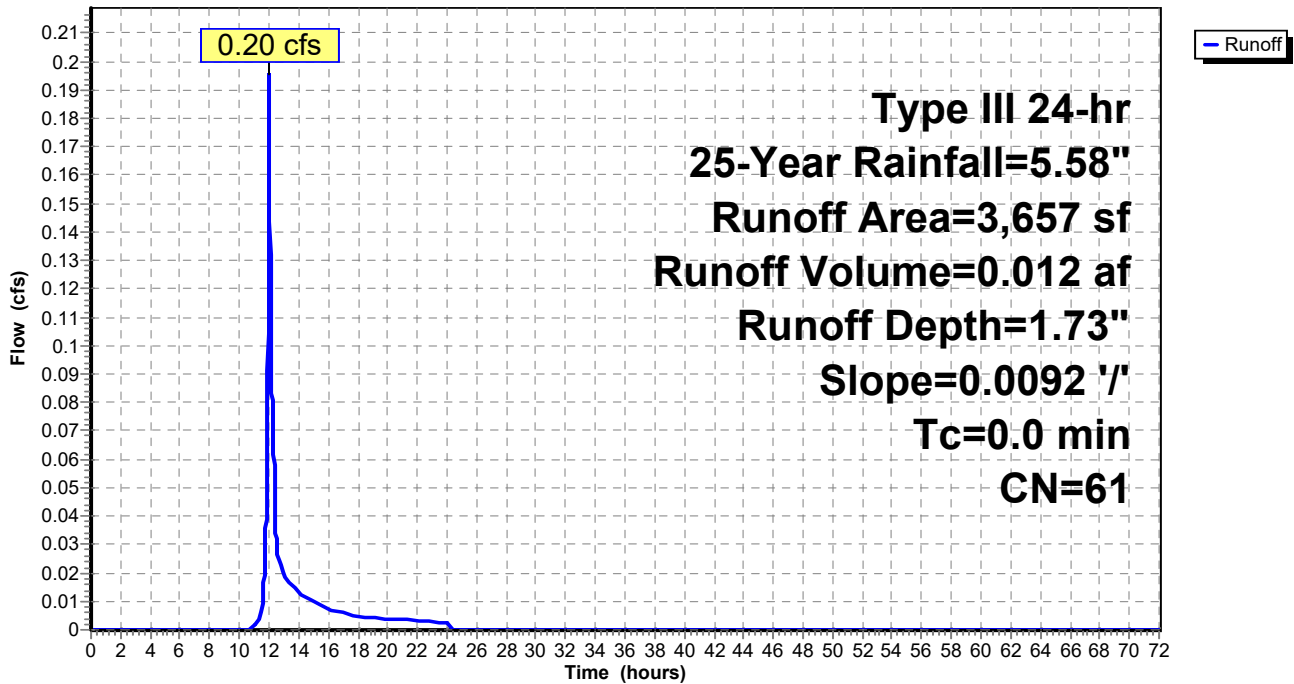
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
3,657	61	>75% Grass cover, Good HSG B
3,657		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0092			Lag/CN Method,

**Subcatchment DV 6S: To Stormwater Management Pond IB-1**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 9

Summary for Subcatchment DV 7S: To Merrimack River

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 8.50 cfs @ 12.17 hrs, Volume= 0.779 af, Depth= 1.65"  
 Routed to Reach OP1 : Observation Point 1

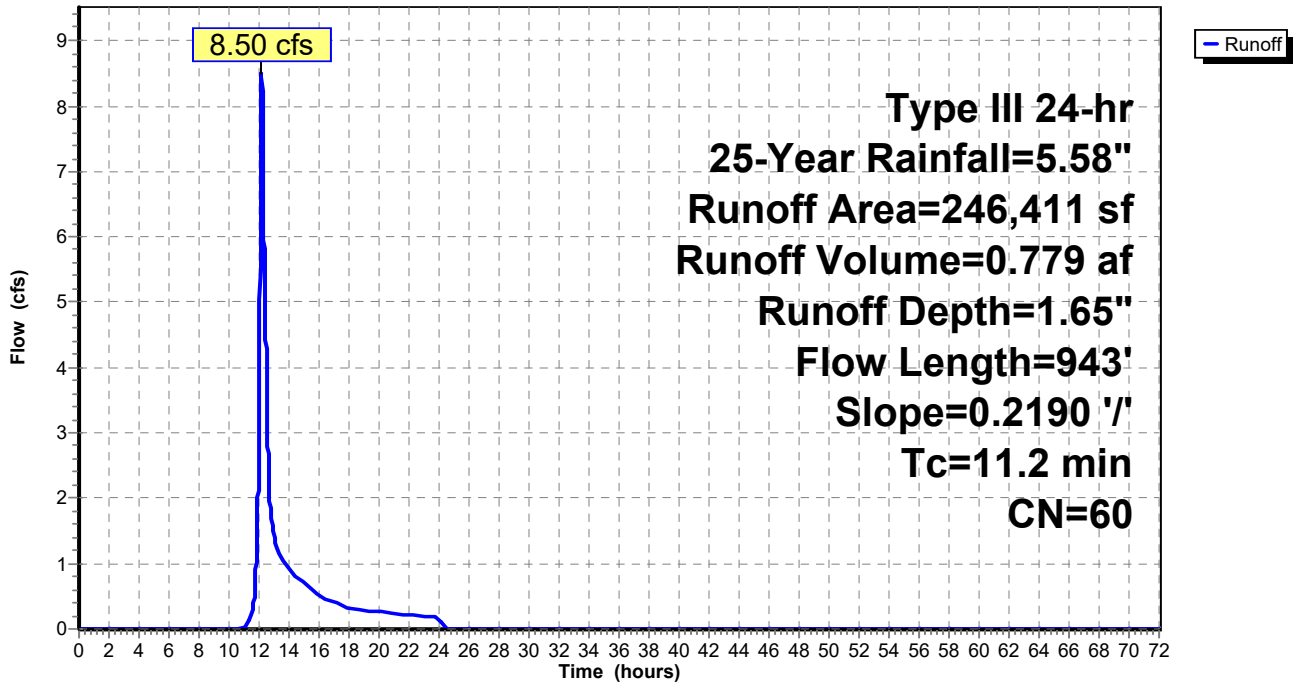
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
8,907	77	Woods, Good HSG D
6,702	98	Paved parking HSG B
2,533	98	Roofs HSG B
121,783	55	Woods, Good HSG B
106,486	61	>75% Grass cover, Good HSG B
246,411	60	Weighted Average
237,176		96.25% Pervious Area
9,235		3.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	943	0.2190	1.40		Lag/CN Method,

Subcatchment DV 7S: To Merrimack River

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 10

**Summary for Subcatchment DV 8S: To Existing Roadway Drainage**

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Runoff = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Depth= 3.60"  
 Routed to Reach OP4 : Observation Point 4

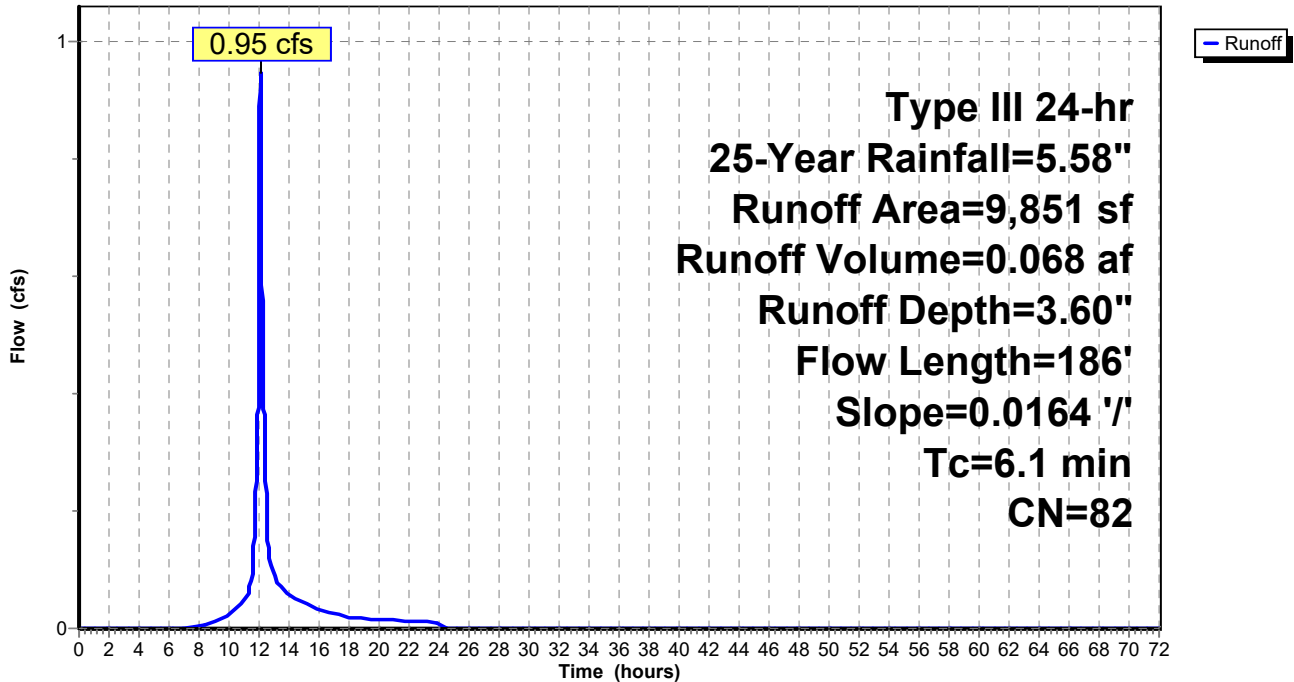
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
5,702	98	Paved parking HSG B
4,149	61	>75% Grass cover, Good HSG B
9,851	82	Weighted Average
4,149		42.12% Pervious Area
5,702		57.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	186	0.0164	0.51		Lag/CN Method,

**Subcatchment DV 8S: To Existing Roadway Drainage**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 11

**Summary for Subcatchment DV 9S: To Southerly Property Line**

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Runoff = 2.19 cfs @ 12.19 hrs, Volume= 0.208 af, Depth= 1.73"  
 Routed to Reach OP3 : Observation Point 3

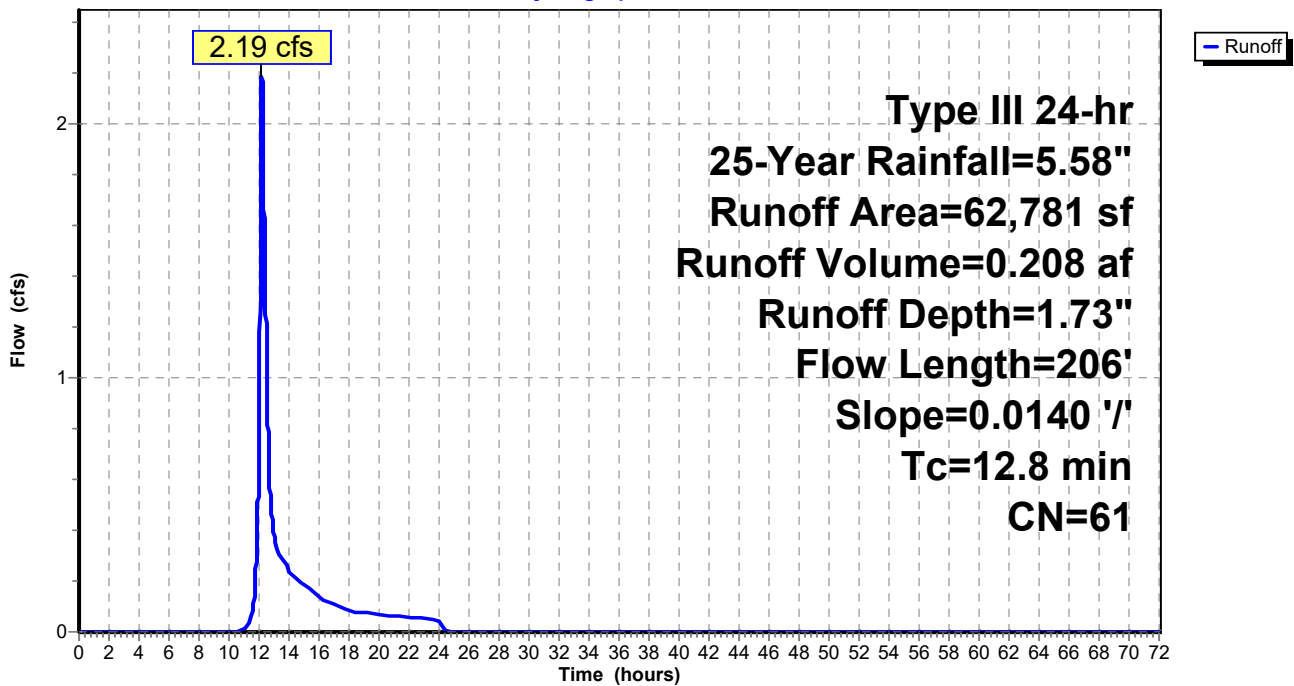
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 25-Year Rainfall=5.58"

Area (sf)	CN	Description
62,781	61	>75% Grass cover, Good HSG B
62,781		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	206	0.0140	0.27		Lag/CN Method,

**Subcatchment DV 9S: To Southerly Property Line**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 12

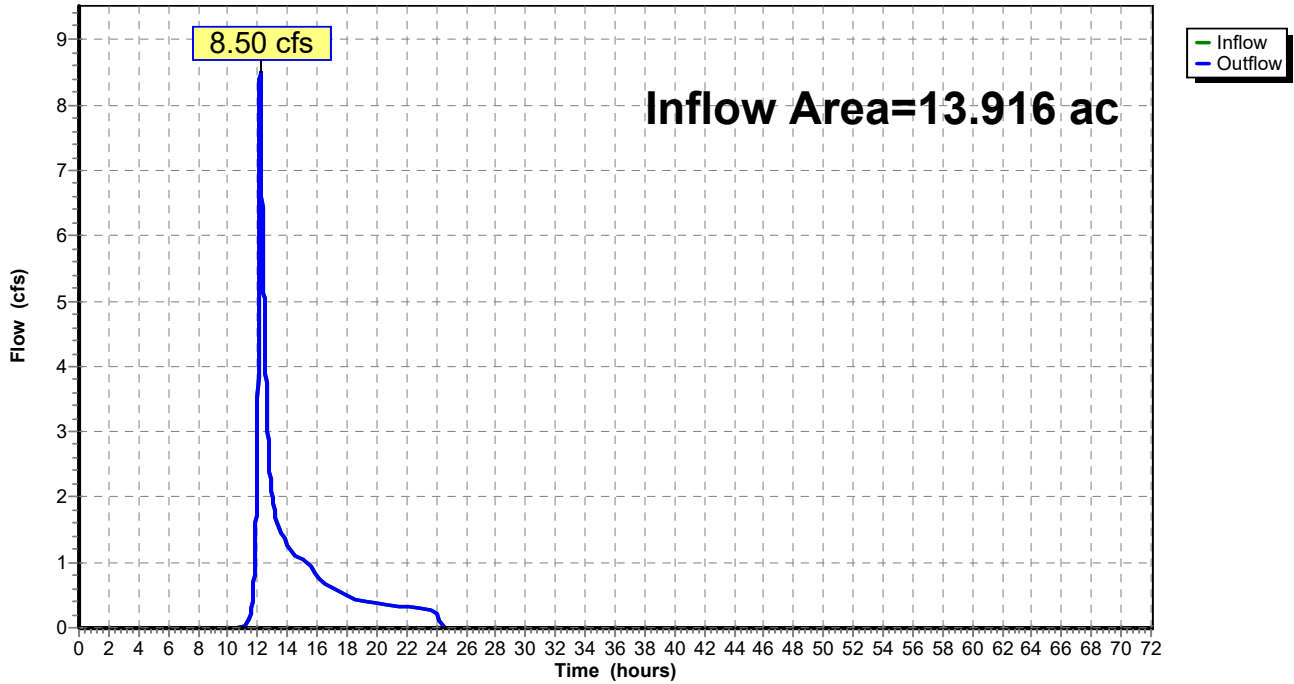
Summary for Reach OP1: Observation Point 1

Inflow Area = 13.916 ac, 4.71% Impervious, Inflow Depth = 0.85" for 25-Year event  
Inflow = 8.50 cfs @ 12.17 hrs, Volume= 0.991 af  
Outflow = 8.50 cfs @ 12.17 hrs, Volume= 0.991 af, Atten= 0%, Lag= 0.0 min

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

Reach OP1: Observation Point 1

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 13

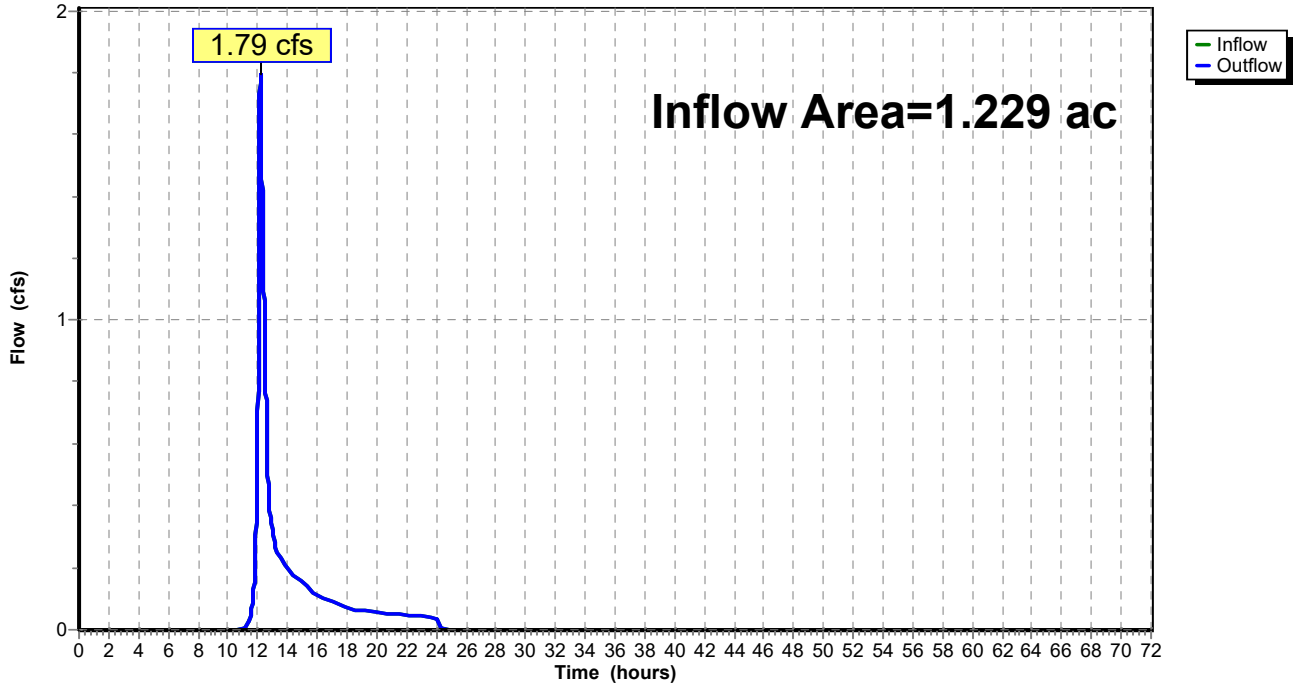
Summary for Reach OP2: Observation Point 2

Inflow Area = 1.229 ac, 0.00% Impervious, Inflow Depth = 1.65" for 25-Year event  
Inflow = 1.79 cfs @ 12.18 hrs, Volume= 0.169 af  
Outflow = 1.79 cfs @ 12.18 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min

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

Reach OP2: Observation Point 2

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 14

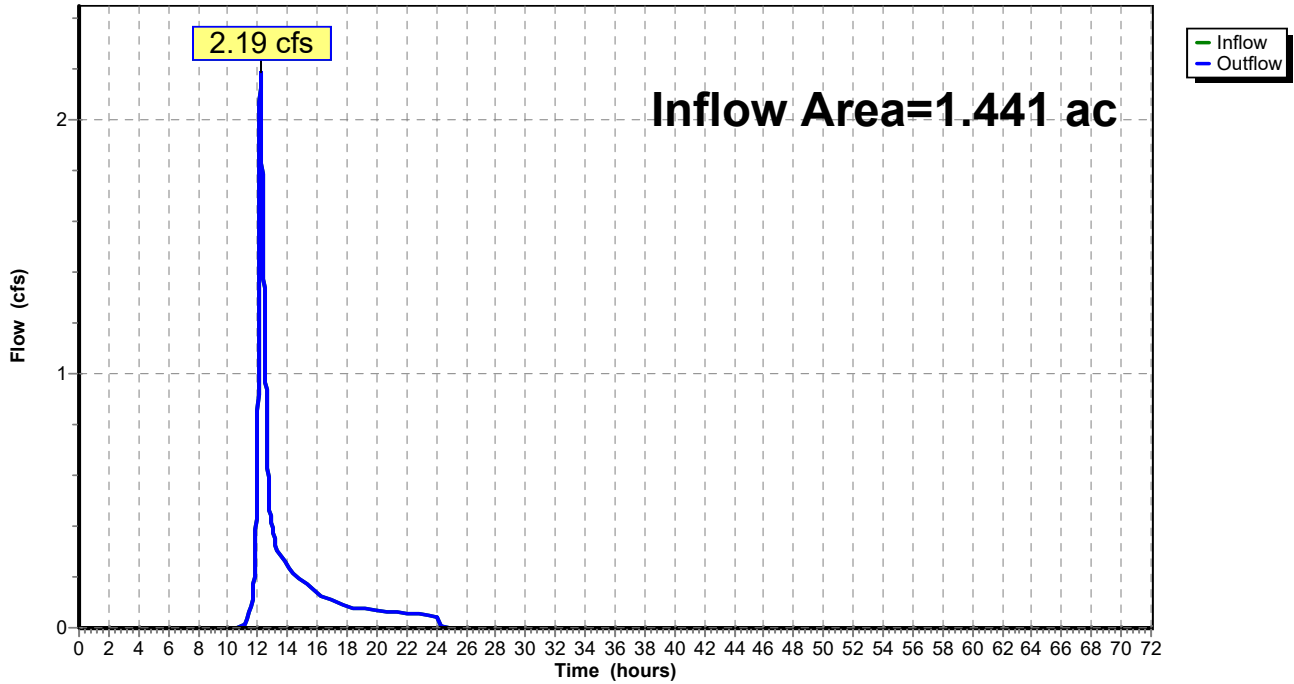
Summary for Reach OP3: Observation Point 3

Inflow Area = 1.441 ac, 0.00% Impervious, Inflow Depth = 1.73" for 25-Year event  
Inflow = 2.19 cfs @ 12.19 hrs, Volume= 0.208 af  
Outflow = 2.19 cfs @ 12.19 hrs, Volume= 0.208 af, Atten= 0%, Lag= 0.0 min

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

Reach OP3: Observation Point 3

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 15

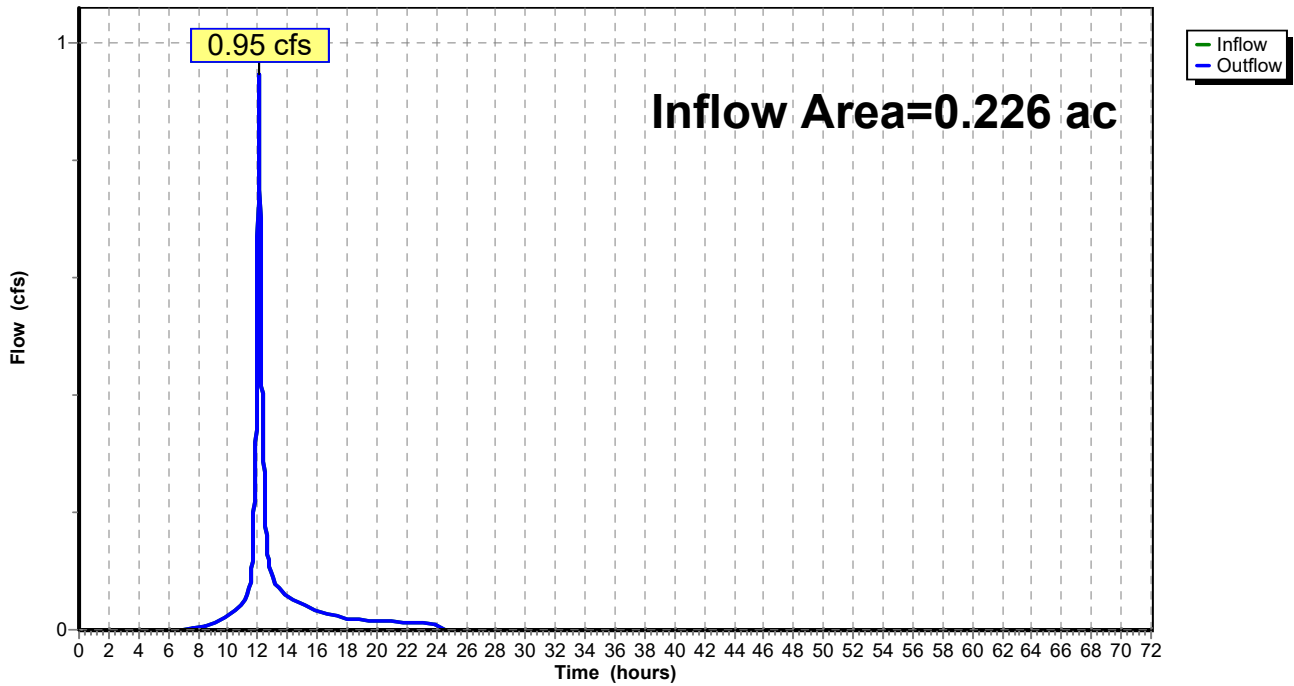
### Summary for Reach OP4: Observation Point 4

Inflow Area = 0.226 ac, 57.88% Impervious, Inflow Depth = 3.60" for 25-Year event  
Inflow = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af  
Outflow = 0.95 cfs @ 12.09 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

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

### Reach OP4: Observation Point 4

Hydrograph



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Page 16

**Summary for Pond 1.3P: Sediment Forebay**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth = 0.78" for 25-Year event  
 Inflow = 0.89 cfs @ 12.08 hrs, Volume= 0.131 af  
 Outflow = 0.78 cfs @ 12.07 hrs, Volume= 0.131 af, Atten= 13%, Lag= 0.0 min  
 Primary = 0.78 cfs @ 12.07 hrs, Volume= 0.069 af  
 Routed to Pond 1P : Stormwater Management Pond IB-1  
 Secondary = 0.20 cfs @ 14.60 hrs, Volume= 0.062 af  
 Routed to Pond 1P : Stormwater Management Pond IB-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.52' @ 15.10 hrs Surf.Area= 429 sf Storage= 559 cf

Plug-Flow detention time= 166.8 min calculated for 0.131 af (100% of inflow)  
 Center-of-Mass det. time= 164.5 min ( 1,056.7 - 892.1 )

Volume	Invert	Avail.Storage	Storage Description			
#1	119.00'	788 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
119.00	61	32.4	0	0	61	
121.00	337	71.6	361	361	402	
122.00	523	89.2	427	788	641	

Device	Routing	Invert	Outlet Devices										
#1	Secondary	121.00'	<b>24.2' long x 2.0' breadth Broad-Crested Rectangular Weir</b>										
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50										
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88 2.85 3.07 3.20 3.32										
#2	Primary	119.00'	<b>24.20' long x 10.00' breadth x 2.00' high Rock Fill</b>										
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%										

**Primary OutFlow** Max=0.00 cfs @ 12.07 hrs HW=119.86' TW=119.86' (Dynamic Tailwater)  
 ↑2=Rock Fill ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 14.60 hrs HW=121.45' TW=121.45' (Dynamic Tailwater)  
 ↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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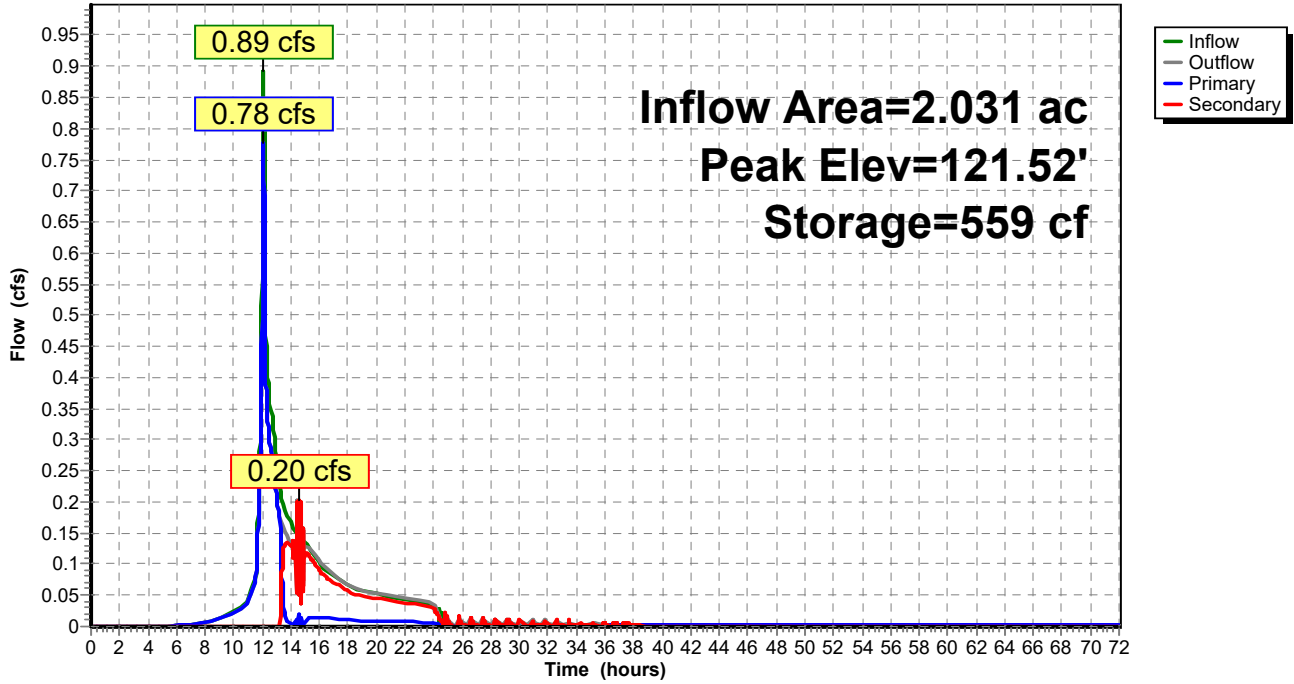
Type III 24-hr 25-Year Rainfall=5.58"

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Page 17

Pond 1.3P: Sediment Forebay

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 18

**Summary for Pond 1P: Stormwater Management Pond IB-1**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth > 0.77" for 25-Year event  
 Inflow = 0.78 cfs @ 12.07 hrs, Volume= 0.131 af  
 Outflow = 0.13 cfs @ 15.09 hrs, Volume= 0.117 af, Atten= 83%, Lag= 181.2 min  
 Discarded = 0.02 cfs @ 15.09 hrs, Volume= 0.079 af  
 Primary = 0.11 cfs @ 15.09 hrs, Volume= 0.038 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.52' @ 15.09 hrs Surf.Area= 1,393 sf Storage= 2,661 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 861.2 min ( 1,917.9 - 1,056.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	119.00'	5,116 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	752	117.7	0	0	752
122.00	1,537	156.2	3,364	3,364	1,686
123.00	1,977	173.6	1,752	5,116	2,172

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	<b>0.550 in/hr Exfiltration per field test results over Surface area</b>
#2	Device 3	121.50'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	119.00'	<b>15.0" Round Culvert</b> L= 20.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.00' / 118.80' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Discarded OutFlow** Max=0.02 cfs @ 15.09 hrs HW=121.52' (Free Discharge)

↑**1=Exfiltration per field test results** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.11 cfs @ 15.09 hrs HW=121.52' TW=0.00' (Dynamic Tailwater)

↑**3=Culvert** (Passes 0.11 cfs of 8.13 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 0.11 cfs @ 0.46 fps)

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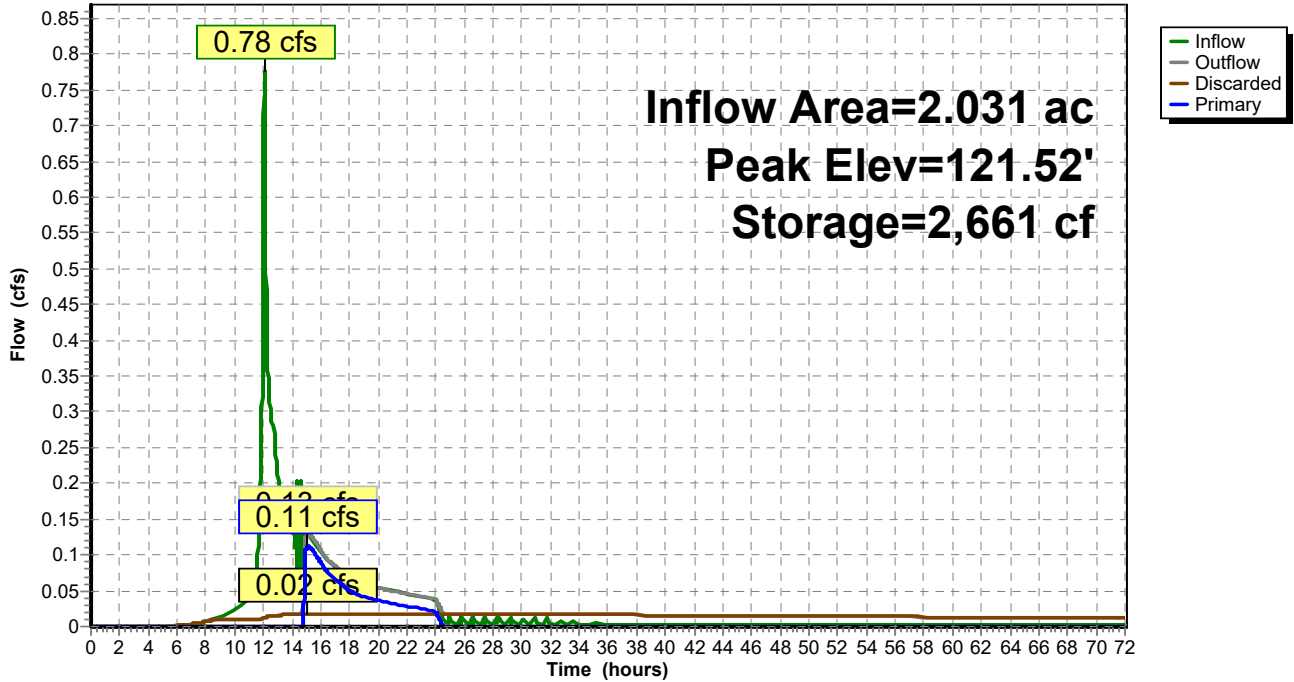
Type III 24-hr 25-Year Rainfall=5.58"

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Page 19

Pond 1P: Stormwater Management Pond IB-1

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 20

**Summary for Pond 2.1P: Sediment Forebay**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 1.81" for 25-Year event  
 Inflow = 2.17 cfs @ 12.10 hrs, Volume= 0.211 af  
 Outflow = 1.98 cfs @ 12.10 hrs, Volume= 0.210 af, Atten= 9%, Lag= 0.0 min  
 Primary = 1.98 cfs @ 12.10 hrs, Volume= 0.089 af  
 Routed to Pond 2P : Stormwater Management Pond IB-2  
 Secondary = 0.82 cfs @ 12.42 hrs, Volume= 0.122 af  
 Routed to Pond 2P : Stormwater Management Pond IB-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.05' @ 12.68 hrs Surf.Area= 388 sf Storage= 388 cf

Plug-Flow detention time= 34.1 min calculated for 0.210 af (100% of inflow)  
 Center-of-Mass det. time= 32.2 min ( 881.7 - 849.5 )

Volume	Invert	Avail.Storage	Storage Description			
#1	121.70'	579 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
121.70	191	53.9	0	0	191	
122.70	340	70.0	262	262	361	
123.50	456	80.1	317	579	496	

Device	Routing	Invert	Outlet Devices											
#1	Secondary	122.70'	<b>42.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88											
			2.85 3.07 3.20 3.32											
#2	Primary	121.70'	<b>42.00' long x 6.00' breadth x 1.00' high Rock Fill</b>											
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%											

**Primary OutFlow** Max=1.44 cfs @ 12.10 hrs HW=122.31' TW=122.28' (Dynamic Tailwater)  
 ↑2=Rock Fill (Rockfill Controls 1.44 cfs @ 0.06 fps)

**Secondary OutFlow** Max=0.00 cfs @ 12.42 hrs HW=122.89' TW=122.90' (Dynamic Tailwater)  
 ↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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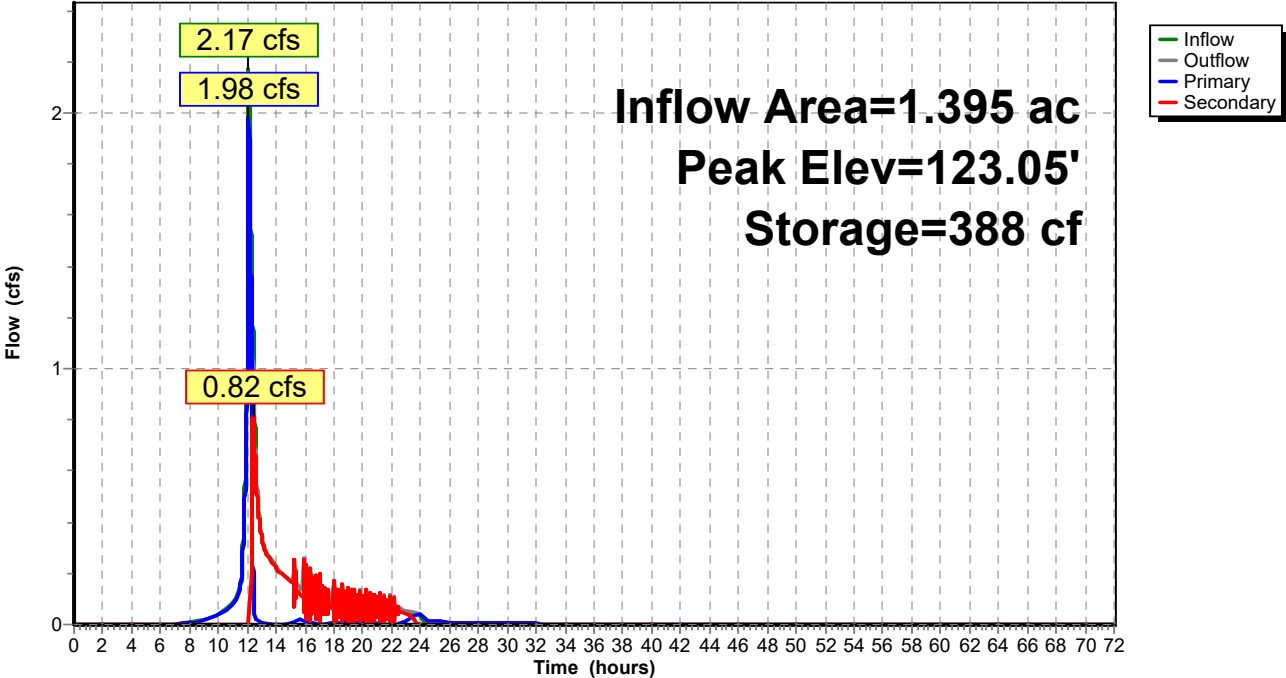
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Page 21

Pond 2.1P: Sediment Forebay

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 22

**Summary for Pond 2P: Stormwater Management Pond IB-2**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 1.81" for 25-Year event  
 Inflow = 1.98 cfs @ 12.10 hrs, Volume= 0.210 af  
 Outflow = 0.52 cfs @ 12.67 hrs, Volume= 0.210 af, Atten= 74%, Lag= 34.0 min  
 Discarded = 0.10 cfs @ 12.67 hrs, Volume= 0.169 af  
 Primary = 0.42 cfs @ 12.67 hrs, Volume= 0.041 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.05' @ 12.67 hrs Surf.Area= 2,674 sf Storage= 3,105 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 273.2 min ( 1,154.9 - 881.7 )

Volume	Invert	Avail.Storage	Storage Description		
#1	121.70'	4,374 cf	<b>Pond Storage (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.70	1,948	181.3	0	0	1,948
122.70	2,483	205.9	2,210	2,210	2,730
123.50	2,933	225.0	2,164	4,374	3,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.70'	<b>1.650 in/hr Exfiltration per field test results over Surface area</b>
#2	Primary	118.70'	<b>15.0" Round Culvert</b> L= 50.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 118.70' / 118.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	123.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.10 cfs @ 12.67 hrs HW=123.05' (Free Discharge)

↑**1=Exfiltration per field test results** (Exfiltration Controls 0.10 cfs)

**Primary OutFlow** Max=0.42 cfs @ 12.67 hrs HW=123.05' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Passes 0.42 cfs of 11.40 cfs potential flow)

↑**3=Orifice/Grate** (Weir Controls 0.42 cfs @ 0.71 fps)

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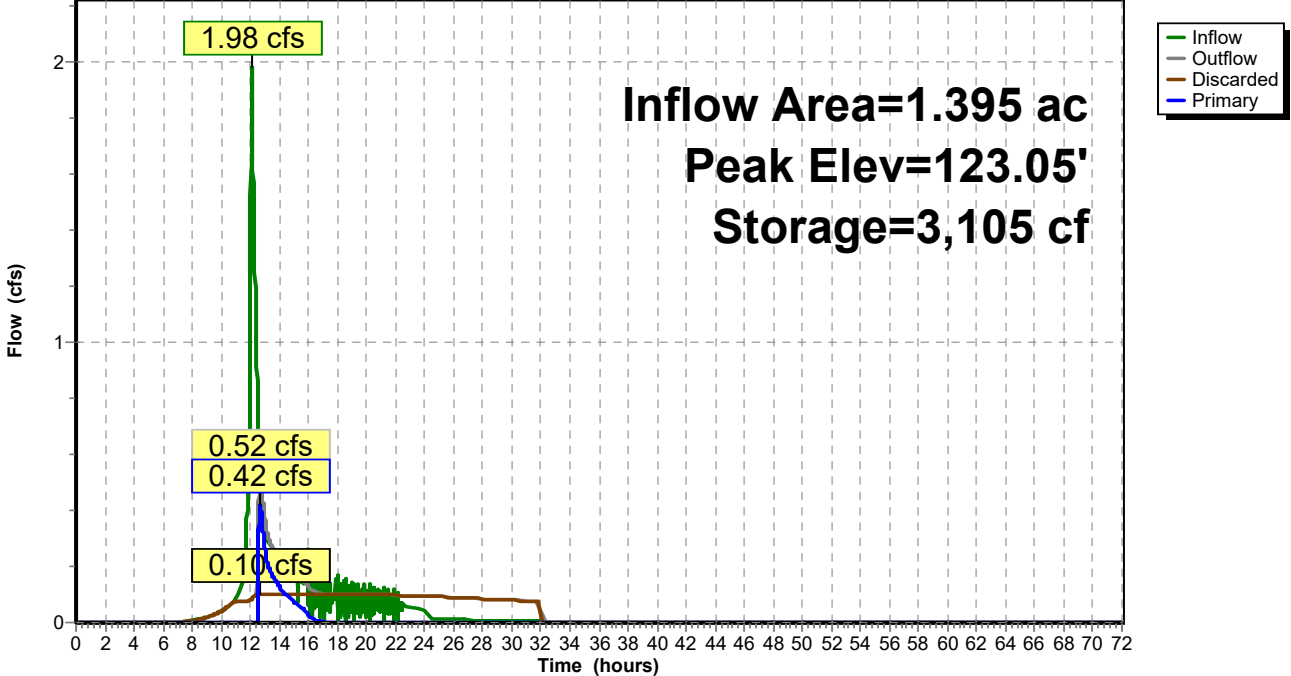
Type III 24-hr 25-Year Rainfall=5.58"

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Page 23

Pond 2P: Stormwater Management Pond IB-2

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 24

Summary for Pond DV 1.1P: CB 100

Inflow Area = 1.947 ac, 10.39% Impervious, Inflow Depth = 0.74" for 25-Year event  
 Inflow = 0.77 cfs @ 12.09 hrs, Volume= 0.119 af  
 Outflow = 0.77 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.77 cfs @ 12.09 hrs, Volume= 0.119 af  
 Routed to Pond 1.3P : Sediment Forebay

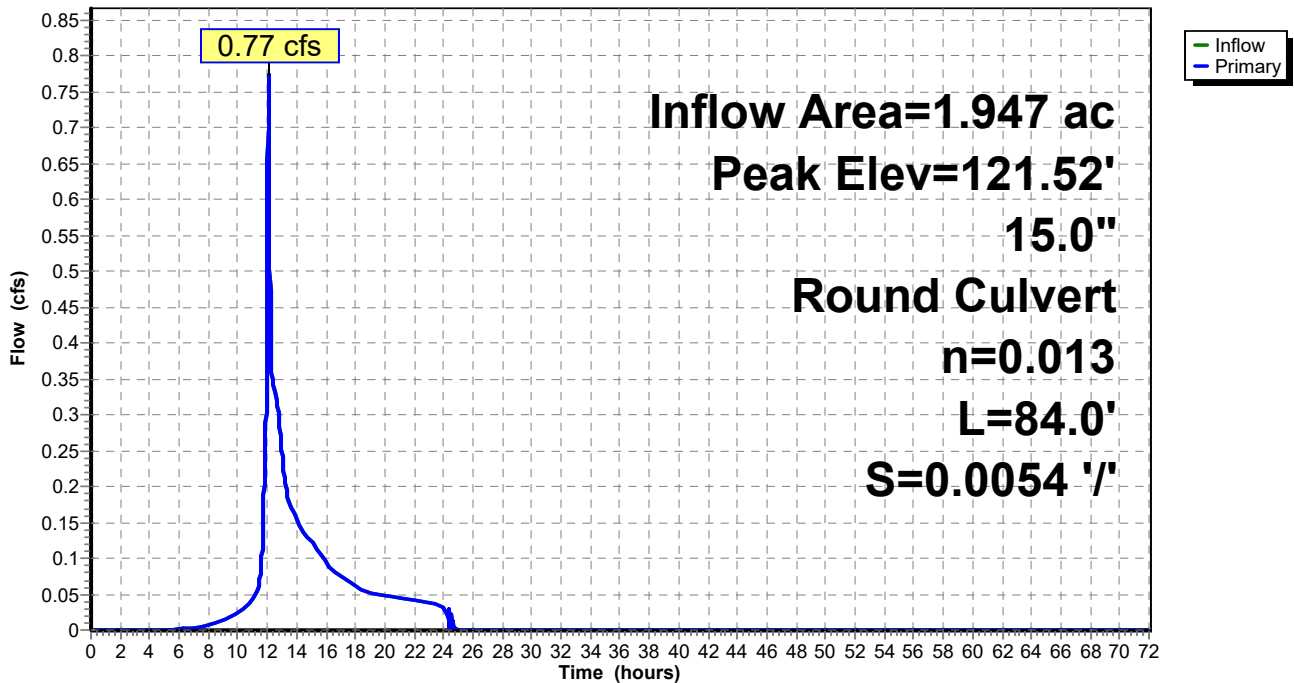
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.52' @ 15.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.45'	<b>15.0" Round Culvert</b> L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.45' / 119.00' S= 0.0054 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.72 cfs @ 12.09 hrs HW=120.08' TW=119.89' (Dynamic Tailwater)  
 ←1=Culvert (Outlet Controls 0.72 cfs @ 1.71 fps)

Pond DV 1.1P: CB 100

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 25

Summary for Pond DV 1.2P: CB 101

Inflow Area = 1.779 ac, 5.06% Impervious, Inflow Depth = 0.43" for 25-Year event  
 Inflow = 0.22 cfs @ 12.69 hrs, Volume= 0.063 af  
 Outflow = 0.22 cfs @ 12.70 hrs, Volume= 0.063 af, Atten= 0%, Lag= 0.4 min  
 Primary = 0.22 cfs @ 12.70 hrs, Volume= 0.063 af  
 Routed to Pond DV 1.1P : CB 100

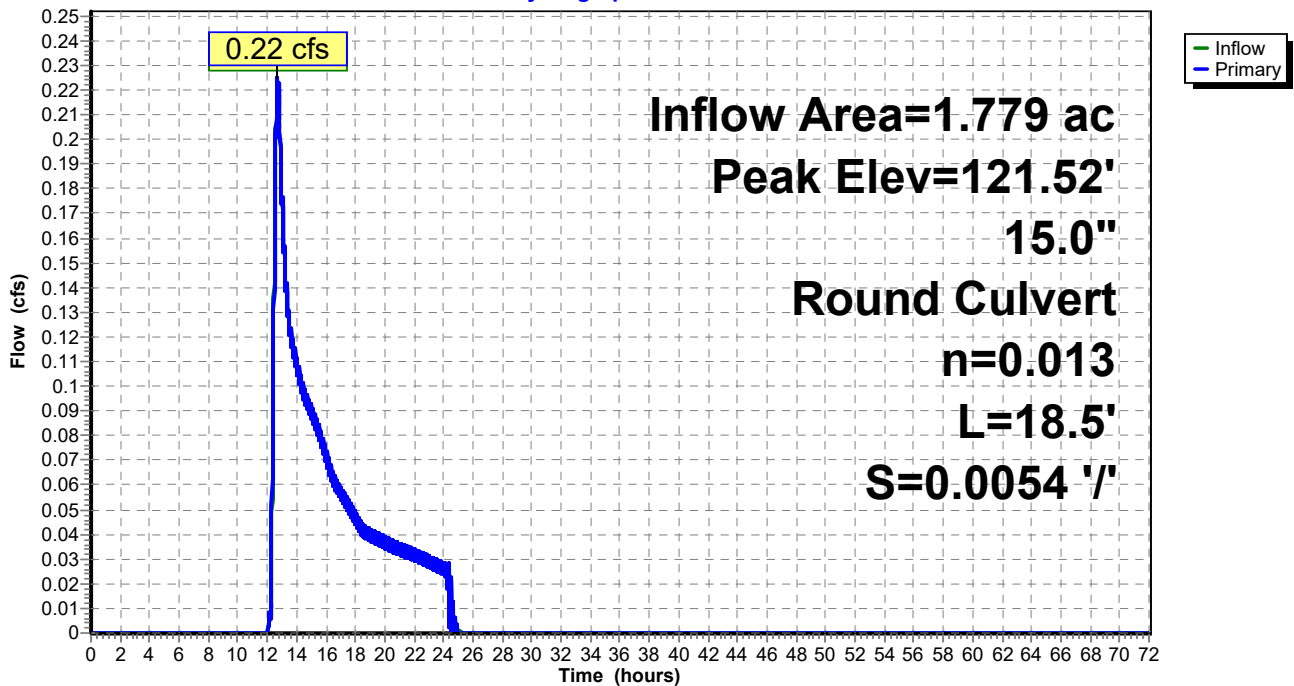
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.52' @ 15.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.65'	<b>15.0" Round Culvert</b> L= 18.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.65' / 119.55' S= 0.0054 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.70 hrs HW=120.65' TW=120.65' (Dynamic Tailwater)  
 ↑1=Culvert ( Controls 0.00 cfs)

Pond DV 1.2P: CB 101

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 26

**Summary for Pond DV 3P: Roadway Culvert to IB-2**

Inflow Area = 0.926 ac, 0.00% Impervious, Inflow Depth = 1.01" for 25-Year event  
 Inflow = 0.64 cfs @ 12.24 hrs, Volume= 0.078 af  
 Outflow = 0.64 cfs @ 12.24 hrs, Volume= 0.078 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.64 cfs @ 12.24 hrs, Volume= 0.078 af  
 Routed to Pond 2.1P : Sediment Forebay

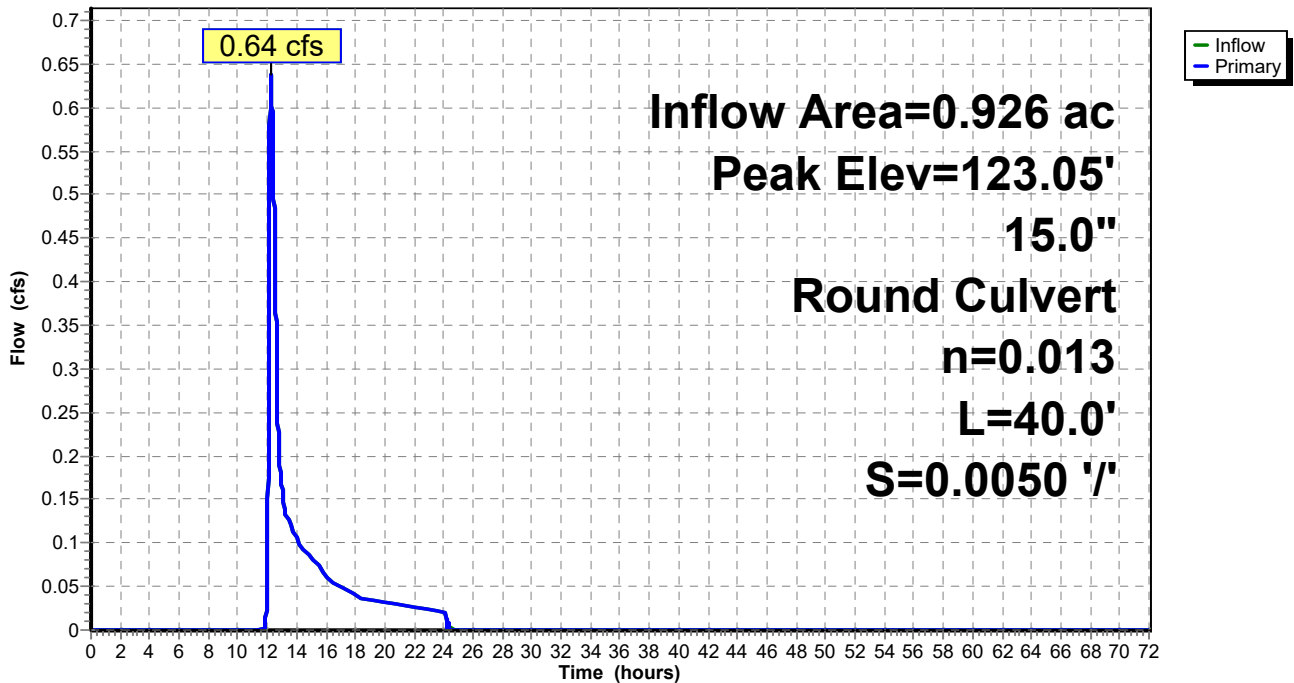
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.05' @ 12.68 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	121.90'	<b>15.0" Round Culvert</b> L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 121.90' / 121.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.52 cfs @ 12.24 hrs HW=122.65' TW=122.61' (Dynamic Tailwater)  
 ↑1=Culvert (Outlet Controls 0.52 cfs @ 0.97 fps)

**Pond DV 3P: Roadway Culvert to IB-2**

Hydrograph



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Type III 24-hr 25-Year Rainfall=5.58"

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Page 27

**Summary for Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Dual 24" CMP Driveway culverts located at existing wetland crossing.

Inflow Area = 4.833 ac, 0.00% Impervious, Inflow Depth = 0.33" for 25-Year event  
 Inflow = 0.42 cfs @ 12.60 hrs, Volume= 0.134 af  
 Outflow = 0.42 cfs @ 12.60 hrs, Volume= 0.134 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.42 cfs @ 12.60 hrs, Volume= 0.134 af  
 Routed to Reach OP1 : Observation Point 1

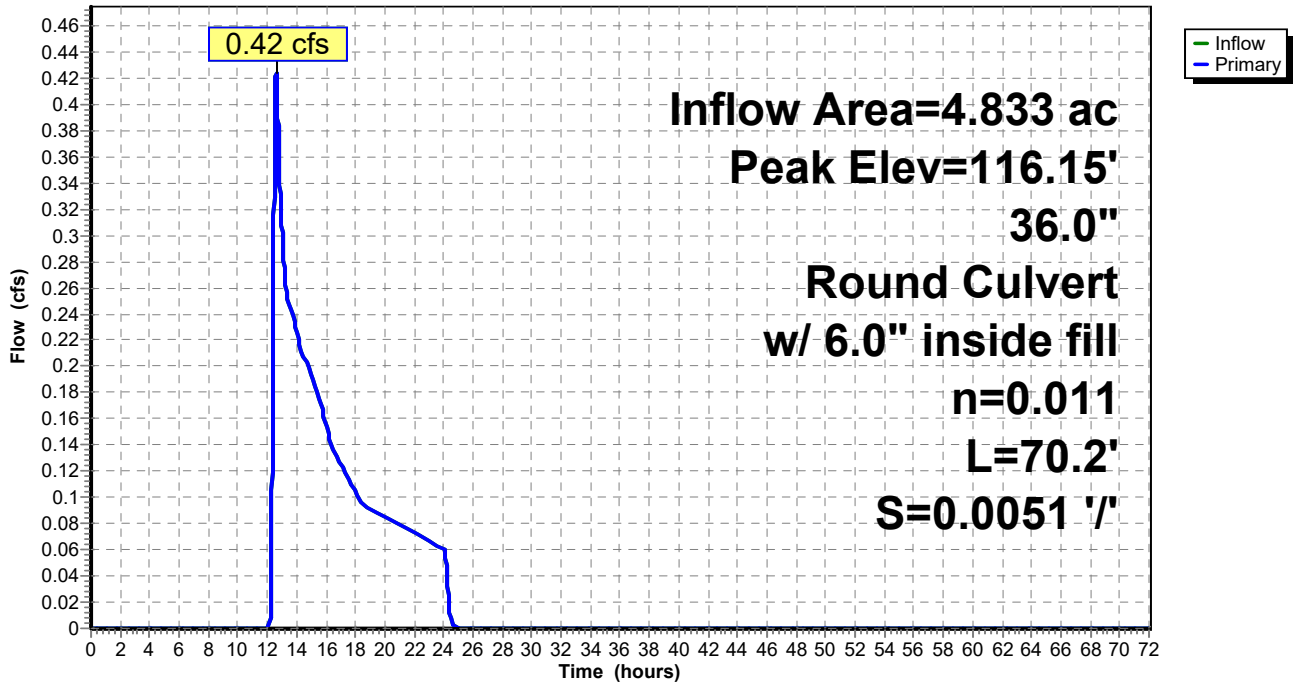
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 116.15' @ 12.60 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	116.00'	<b>36.0" Round Culvert w/ 6.0" inside fill</b> L= 70.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 115.50' / 115.14' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 6.29 sf

**Primary OutFlow** Max=0.42 cfs @ 12.60 hrs HW=116.15' TW=0.00' (Dynamic Tailwater)  
 ↳ **1=Culvert** (Inlet Controls 0.42 cfs @ 1.23 fps)

**Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 28

**Summary for Subcatchment DV 10S: To Low Point Onsite**

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Runoff = 2.68 cfs @ 12.17 hrs, Volume= 0.242 af, Depth= 2.37"  
 Routed to Reach OP2 : Observation Point 2

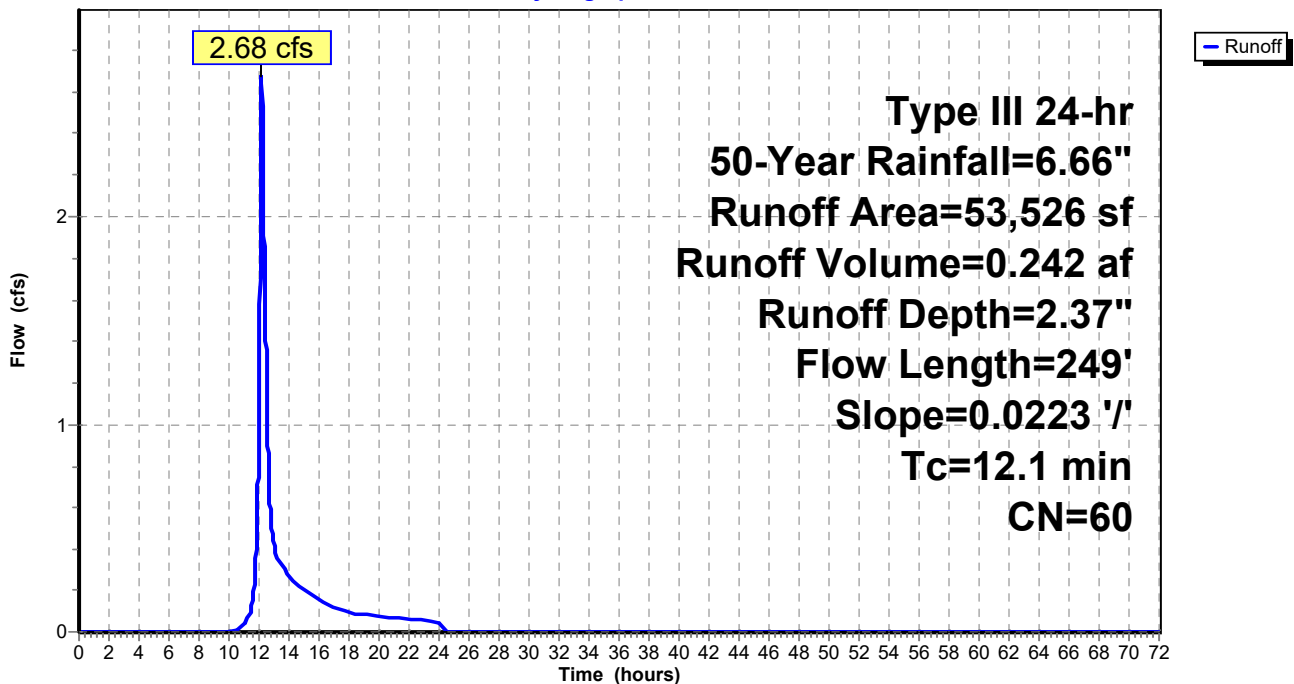
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
4,801	55	Woods, Good HSG B
48,725	61	>75% Grass cover, Good HSG B
53,526	60	Weighted Average
53,526		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	249	0.0223	0.34		Lag/CN Method,

**Subcatchment DV 10S: To Low Point Onsite**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 29

**Summary for Subcatchment DV 1S: To 36' RCP Culvert**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.29 cfs @ 12.50 hrs, Volume= 0.262 af, Depth= 0.65"  
 Routed to Pond EX 1P : 36" RCP Culvert with 6" Embedment

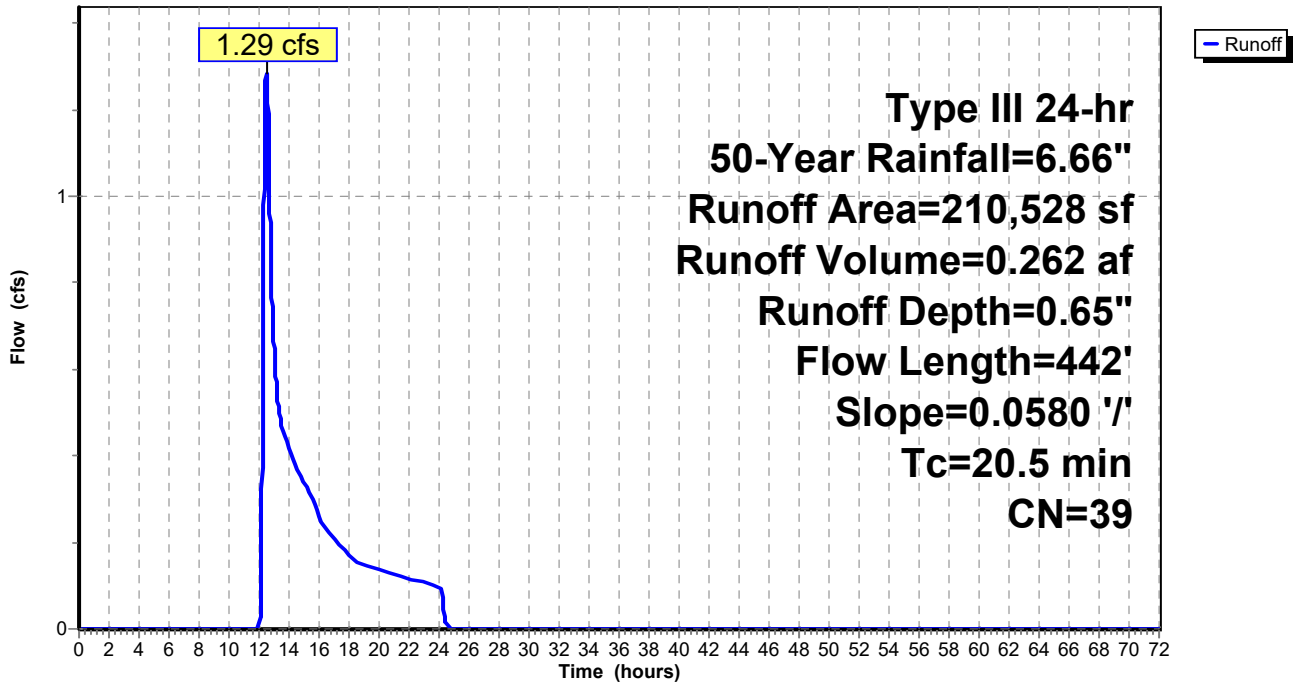
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
48	55	Woods, Good HSG B
49,416	30	Woods, Good HSG A
143,858	39	>75% Grass cover, Good HSG A
17,206	61	>75% Grass cover, Good HSG B
210,528	39	Weighted Average
210,528		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	442	0.0580	0.36		Lag/CN Method,

**Subcatchment DV 1S: To 36' RCP Culvert**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 30

Summary for Subcatchment DV 2S: To CB 101

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.57 cfs @ 12.59 hrs, Volume= 0.117 af, Depth= 0.79"  
 Routed to Pond DV 1.2P : CB 101

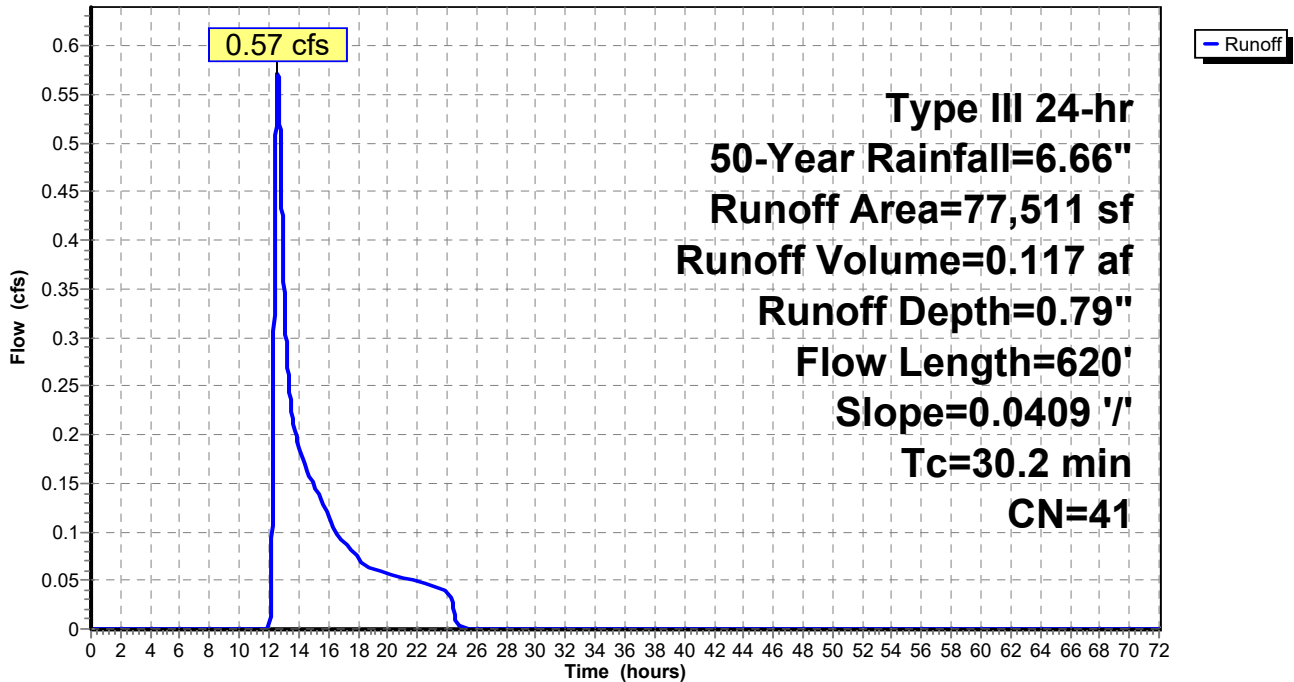
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
1,196	98	Paved parking HSG A
2,723	98	Paved parking HSG B
12,398	30	Woods, Good HSG A
58,940	39	>75% Grass cover, Good HSG A
2,254	61	>75% Grass cover, Good HSG B
77,511	41	Weighted Average
73,592		94.94% Pervious Area
3,919		5.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	620	0.0409	0.34		Lag/CN Method,

Subcatchment DV 2S: To CB 101

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 31

**Summary for Subcatchment DV 3S: To Roadway Culvert**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.12 cfs @ 12.23 hrs, Volume= 0.121 af, Depth= 1.57"  
 Routed to Pond DV 3P : Roadway Culvert to IB-2

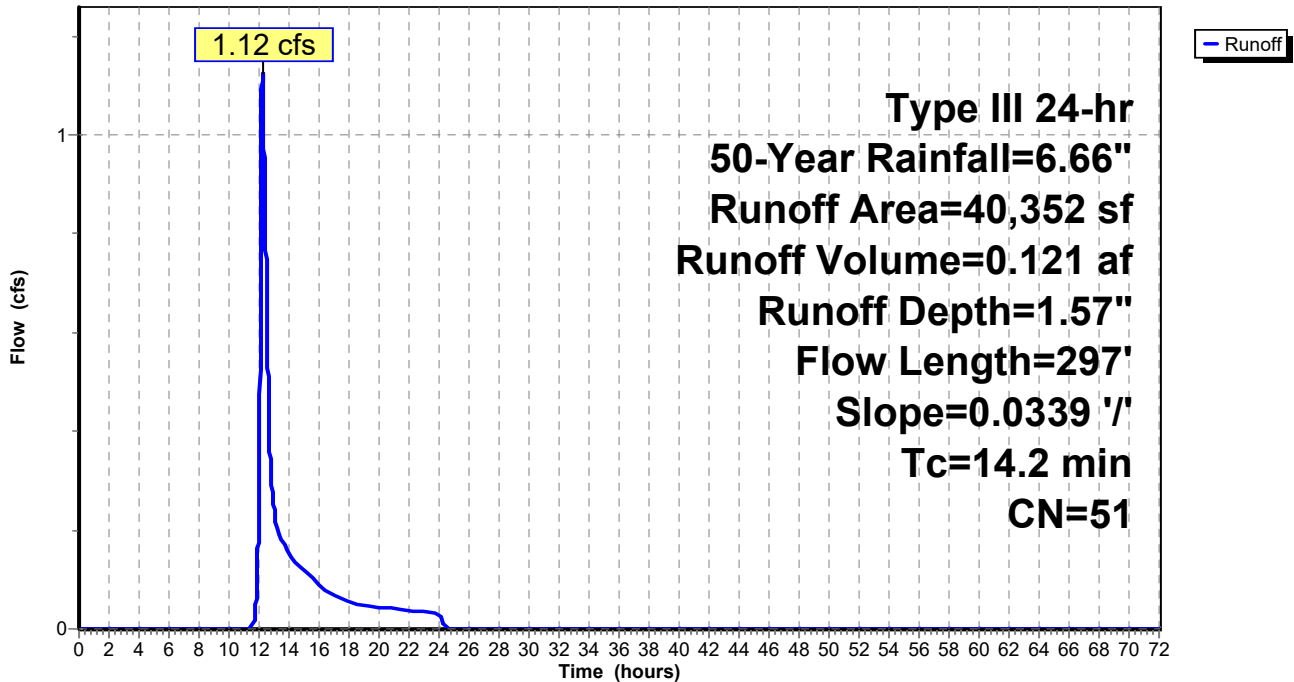
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
1,155	30	Woods, Good HSG A
2,496	55	Woods, Good HSG B
16,638	39	>75% Grass cover, Good HSG A
20,063	61	>75% Grass cover, Good HSG B
40,352	51	Weighted Average
40,352		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.2	297	0.0339	0.35		Lag/CN Method,

**Subcatchment DV 3S: To Roadway Culvert**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 32

**Summary for Subcatchment DV 4.1S: To Stormwater Management Pond IB-2**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.16 cfs @ 12.09 hrs, Volume= 0.083 af, Depth= 4.17"  
 Routed to Pond 2.1P : Sediment Forebay

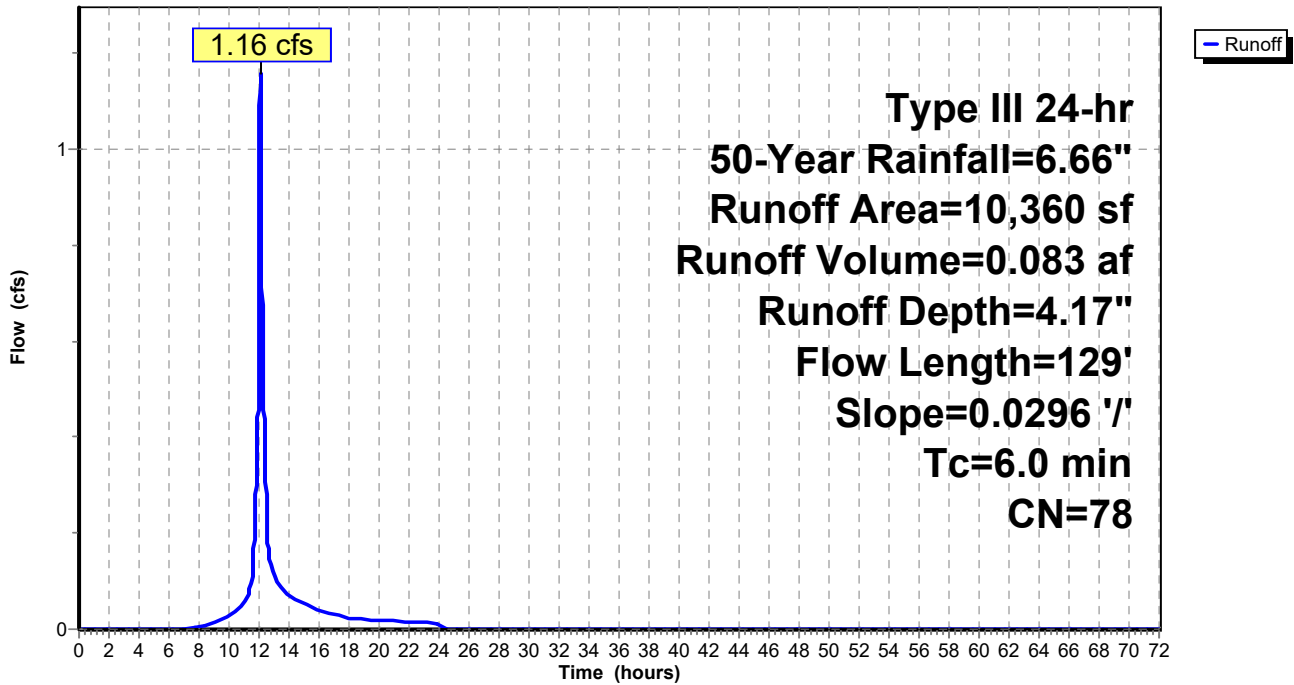
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
4,694	98	Paved parking HSG B
5,666	61	>75% Grass cover, Good HSG B
10,360	78	Weighted Average
5,666		54.69% Pervious Area
4,694		45.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.8	129	0.0296	0.56		Lag/CN Method,
3.8	129	Total, Increased to minimum Tc = 6.0 min			

**Subcatchment DV 4.1S: To Stormwater Management Pond IB-2**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 33

**Summary for Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.23 cfs @ 12.09 hrs, Volume= 0.088 af, Depth= 4.60"  
 Routed to Pond 2.1P : Sediment Forebay

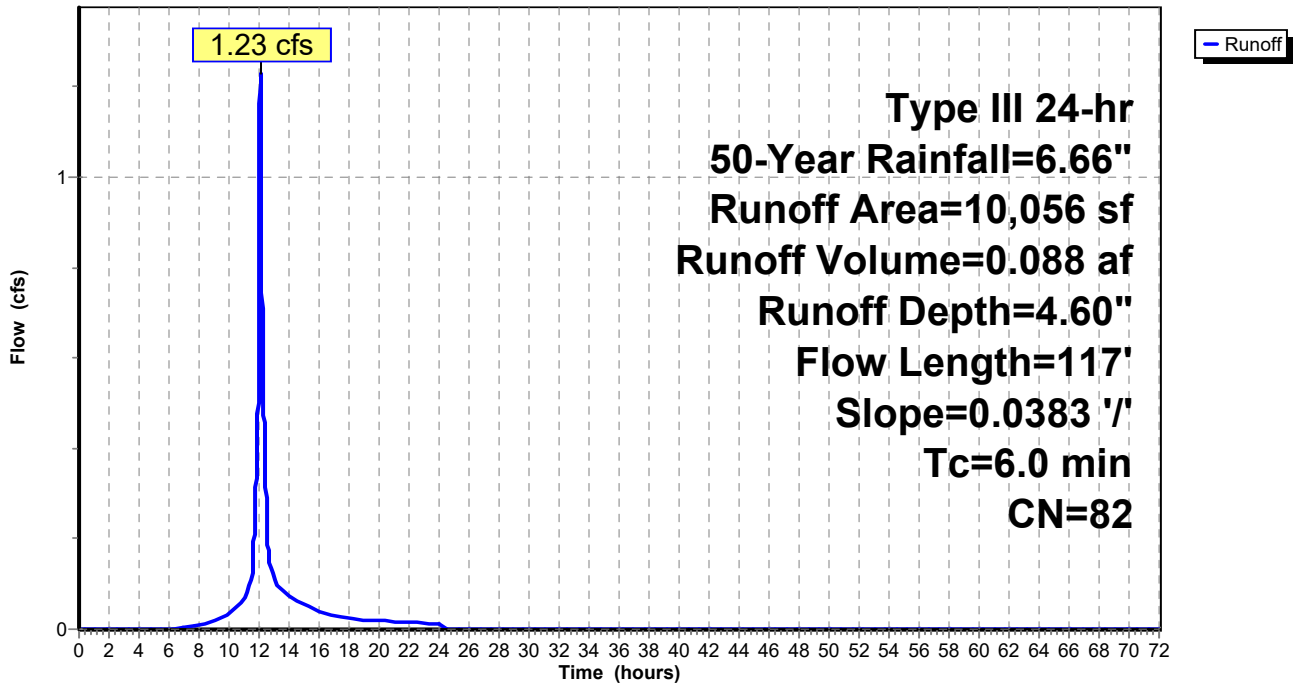
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
5,779	98	Paved parking HSG B
4,277	61	>75% Grass cover, Good HSG B
10,056	82	Weighted Average
4,277		42.53% Pervious Area
5,779		57.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	117	0.0383	0.71		Lag/CN Method,
2.7	117	Total, Increased to minimum Tc = 6.0 min			

**Subcatchment DV 4.2S: To Stormwater Management Pond IB-2**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 34

Summary for Subcatchment DV 5S: To CB 100

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Runoff = 0.96 cfs @ 12.09 hrs, Volume= 0.070 af, Depth= 5.04"  
 Routed to Pond DV 1.1P : CB 100

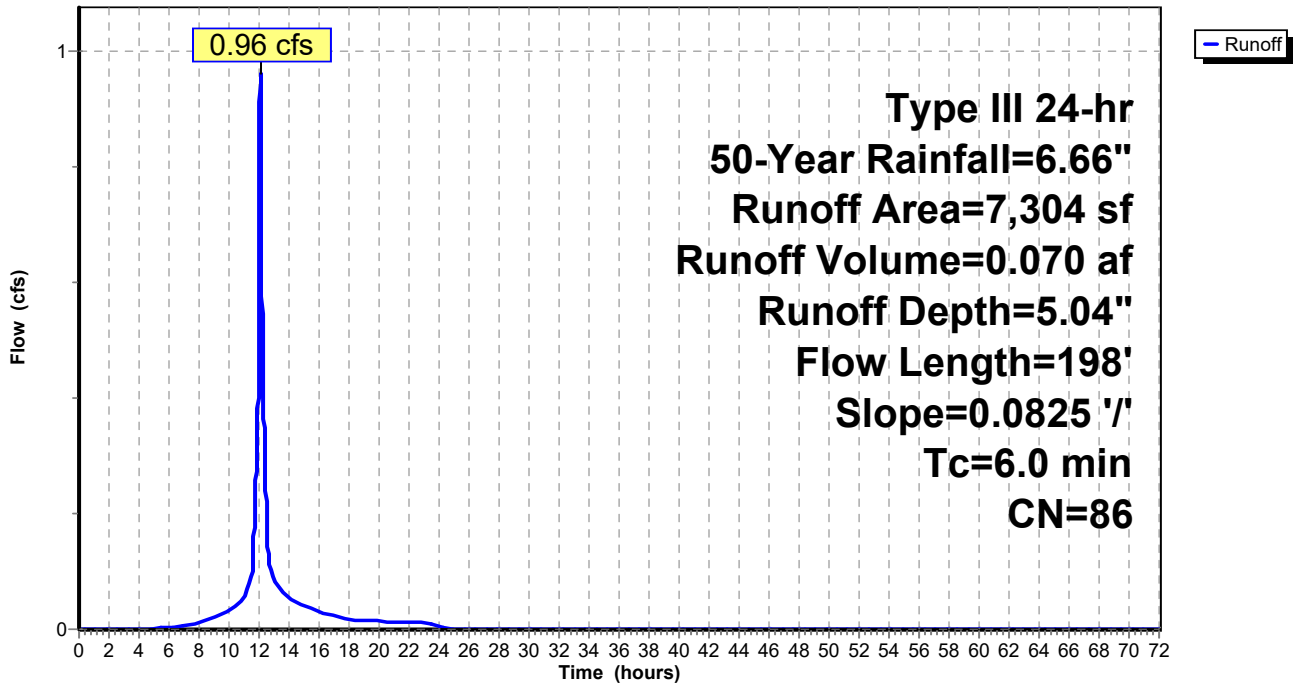
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
174	98	Paved parking HSG A
4,722	98	Paved parking HSG B
11	55	Woods, Good HSG B
2,397	61	>75% Grass cover, Good HSG B
7,304	86	Weighted Average
2,408		32.97% Pervious Area
4,896		67.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.5	198	0.0825	1.33		Lag/CN Method,
2.5	198	Total, Increased to minimum Tc = 6.0 min			

Subcatchment DV 5S: To CB 100

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 35

**Summary for Subcatchment DV 6S: To Stormwater Management Pond IB-1**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 0.29 cfs @ 12.00 hrs, Volume= 0.017 af, Depth= 2.46"  
 Routed to Pond 1.3P : Sediment Forebay

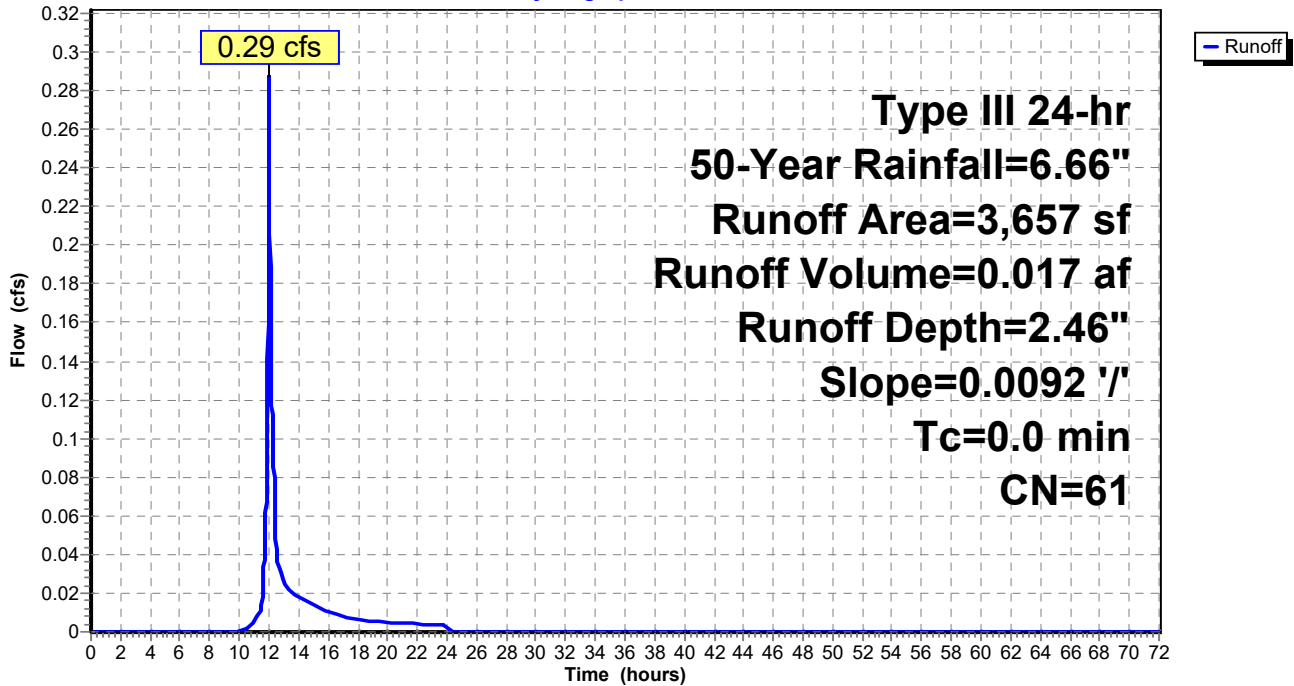
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
3,657	61	>75% Grass cover, Good HSG B
3,657		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0		0.0092			Lag/CN Method,

**Subcatchment DV 6S: To Stormwater Management Pond IB-1**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 36

Summary for Subcatchment DV 7S: To Merrimack River

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 12.66 cfs @ 12.16 hrs, Volume= 1.115 af, Depth= 2.37"  
 Routed to Reach OP1 : Observation Point 1

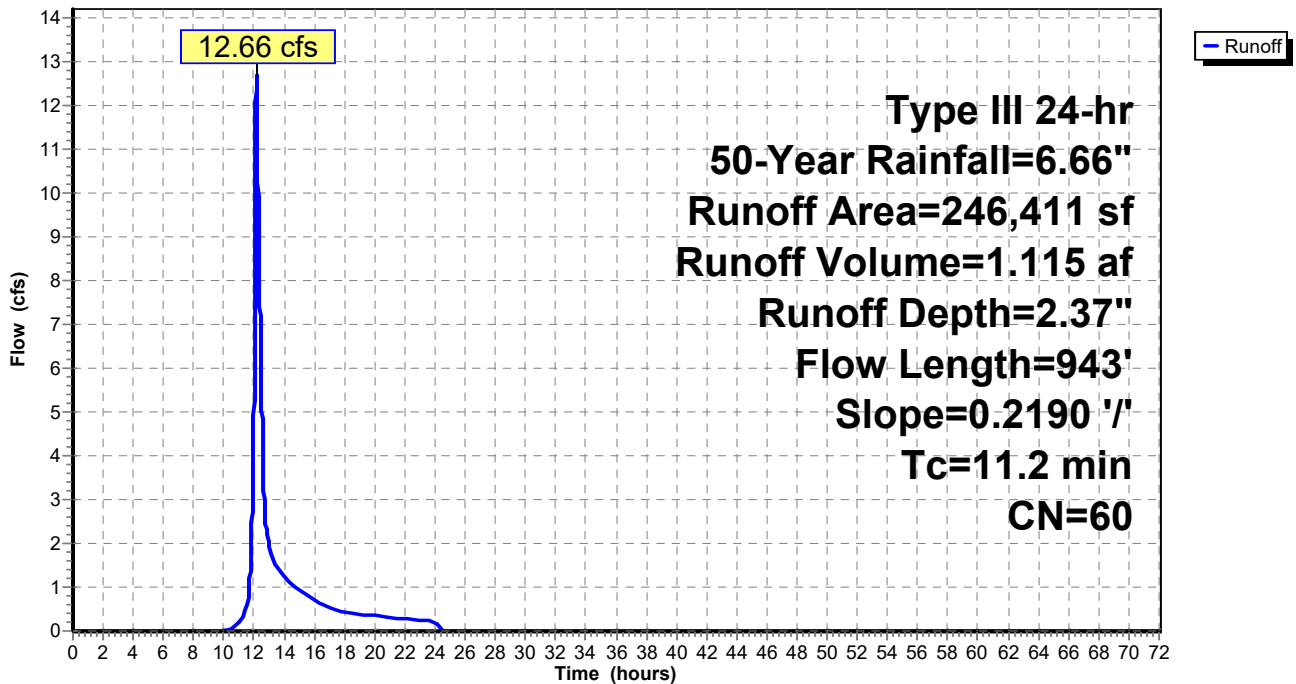
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
8,907	77	Woods, Good HSG D
6,702	98	Paved parking HSG B
2,533	98	Roofs HSG B
121,783	55	Woods, Good HSG B
106,486	61	>75% Grass cover, Good HSG B
246,411	60	Weighted Average
237,176		96.25% Pervious Area
9,235		3.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.2	943	0.2190	1.40		Lag/CN Method,

Subcatchment DV 7S: To Merrimack River

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 37

**Summary for Subcatchment DV 8S: To Existing Roadway Drainage**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 1.20 cfs @ 12.09 hrs, Volume= 0.087 af, Depth= 4.60"  
 Routed to Reach OP4 : Observation Point 4

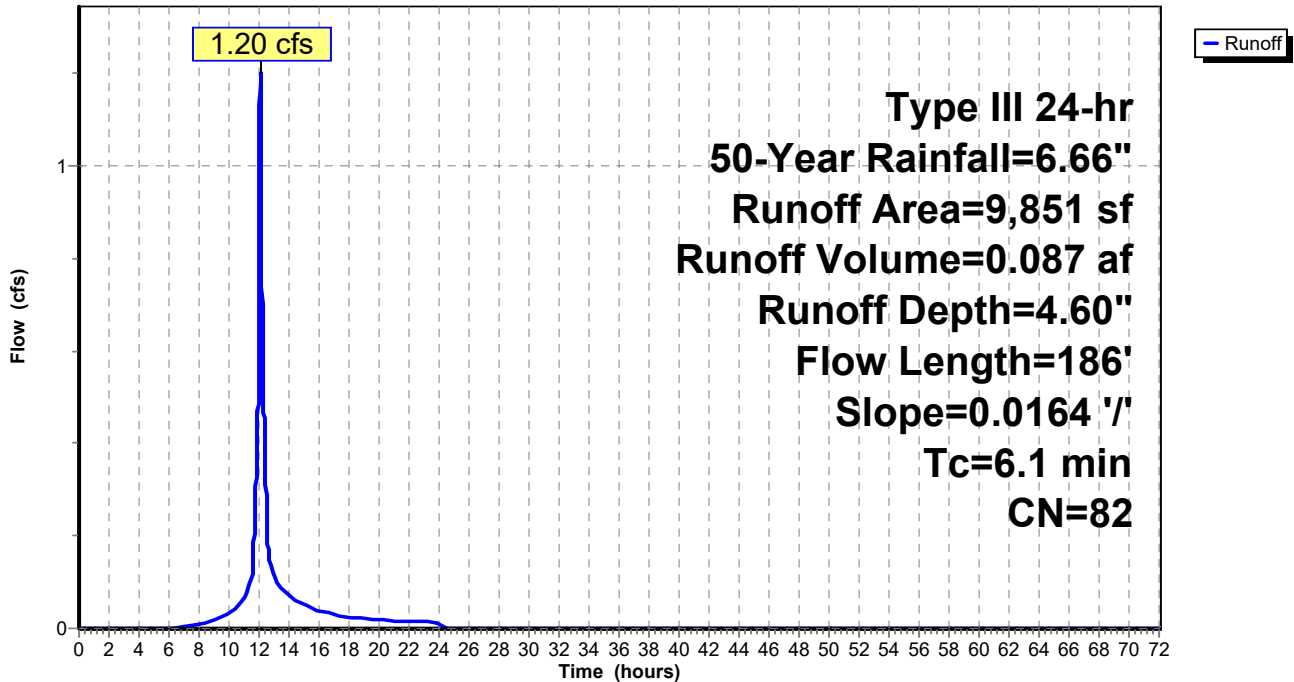
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
5,702	98	Paved parking HSG B
4,149	61	>75% Grass cover, Good HSG B
9,851	82	Weighted Average
4,149		42.12% Pervious Area
5,702		57.88% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.1	186	0.0164	0.51		Lag/CN Method,

**Subcatchment DV 8S: To Existing Roadway Drainage**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 38

**Summary for Subcatchment DV 9S: To Southerly Property Line**

CarlsonPlanXYPos|0.0000|0.0000|

Runoff = 3.22 cfs @ 12.19 hrs, Volume= 0.295 af, Depth= 2.46"  
 Routed to Reach OP3 : Observation Point 3

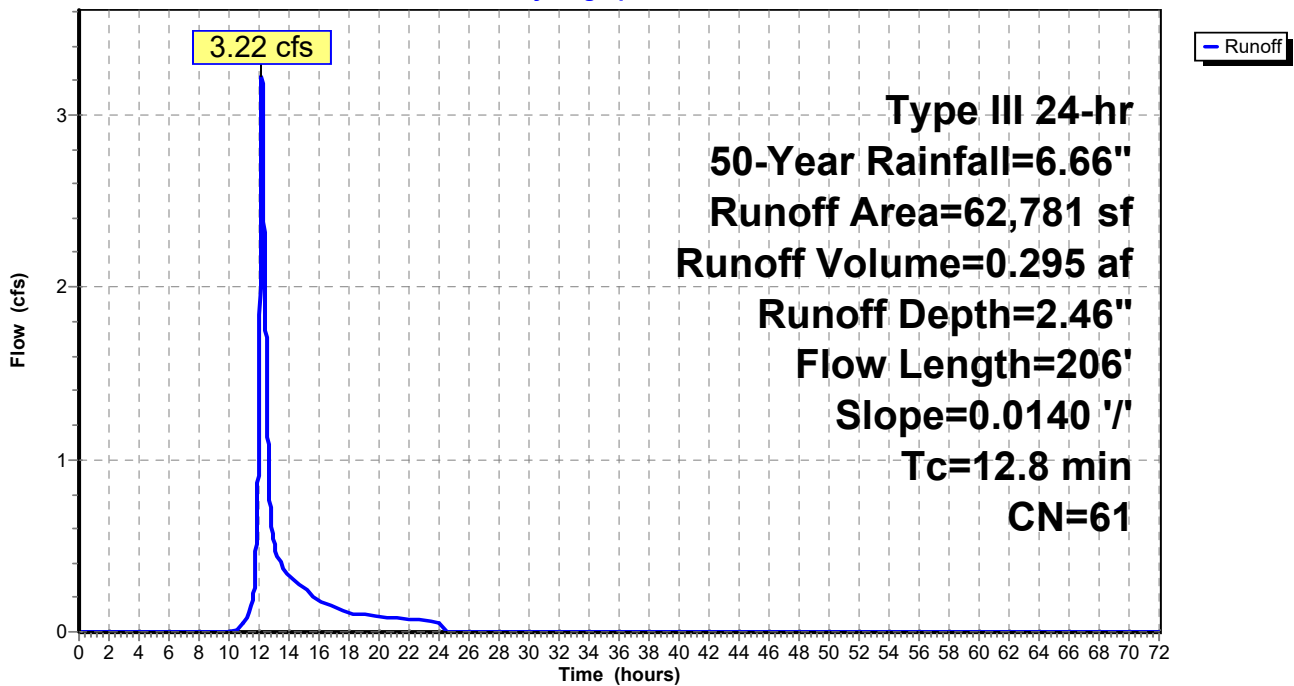
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Type III 24-hr 50-Year Rainfall=6.66"

Area (sf)	CN	Description
62,781	61	>75% Grass cover, Good HSG B
62,781		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.8	206	0.0140	0.27		Lag/CN Method,

**Subcatchment DV 9S: To Southerly Property Line**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 39

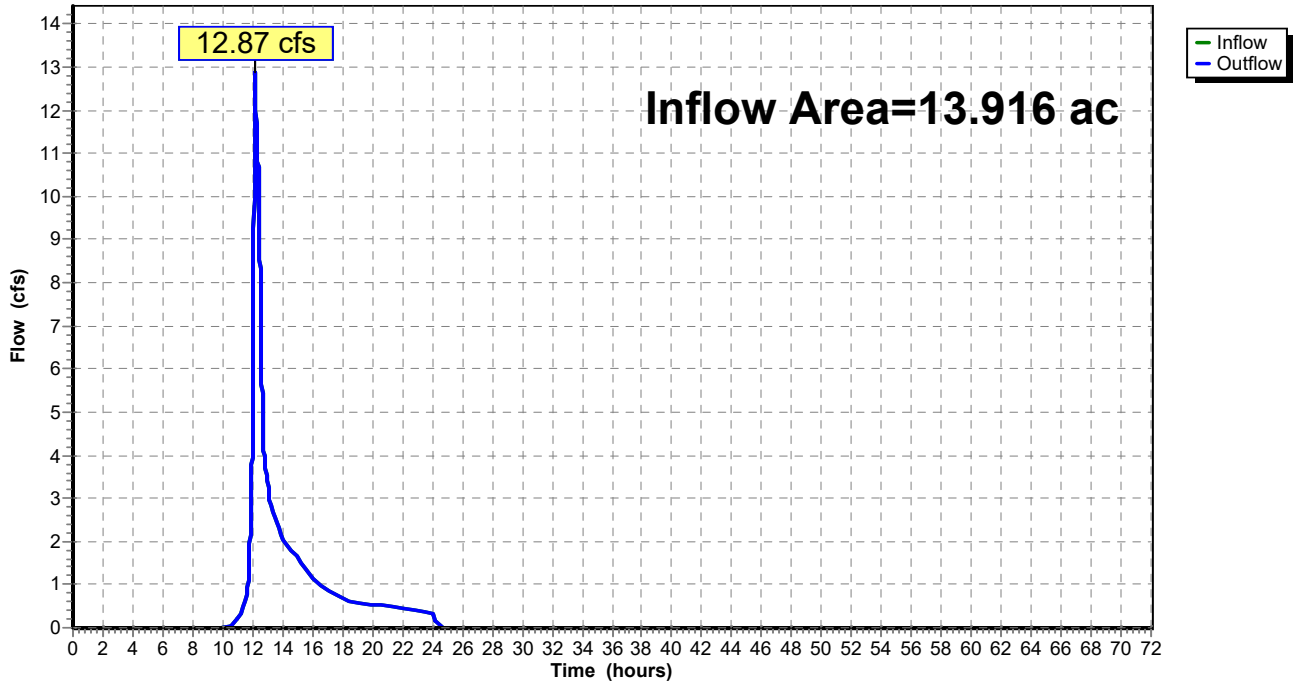
### Summary for Reach OP1: Observation Point 1

Inflow Area = 13.916 ac, 4.71% Impervious, Inflow Depth = 1.37" for 50-Year event  
Inflow = 12.87 cfs @ 12.17 hrs, Volume= 1.594 af  
Outflow = 12.87 cfs @ 12.17 hrs, Volume= 1.594 af, Atten= 0%, Lag= 0.0 min

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

### Reach OP1: Observation Point 1

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 40

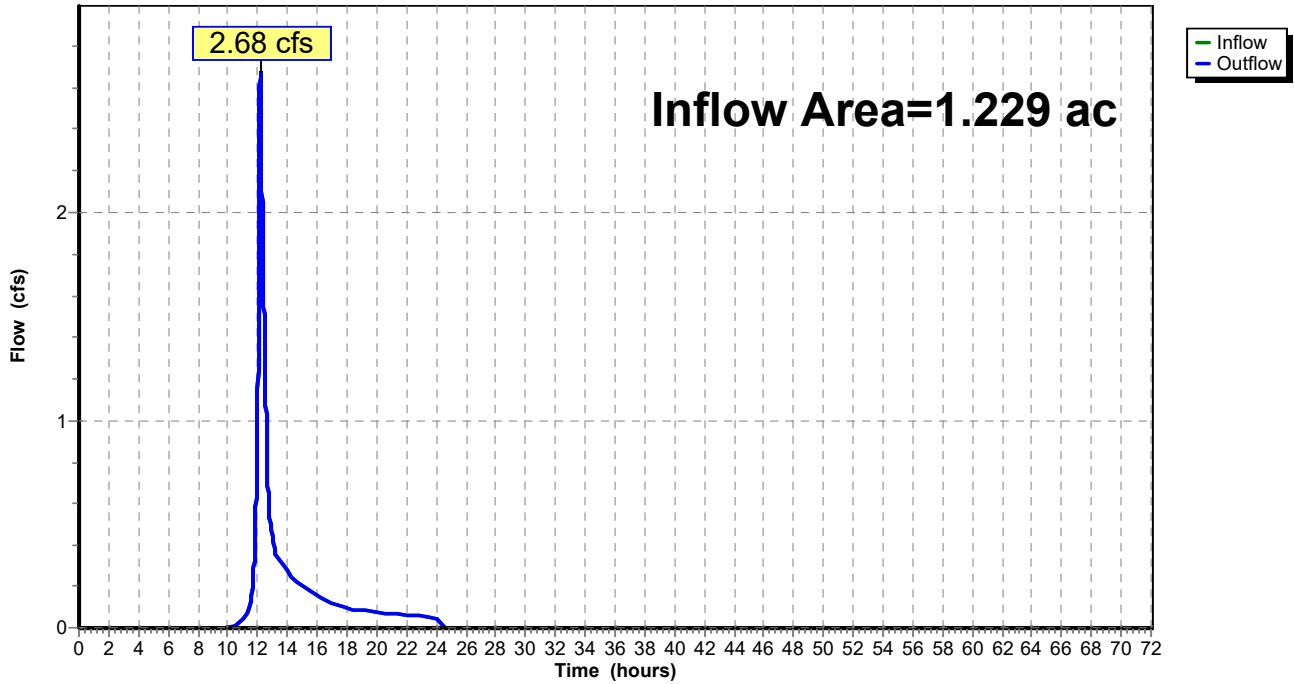
Summary for Reach OP2: Observation Point 2

Inflow Area = 1.229 ac, 0.00% Impervious, Inflow Depth = 2.37" for 50-Year event  
Inflow = 2.68 cfs @ 12.17 hrs, Volume= 0.242 af  
Outflow = 2.68 cfs @ 12.17 hrs, Volume= 0.242 af, Atten= 0%, Lag= 0.0 min

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

Reach OP2: Observation Point 2

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 41

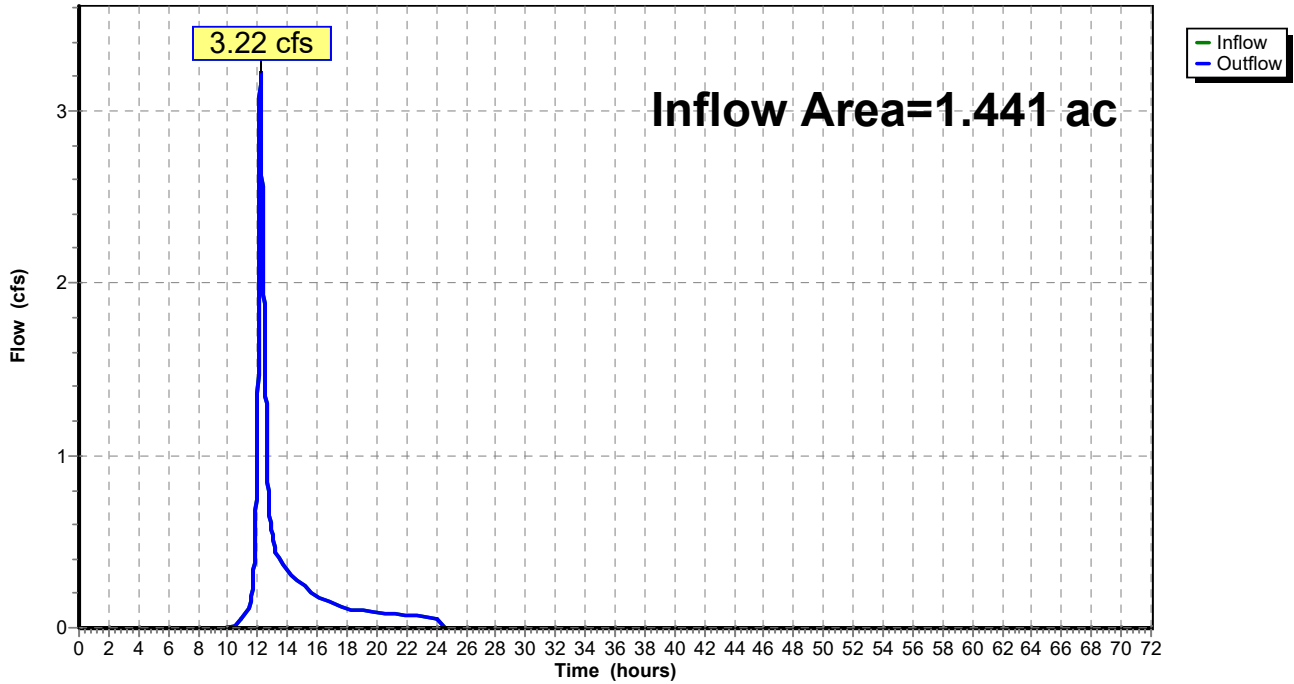
Summary for Reach OP3: Observation Point 3

Inflow Area = 1.441 ac, 0.00% Impervious, Inflow Depth = 2.46" for 50-Year event  
Inflow = 3.22 cfs @ 12.19 hrs, Volume= 0.295 af  
Outflow = 3.22 cfs @ 12.19 hrs, Volume= 0.295 af, Atten= 0%, Lag= 0.0 min

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

Reach OP3: Observation Point 3

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 42

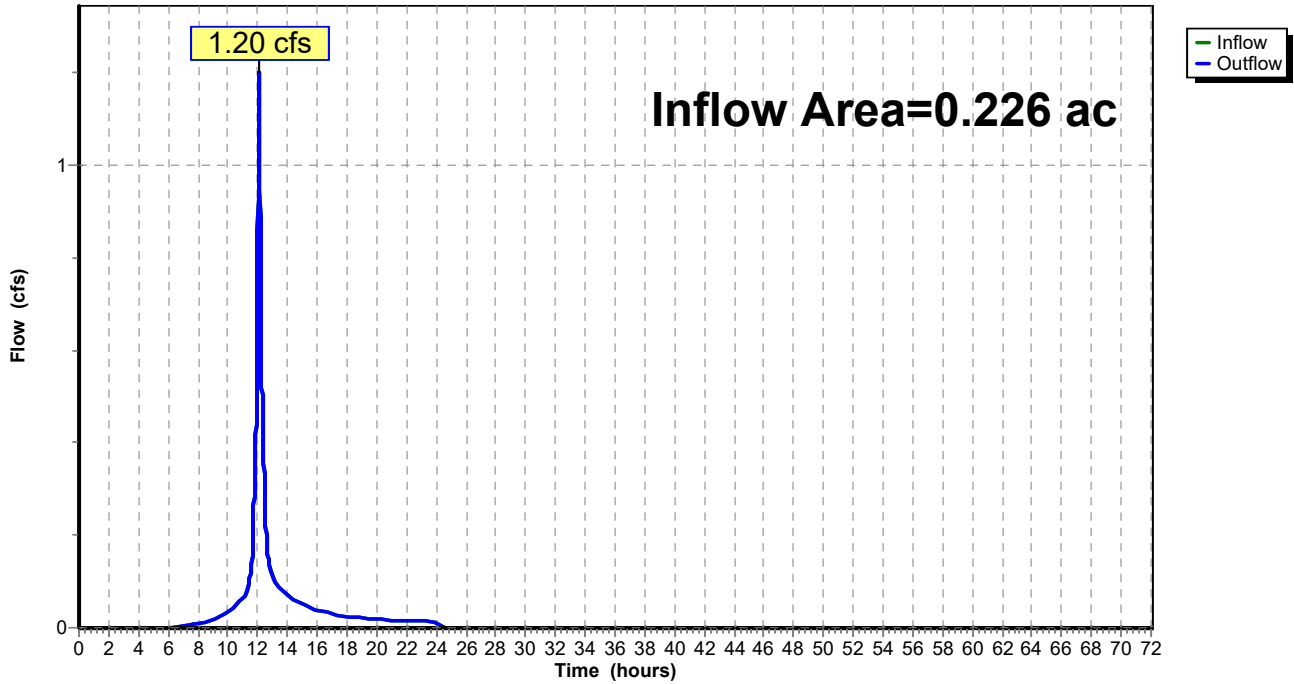
Summary for Reach OP4: Observation Point 4

Inflow Area = 0.226 ac, 57.88% Impervious, Inflow Depth = 4.60" for 50-Year event  
Inflow = 1.20 cfs @ 12.09 hrs, Volume= 0.087 af  
Outflow = 1.20 cfs @ 12.09 hrs, Volume= 0.087 af, Atten= 0%, Lag= 0.0 min

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

Reach OP4: Observation Point 4

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 43

**Summary for Pond 1.3P: Sediment Forebay**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth = 1.21" for 50-Year event  
 Inflow = 1.14 cfs @ 12.07 hrs, Volume= 0.204 af  
 Outflow = 0.97 cfs @ 12.07 hrs, Volume= 0.204 af, Atten= 15%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.07 hrs, Volume= 0.070 af  
 Routed to Pond 1P : Stormwater Management Pond IB-1  
 Secondary = 0.50 cfs @ 12.68 hrs, Volume= 0.133 af  
 Routed to Pond 1P : Stormwater Management Pond IB-1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.55' @ 12.97 hrs Surf.Area= 434 sf Storage= 573 cf

Plug-Flow detention time= 110.1 min calculated for 0.204 af (100% of inflow)  
 Center-of-Mass det. time= 108.9 min ( 995.4 - 886.6 )

Volume	Invert	Avail.Storage	Storage Description			
#1	119.00'	788 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
119.00	61	32.4	0	0	61	
121.00	337	71.6	361	361	402	
122.00	523	89.2	427	788	641	

Device	Routing	Invert	Outlet Devices										
#1	Secondary	121.00'	<b>24.2' long x 2.0' breadth Broad-Crested Rectangular Weir</b>										
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00										
			2.50 3.00 3.50										
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88										
			2.85 3.07 3.20 3.32										
#2	Primary	119.00'	<b>24.20' long x 10.00' breadth x 2.00' high Rock Fill</b>										
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%										

**Primary OutFlow** Max=0.00 cfs @ 12.07 hrs HW=120.13' TW=120.14' (Dynamic Tailwater)  
 ↑2=Rock Fill ( Controls 0.00 cfs)

**Secondary OutFlow** Max=0.00 cfs @ 12.68 hrs HW=121.30' TW=121.32' (Dynamic Tailwater)  
 ↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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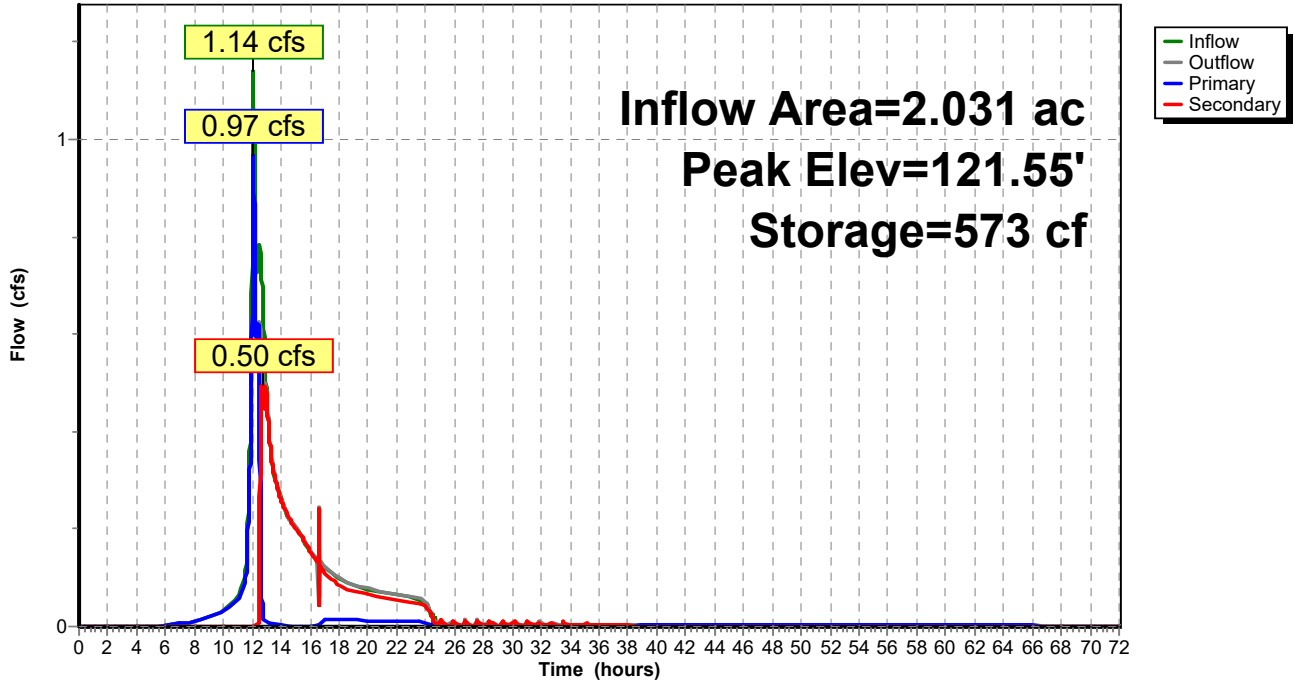
Type III 24-hr 50-Year Rainfall=6.66"

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Page 44

Pond 1.3P: Sediment Forebay

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 45

**Summary for Pond 1P: Stormwater Management Pond IB-1**

Inflow Area = 2.031 ac, 9.96% Impervious, Inflow Depth > 1.20" for 50-Year event  
 Inflow = 0.97 cfs @ 12.07 hrs, Volume= 0.204 af  
 Outflow = 0.49 cfs @ 12.96 hrs, Volume= 0.189 af, Atten= 49%, Lag= 53.4 min  
 Discarded = 0.02 cfs @ 12.96 hrs, Volume= 0.080 af  
 Primary = 0.47 cfs @ 12.96 hrs, Volume= 0.109 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.55' @ 12.96 hrs Surf.Area= 1,402 sf Storage= 2,705 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 538.1 min ( 1,533.6 - 995.4 )

Volume	Invert	Avail.Storage	Storage Description		
#1	119.00'	5,116 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
119.00	752	117.7	0	0	752
122.00	1,537	156.2	3,364	3,364	1,686
123.00	1,977	173.6	1,752	5,116	2,172

Device	Routing	Invert	Outlet Devices
#1	Discarded	119.00'	<b>0.550 in/hr Exfiltration per field test results over Surface area</b>
#2	Device 3	121.50'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#3	Primary	119.00'	<b>15.0" Round Culvert</b> L= 20.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.00' / 118.80' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Discarded OutFlow** Max=0.02 cfs @ 12.96 hrs HW=121.55' (Free Discharge)

↑**1=Exfiltration per field test results** (Exfiltration Controls 0.02 cfs)

**Primary OutFlow** Max=0.47 cfs @ 12.96 hrs HW=121.55' TW=0.00' (Dynamic Tailwater)

↑**3=Culvert** (Passes 0.47 cfs of 8.20 cfs potential flow)

↑**2=Orifice/Grate** (Weir Controls 0.47 cfs @ 0.74 fps)

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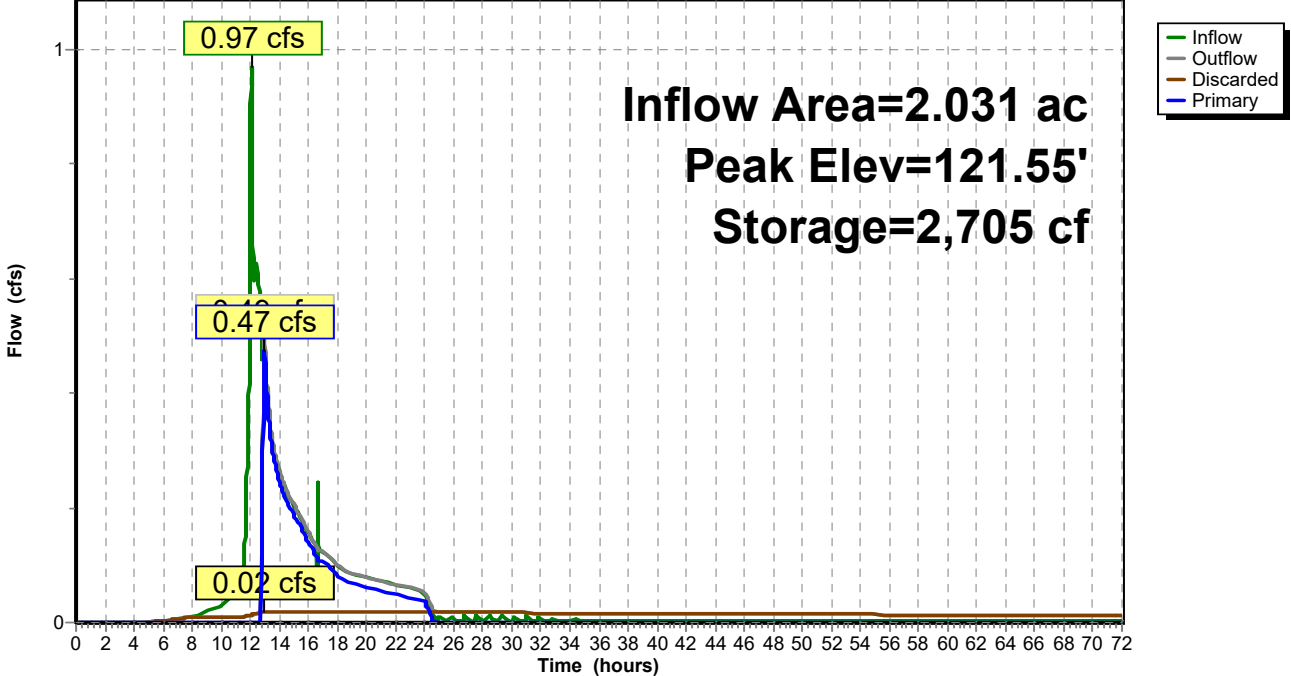
Type III 24-hr 50-Year Rainfall=6.66"

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Page 46

Pond 1P: Stormwater Management Pond IB-1

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 47

**Summary for Pond 2.1P: Sediment Forebay**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 2.51" for 50-Year event  
 Inflow = 3.05 cfs @ 12.10 hrs, Volume= 0.292 af  
 Outflow = 2.74 cfs @ 12.10 hrs, Volume= 0.291 af, Atten= 10%, Lag= 0.0 min  
 Primary = 2.74 cfs @ 12.10 hrs, Volume= 0.094 af  
 Routed to Pond 2P : Stormwater Management Pond IB-2  
 Secondary = 1.81 cfs @ 12.29 hrs, Volume= 0.196 af  
 Routed to Pond 2P : Stormwater Management Pond IB-2

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.12' @ 12.37 hrs Surf.Area= 399 sf Storage= 416 cf

Plug-Flow detention time= 27.9 min calculated for 0.291 af (100% of inflow)  
 Center-of-Mass det. time= 25.6 min ( 868.2 - 842.6 )

Volume	Invert	Avail.Storage	Storage Description			
#1	121.70'	579 cf	<b>Sediment Forebay (Irregular)</b> Listed below (Recalc)			
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)	
121.70	191	53.9	0	0	191	
122.70	340	70.0	262	262	361	
123.50	456	80.1	317	579	496	

Device	Routing	Invert	Outlet Devices											
#1	Secondary	122.70'	<b>42.0' long x 2.0' breadth Broad-Crested Rectangular Weir</b>											
			Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00											
			2.50 3.00 3.50											
			Coef. (English) 2.54 2.61 2.61 2.60 2.66 2.70 2.77 2.89 2.88											
			2.85 3.07 3.20 3.32											
#2	Primary	121.70'	<b>42.00' long x 6.00' breadth x 1.00' high Rock Fill</b>											
			Rock Diam.= 6.000", S.D.= 1.000", Voids= 40.0%											

**Primary OutFlow** Max=1.43 cfs @ 12.10 hrs HW=122.58' TW=122.57' (Dynamic Tailwater)  
 ↑2=Rock Fill (Rockfill Controls 1.43 cfs @ 0.04 fps)

**Secondary OutFlow** Max=0.00 cfs @ 12.29 hrs HW=123.08' TW=123.09' (Dynamic Tailwater)  
 ↑1=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

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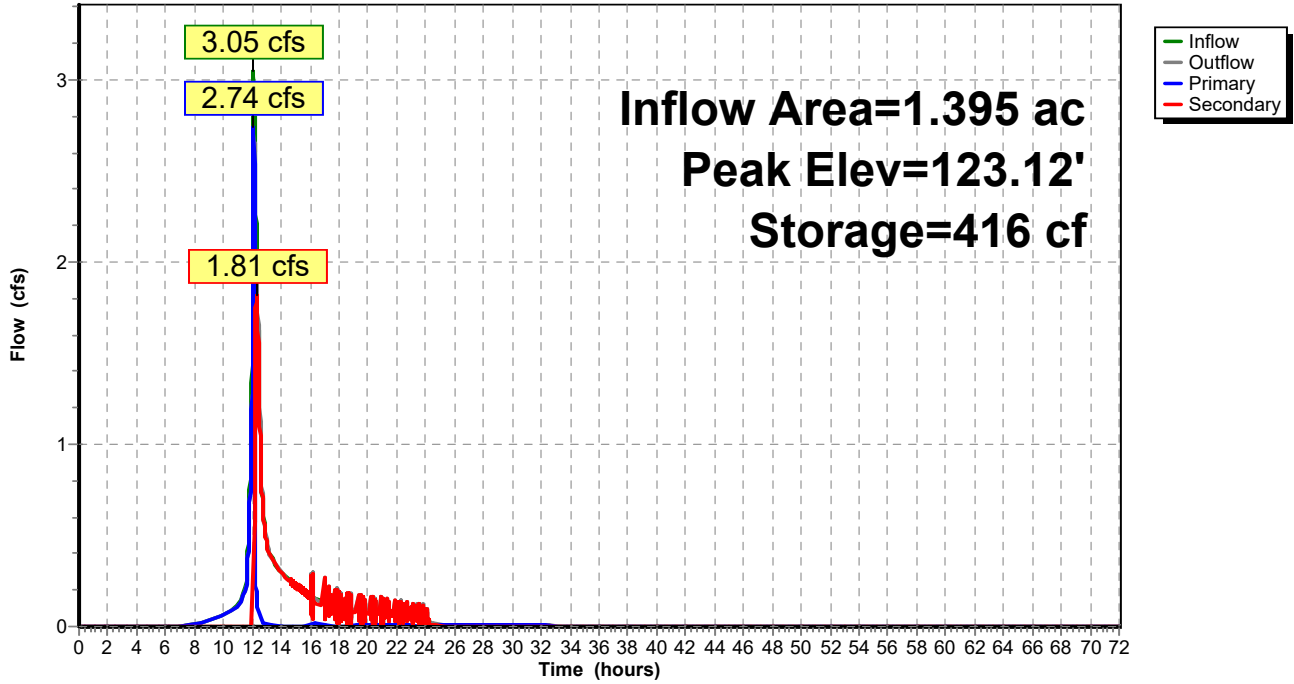
Type III 24-hr 50-Year Rainfall=6.66"

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Page 48

Pond 2.1P: Sediment Forebay

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 49

**Summary for Pond 2P: Stormwater Management Pond IB-2**

Inflow Area = 1.395 ac, 17.23% Impervious, Inflow Depth = 2.50" for 50-Year event  
 Inflow = 2.74 cfs @ 12.10 hrs, Volume= 0.291 af  
 Outflow = 1.77 cfs @ 12.36 hrs, Volume= 0.291 af, Atten= 35%, Lag= 15.5 min  
 Discarded = 0.10 cfs @ 12.36 hrs, Volume= 0.184 af  
 Primary = 1.67 cfs @ 12.36 hrs, Volume= 0.107 af  
 Routed to Reach OP1 : Observation Point 1

Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.12' @ 12.36 hrs Surf.Area= 2,713 sf Storage= 3,296 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)  
 Center-of-Mass det. time= 219.8 min ( 1,088.0 - 868.2 )

Volume	Invert	Avail.Storage	Storage Description		
#1	121.70'	4,374 cf	<b>Pond Storage (Irregular)</b> Listed below (Recalc)		
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
121.70	1,948	181.3	0	0	1,948
122.70	2,483	205.9	2,210	2,210	2,730
123.50	2,933	225.0	2,164	4,374	3,408

Device	Routing	Invert	Outlet Devices
#1	Discarded	121.70'	<b>1.650 in/hr Exfiltration per field test results over Surface area</b>
#2	Primary	118.70'	<b>15.0" Round Culvert</b> L= 50.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 118.70' / 118.20' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf
#3	Device 2	123.00'	<b>48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads

**Discarded OutFlow** Max=0.10 cfs @ 12.36 hrs HW=123.12' (Free Discharge)

↑**1=Exfiltration per field test results** (Exfiltration Controls 0.10 cfs)

**Primary OutFlow** Max=1.66 cfs @ 12.36 hrs HW=123.12' TW=0.00' (Dynamic Tailwater)

↑**2=Culvert** (Passes 1.66 cfs of 11.51 cfs potential flow)

↑**3=Orifice/Grate** (Weir Controls 1.66 cfs @ 1.12 fps)

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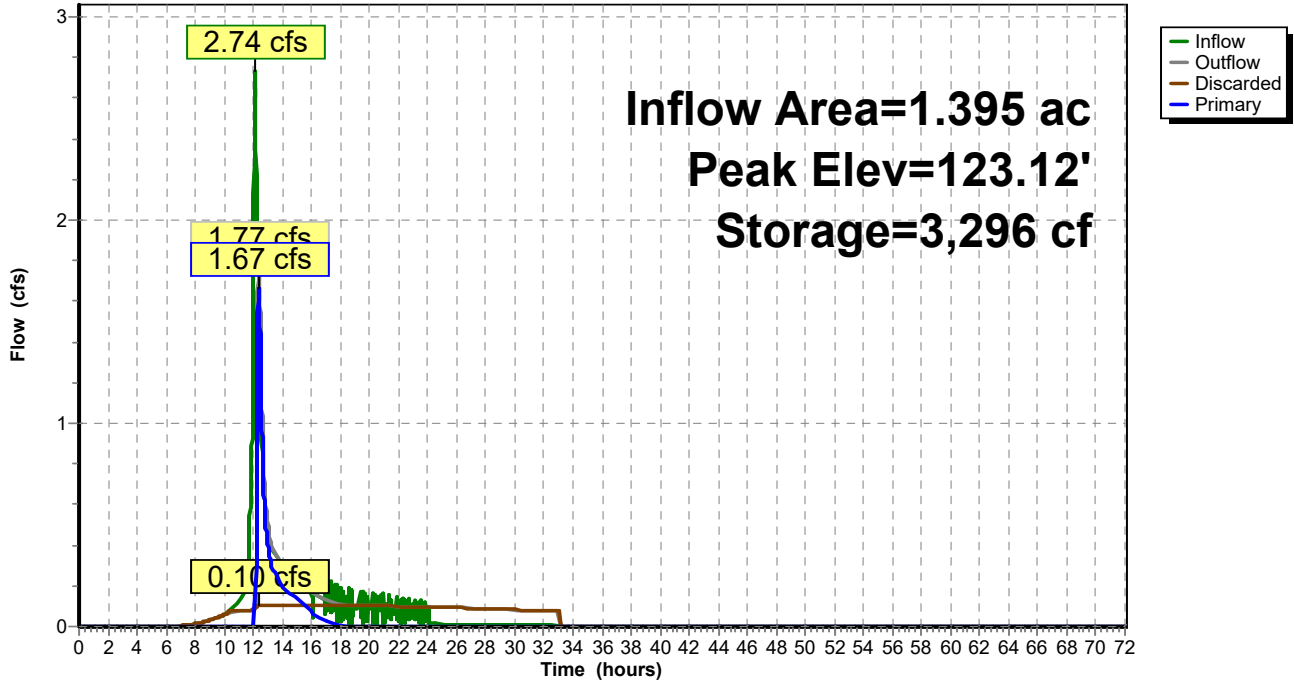
Type III 24-hr 50-Year Rainfall=6.66"

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Page 50

Pond 2P: Stormwater Management Pond IB-2

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 51

Summary for Pond DV 1.1P: CB 100

Inflow Area = 1.947 ac, 10.39% Impervious, Inflow Depth = 1.15" for 50-Year event  
 Inflow = 0.97 cfs @ 12.09 hrs, Volume= 0.187 af  
 Outflow = 0.97 cfs @ 12.09 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.97 cfs @ 12.09 hrs, Volume= 0.187 af  
 Routed to Pond 1.3P : Sediment Forebay

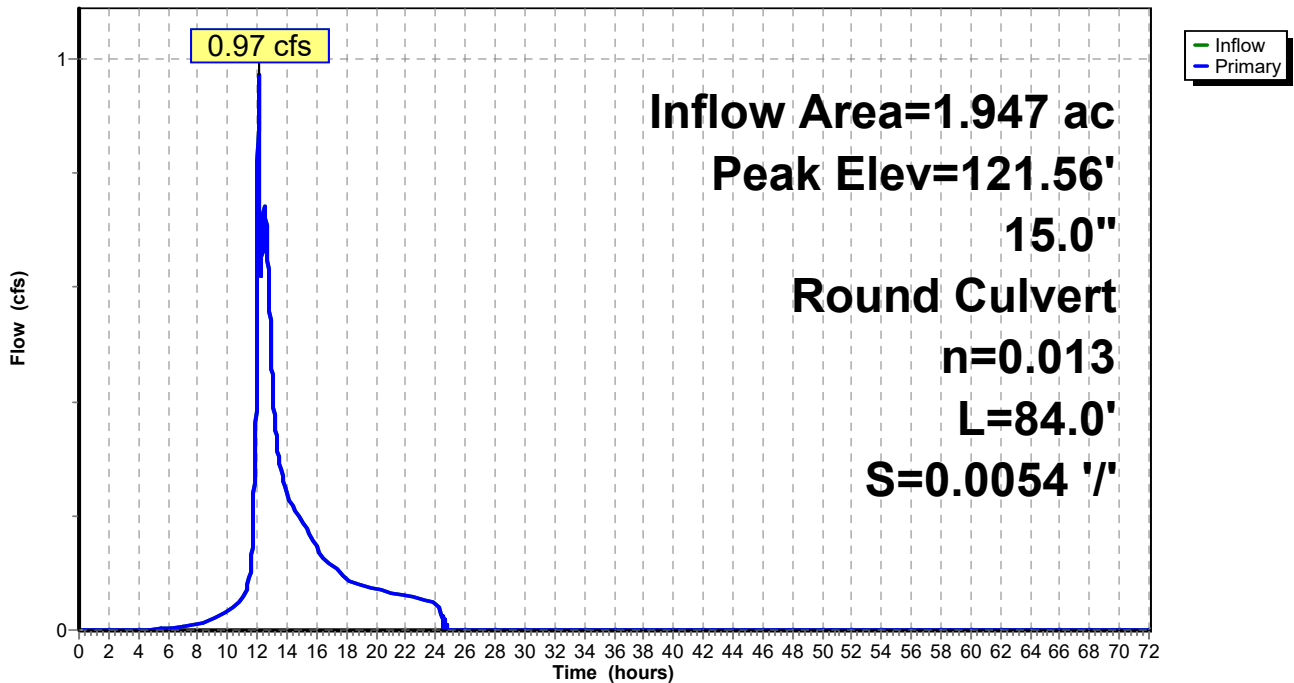
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.56' @ 12.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.45'	<b>15.0" Round Culvert</b> L= 84.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.45' / 119.00' S= 0.0054 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.85 cfs @ 12.09 hrs HW=120.28' TW=120.18' (Dynamic Tailwater)  
 1=Culvert (Outlet Controls 0.85 cfs @ 1.38 fps)

Pond DV 1.1P: CB 100

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 52

Summary for Pond DV 1.2P: CB 101

Inflow Area = 1.779 ac, 5.06% Impervious, Inflow Depth = 0.79" for 50-Year event  
 Inflow = 0.57 cfs @ 12.59 hrs, Volume= 0.117 af  
 Outflow = 0.57 cfs @ 12.59 hrs, Volume= 0.117 af, Atten= 0%, Lag= 0.1 min  
 Primary = 0.57 cfs @ 12.59 hrs, Volume= 0.117 af  
 Routed to Pond DV 1.1P : CB 100

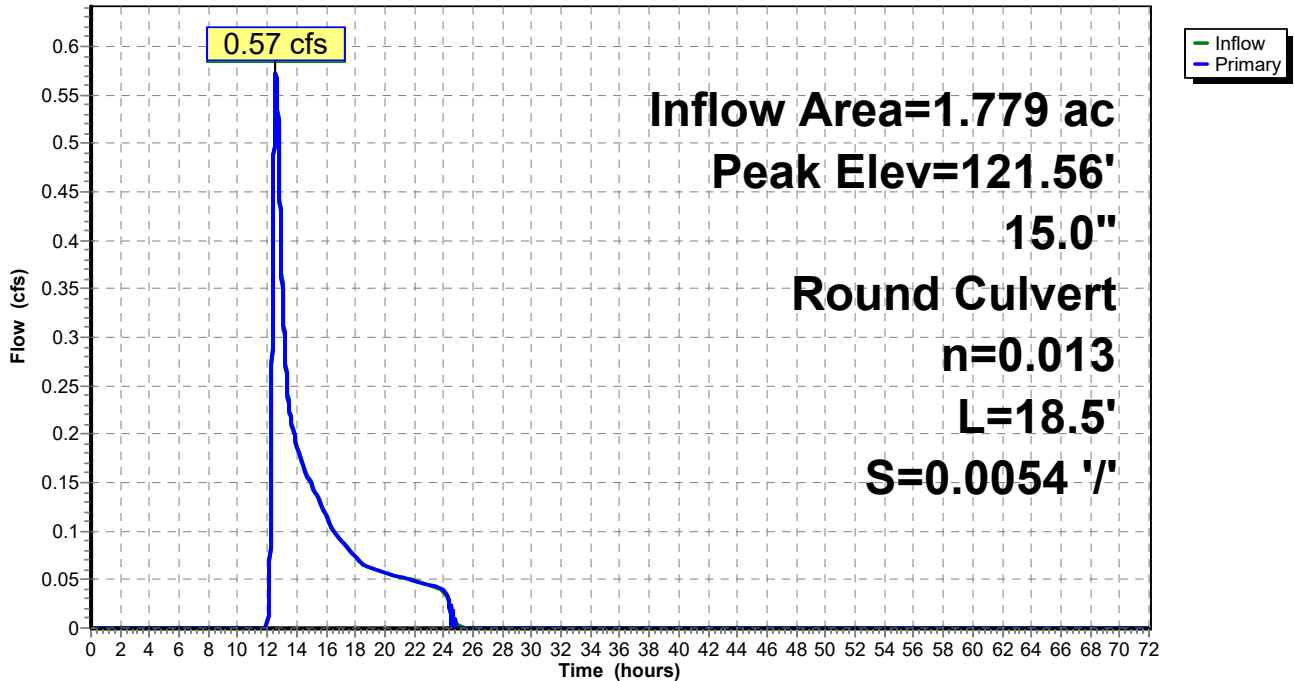
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 121.56' @ 12.97 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	119.65'	<b>15.0" Round Culvert</b> L= 18.5' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 119.65' / 119.55' S= 0.0054 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.00 cfs @ 12.59 hrs HW=121.16' TW=121.17' (Dynamic Tailwater)  
 ↑1=Culvert ( Controls 0.00 cfs)

Pond DV 1.2P: CB 101

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 53

**Summary for Pond DV 3P: Roadway Culvert to IB-2**

Inflow Area = 0.926 ac, 0.00% Impervious, Inflow Depth = 1.57" for 50-Year event  
 Inflow = 1.12 cfs @ 12.23 hrs, Volume= 0.121 af  
 Outflow = 1.12 cfs @ 12.23 hrs, Volume= 0.121 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.12 cfs @ 12.23 hrs, Volume= 0.121 af  
 Routed to Pond 2.1P : Sediment Forebay

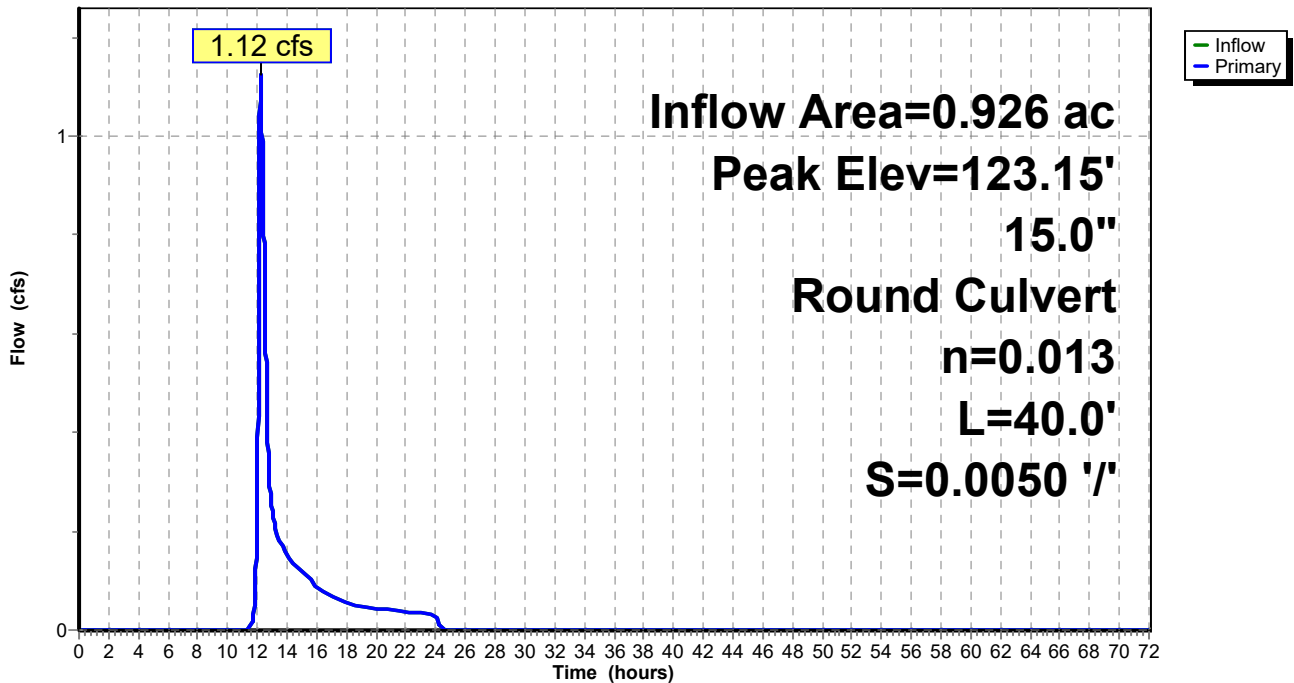
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 123.15' @ 12.36 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	121.90'	<b>15.0" Round Culvert</b> L= 40.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 121.90' / 121.70' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

**Primary OutFlow** Max=0.83 cfs @ 12.23 hrs HW=122.98' TW=122.95' (Dynamic Tailwater)  
 ↑1=Culvert (Outlet Controls 0.83 cfs @ 0.99 fps)

**Pond DV 3P: Roadway Culvert to IB-2**

Hydrograph



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Type III 24-hr 50-Year Rainfall=6.66"

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Page 54

**Summary for Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Dual 24" CMP Driveway culverts located at existing wetland crossing.

Inflow Area = 4.833 ac, 0.00% Impervious, Inflow Depth = 0.65" for 50-Year event  
 Inflow = 1.29 cfs @ 12.50 hrs, Volume= 0.262 af  
 Outflow = 1.29 cfs @ 12.50 hrs, Volume= 0.262 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.29 cfs @ 12.50 hrs, Volume= 0.262 af  
 Routed to Reach OP1 : Observation Point 1

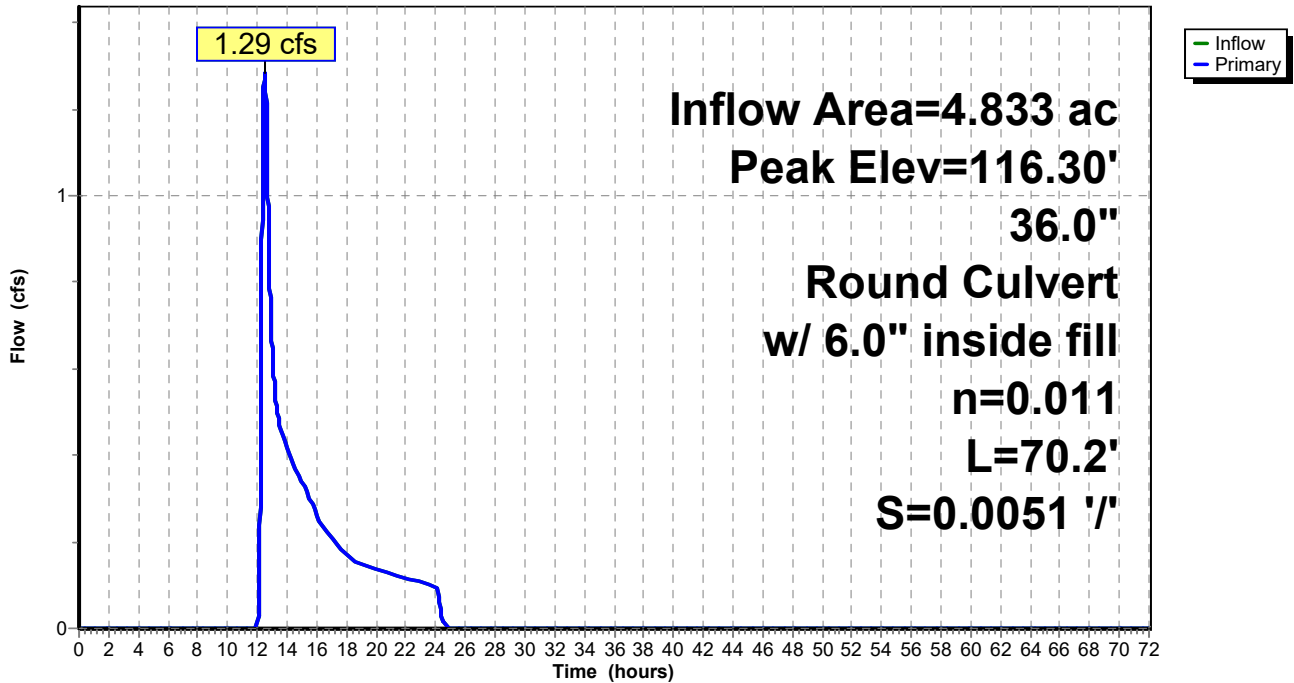
Routing by Dyn-Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs  
 Peak Elev= 116.30' @ 12.50 hrs

Device #	Routing	Invert	Outlet Devices
#1	Primary	116.00'	<b>36.0" Round Culvert w/ 6.0" inside fill</b> L= 70.2' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 115.50' / 115.14' S= 0.0051 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 6.29 sf

**Primary OutFlow** Max=1.28 cfs @ 12.50 hrs HW=116.30' TW=0.00' (Dynamic Tailwater)  
 ↳1=Culvert (Inlet Controls 1.28 cfs @ 1.74 fps)

**Pond EX 1P: 36" RCP Culvert with 6" Embedment**

Hydrograph



## **Section 3.1: Drainage Area Plans**

Existing Conditions – Site Design Plan (See attached)

Developed Conditions – Site Design Plan (See attached)





- LEGEND, EXISTING CONDITIONS**
- EX 1R REACH
  - EX 1S SUBCATCHMENT
  - EX 1P POND
  - OP-1 OBSERVATION POINT
  - SUB-CATCHMENT DELINEATION
  - Tc - TIME OF CONCENTRATION PATH
  - EXISTING 2' CONTOUR INTERVAL
  - EXISTING 10' CONTOUR INTERVAL
  - NRCS SOIL DELINEATION

- SOIL LEGEND:**
- WdA WINDSOR LOAMY SAND, 0 TO 3 PERCENT SLOPES HSG A
  - WdB WINDSOR LOAMY SAND, 3 TO 8 PERCENT SLOPES HSG A
  - WdC WINDSOR LOAMY SAND, 8 TO 15 PERCENT SLOPES HSG A
  - Om OCCUM FINE SANDY LOAM, HIGH BOTTOM HSG B
- SOURCE: USDA NATURAL RESOURCE CONSERVATION SERVICE WEB SOIL SURVEY

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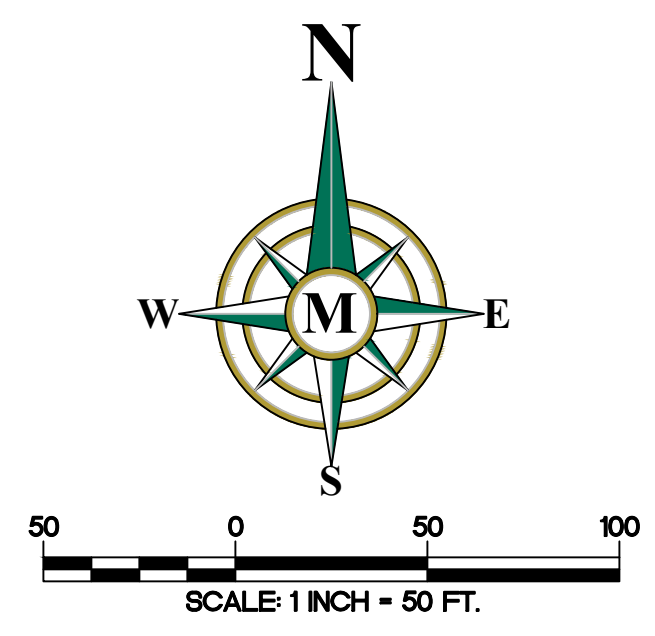
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A				
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SUBDIVISION OF  
 TAX MAP 147 LOT 6  
 EXISTING CONDITIONS  
 DRAINAGE AREA PLAN

RON LECLAIR  
 12 LECLAIR DRIVE  
 MAP 147 LOT 6  
 HUDSON, NEW HAMPSHIRE

APRIL 8, 2026

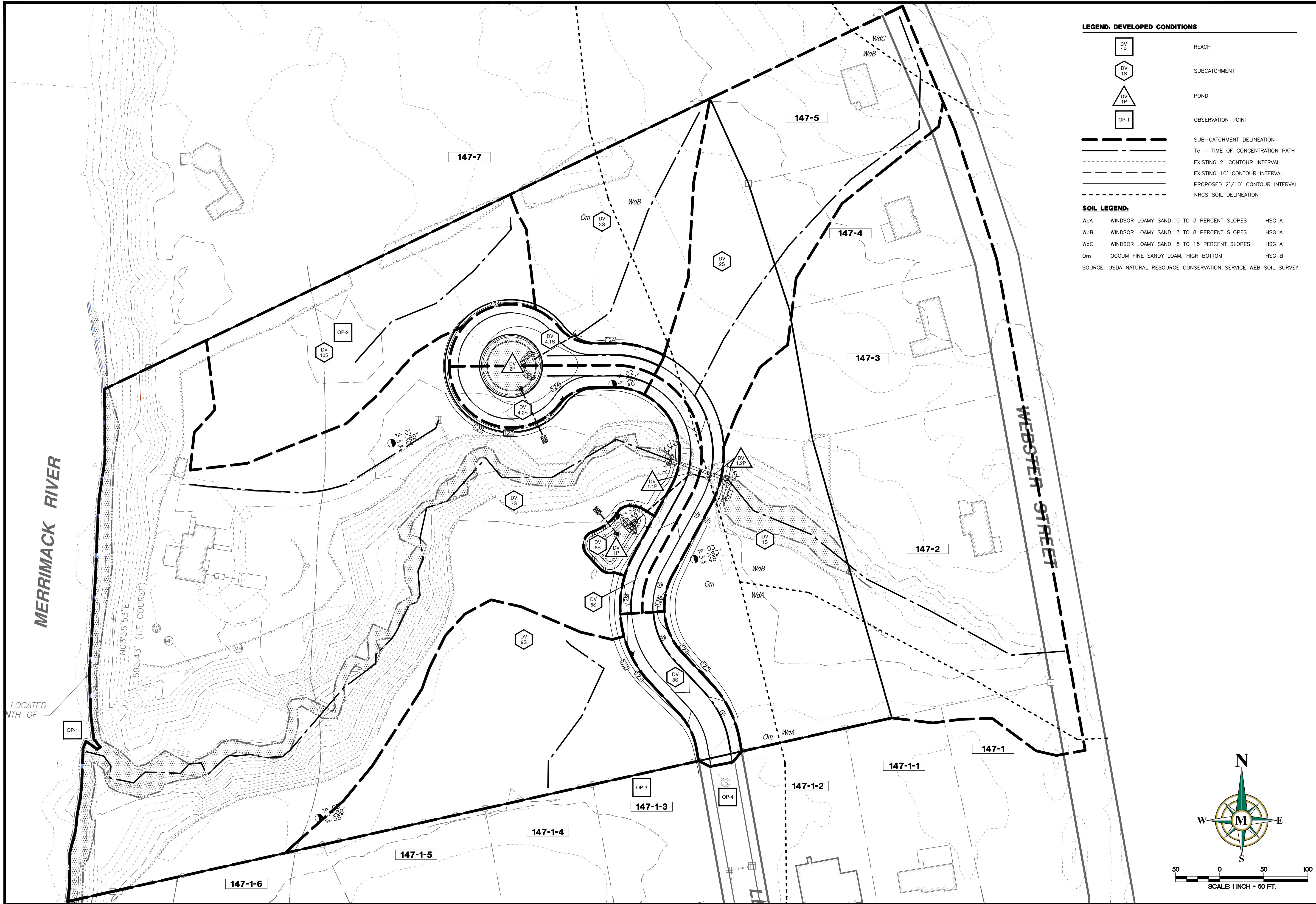
SCALE: 1" = 50'



**DRN-EX**  
 SHEET

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PROJECT	12916.01
SHEET NO.	1 OF 2

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**LEGEND, DEVELOPED CONDITIONS**

- REACH
- SUBCATCHMENT
- POND
- OBSERVATION POINT
- SUB-CATCHMENT DELINEATION
- Tc - TIME OF CONCENTRATION PATH
- EXISTING 2' CONTOUR INTERVAL
- EXISTING 10' CONTOUR INTERVAL
- PROPOSED 2'/10' CONTOUR INTERVAL
- NRCS SOIL DELINEATION

**SOIL LEGEND:**

WdA	WINDSOR LOAMY SAND, 0 TO 3 PERCENT SLOPES	HSG A
WdB	WINDSOR LOAMY SAND, 3 TO 8 PERCENT SLOPES	HSG A
WdC	WINDSOR LOAMY SAND, 8 TO 15 PERCENT SLOPES	HSG A
Om	OCCUM FINE SANDY LOAM, HIGH BOTTOM	HSG B

SOURCE: USDA NATURAL RESOURCE CONSERVATION SERVICE WEB SOIL SURVEY

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SCALE: 1" = 50'

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 SCALE: 1 INCH = 50 FT.

REV.	DATE	DESCRIPTION	DR	CK
1				
2				
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SUBDIVISION OF  
 TAX MAP 147 LOT 6  
 DEVELOPED CONDITIONS  
 DRAINAGE AREA PLAN

APRIL 8, 2026

RON LECLAIR  
 12 LECLAIR DRIVE  
 MAP 147 LOT 6  
 HUDSON, NEW HAMPSHIRE

SCALE: 1" = 50'

**DRN-DV**  
 SHEET

FILE: 12916DRN01C.dwg  
 PROJECT: 12916.01  
 SHEET NO.: 2 OF 2

# Subdivision of Tax Map 147 Lot 6

Leclair Drive

Hudson, New Hampshire

Storm Water Management System

Inspection and Maintenance Manual

May 13, 2026

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## **Introduction:**

The operation and maintenance of a storm water management system and its individual components is as critical to system performance as the design. Without proper maintenance, best management practices (BMPs) are likely to become functionally impaired or to fail, providing reduced or no treatment of storm water. Proper operation and maintenance will ensure that the storm water system and individual BMPs will remain effective at removing pollutants as designed and meeting New Hampshire's water quality objectives. Proper maintenance will:

- Maintain the volume of storm water treated over the long term;
- Sustain the pollutant removal efficiency of the BMP;
- Reduce the risk of re-suspending sediment and other pollutants captured by the BMP;
- Prevent structural deterioration of the BMP and minimize the need for expensive repairs;
- Decrease the potential for failure of the BMP.

**Facilities Information:**

Owner of Record: Ronald O. Leclair Revocable Trust  
c/o Ron Leclair  
12 Leclair Drive  
Hudson, New Hampshire 03051

Applicant: MR Lacasse Homes, LLC  
c/o Mike Lacasse  
9 Scenic Lane  
Hudson, New Hampshire 03051

**Report Information:**

- Every effort has been made to provide a comprehensive operation and maintenance plan for this project. All measures and guidelines presented within this plan are the minimum efforts required to achieve the intent of the erosion and sedimentation control program and minimize off site impacts.
- Should any omissions or inconsistencies arise in the plan, the owner, and governing officials are expected to use reasonable and experienced judgment in the field relative to evaluation and implementing measures based on the intent of this plan.
- This manual does not preclude any requirements for additional controls identified in the approved plan set or support documents or any other appropriate techniques to limit erosion and sedimentation of the site.
- Any measures deemed necessary by the town planning board, conservation commission, zoning board, or the town's representative shall become part of this inspection and maintenance plan.
- **Town of Hudson** will be responsible for implementing the required reporting, inspection, and maintenance activities identified in this Inspection and Maintenance (I&M) manual.
- **Town of Hudson** shall maintain all record keeping required by the I&M manual. Any transfer of responsibility for I&M activities or transfer in ownership shall be documented to the DES in writing.
- Inspection and maintenance reports shall be completed after each inspection. Copies of the report forms to be completed by the inspector are attached at the end of this manual, including:
  - Inspection checklist to be used during each inspection;
  - Inspection and maintenance logs to document each inspection and maintenance activity;
  - Photographs are to be provided of each BMP;
- A plan showing the locations of all the storm water practices described in the I&M manual is attached at the end of this manual.

**Storm water management systems present at Subdivision of Tax Map 147 Lot 6**Description:

The proposed stormwater management includes but may not be limited to deep sump catch basins, surface infiltration basins and rip rap scour holes.

Maintenance:

1. Regular inspection and routine maintenance are necessary to ensure that the storm water management system continues to control and treat runoff.
2. Structural components of the site's drainage system must be inspected and maintained on an annual basis (minimum).
3. The outlets of the storm water management system must be inspected bi-annually.
4. All outfalls shall be cleaned of all siltation and debris at the completion of the construction process when the site has been stabilized with loam, seed, and landscaping.
5. Any evidence of erosion, structural damage to the outlet, or other damage must be reported to the appropriate on-site representative and repaired as soon as possible.
6. Any sediment and/or trash should be removed from the outlet structures and pipes cleaned of all silt.
7. Subsurface pipe detention systems must be inspected and maintained on an annual basis (minimum).

## **Deep Sump Catch Basin**

### Description:

A deep sump catch basin consists of a manhole-type structure with an inlet grate, an outlet pipe connected to the piped drainage system, and a sump with a depth several times the diameter of the outlet pipe. The sump's purpose is to capture coarse sediments and debris from the runoff intercepted by the structure. The outlet pipe can be fitted with a "hood" consisting of a cast metal or formed plastic fitting, designed to prevent floating materials from exiting the structure.

### Maintenance:

1. Catch basins may require frequent maintenance. Depending on location, this may require several cleanings of the sumps each year. At a minimum, it is recommended that catch basins be inspected at least twice annually, once following snow-melt and once following leaf drop and cleaned as indicated by inspection.
2. Sediment should be removed when it approaches half the sump depth.
3. If floating hydrocarbons are observed during an inspection, the material should be removed immediately by skimming, absorbent materials, or other method and disposed in conformance with applicable state and federal regulations.
4. Cleaning may require Vacuum-truck instead of "clam-shell" to avoid damage to hood.
5. Damaged hoods should be replaced when noted by inspection.

**Inspection Checklist and Maintenance Report**  
**Deep Sump Catch Basin**

Deep Sump Catch Basin: \_\_\_\_\_

Date: \_\_\_\_\_

Performed By: \_\_\_\_\_

Signature \_\_\_\_\_

**Inspection Checklist**

Presence of trash or debris at inlet grates	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Presence of sediment around inlet grate	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Presence of trash or debris at outlet hood	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Presence of sediment around outlet hood	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Accumulate sediment less than half of sump depth	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Drains within 72 hours of rainfall	<input type="checkbox"/> Yes	<input type="checkbox"/> No

**Maintenance Performed**

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## **Conveyance Swales**

### Description:

Conveyance swales are stabilized channels designed to convey runoff at non-erosive velocities. They may be stabilized using vegetation, riprap, or a combination, or with an alternative lining designed to accommodate design flows while protecting the integrity of the sides and bottom of the channel. Conveyance channels may provide incidental water quality benefits but are not specifically designed to provide treatment. Conveyance swales are not considered a Treatment or Pretreatment Practice under the AoT regulations, unless they are also designed to meet the requirements of an acceptable Treatment/Pretreatment Practice as described elsewhere in this Chapter.

### Maintenance:

1. Grassed channels should be inspected periodically (at least annually) for sediment accumulation, erosion, and condition of surface lining (vegetation or riprap).
2. Repairs, including stone or vegetation replacement, should be made based on this inspection.
3. Remove sediment and debris annually, or more frequently as warranted by inspection.
4. Mow vegetated channels based on frequency specified by design. Mowing at least once per year is required to control establishment of woody vegetation. It is recommended to cut grass no shorter than 4 inches.

**Inspection Checklist and Maintenance Report  
Conveyance Swales**

Practice Location: \_\_\_\_\_

Date: \_\_\_\_\_

Performed By: \_\_\_\_\_

Signature \_\_\_\_\_

**Inspection Checklist**

Presence of erosion or vegetation loss  Yes  No

Presence of accumulated sediment  Yes  No

Presence of trash or debris  Yes  No

**Maintenance Performed**

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## Surface Infiltration Basin

### Description:

Infiltration basins are impoundments designed to temporarily store runoff, allowing all or a portion of the water to infiltrate into the ground. An infiltration basin is designed to completely drain between storm events. An infiltration basin is specifically designed to retain and infiltrate the entire Water Quality Volume. Some infiltration basins may infiltrate additional volumes during larger storm events, but many will be designed to release stormwater exceeding the water quality volume from the larger storms. In a properly sited and designed infiltration basin, water quality treatment is provided by runoff pollutants binding to soil particles beneath the basin as water percolates into the subsurface. Biological and chemical processes occurring in the soil also contribute to the breakdown of pollutants. Infiltrated water is used by plants to support growth or it is recharged to the underlying groundwater.

As with all impoundment BMPs, surface infiltration basins should be designed with an outlet structure to pass peak flows during a range of storm events, as well as with an emergency spillway to pass peak flows around the embankment during extreme storm events that exceed the combined infiltration capacity and outlet structure capacity of the facility.

### Maintenance:

1. Removal of debris from inlet and outlet structures
2. Removal of accumulated sediment
3. Inspection and repair of outlet structures and appurtenances
4. Inspection of infiltration components at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
5. Inspection of pretreatment measures at least twice annually, and removal of accumulated sediment as warranted by inspection, but no less than once annually.
6. Periodic mowing of embankments
7. Removal of woody vegetation from embankments
8. Inspection and repair of embankments and spillways
9. If an infiltration system does not drain within 72-hours following a rainfall event, then a qualified professional should assess the condition of the facility to determine measures required to restore infiltration function, including but not limited to removal of accumulated sediments or reconstruction of the infiltration trench.

**Inspection Checklist and Maintenance Report**  
**Surface Infiltration Basin**

Practice Location: \_\_\_\_\_

Date: \_\_\_\_\_

Performed By: \_\_\_\_\_

Signature \_\_\_\_\_

**Inspection Checklist**

Presence of woody vegetation on embankments  Yes  No

Presence of trash or debris  Yes  No

Presence of accumulated sediment  Yes  No

Structural damage at inlet or outlet  Yes  No

Drains with 72 hours of rainfall  Yes  No

**Maintenance Performed**

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**Outlet Protection - Riprap Scour Hole**Description:

Erosion control stone at storm water discharge conduits reduce the velocity of concentrated storm water flows to prevent scour and minimize the potential for downstream erosion.

Maintenance:

1. Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
2. Remove debris from apron area.

**Inspection Checklist and Maintenance Report**  
**Riprap Scour Hole**

Apron Location: \_\_\_\_\_

Date: \_\_\_\_\_

Performed By: \_\_\_\_\_

Signature \_\_\_\_\_

**Inspection Checklist**

Stone evenly distributed  Yes  No

Presence of accumulated sediment  Yes  No

Presence of trash or debris  Yes  No

**Maintenance Performed**

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**Invasive Species Information:**Description:

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem.

Maintenance:

1. Remove invasive plant species from the storm water management practices by pulling, either by hand for small plants or by hand shovel for shrubs and bushes.
2. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.



UNIVERSITY of NEW HAMPSHIRE  
COOPERATIVE EXTENSION

## Methods for Disposing Non-Native Invasive Plants

*Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.*



Tatarian honeysuckle  
*Lonicera tatarica*

USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Knowing how a particular plant reproduces helps determine the appropriate disposal method. Most

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit [www.nhinvasives.org](http://www.nhinvasives.org) or contact your UNH Cooperative Extension office.

### New Hampshire Regulations

Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

### How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

**Burning:** Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.

**Bagging (solarization):** Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

**Tarping and Drying:** Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let it dry for several weeks.

**Chipping:** Use this method for woody plants that don't reproduce vegetatively.

**Burying:** This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

**Drowning:** Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

**Composting:** Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants non-viable before composting. Closely examine the plant before composting and avoid composting seeds.



Japanese knotweed  
*Polygonum cuspidatum*  
USDA-NRCS PLANTS Database /  
Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

**Finally, be diligent looking for seedlings for years in areas where removal and disposal took place.**

## Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

Plant Name	Method of Reproducing	Time of Year To Dispose	Methods of Disposal
<b>Woody Plants*</b>	<b>Fruit/Seeds</b>		
Norway Maple ( <i>Acer platanoides</i> ) European Barberry ( <i>Berberis vulgaris</i> ) Japanese Barberry ( <i>Berberis thunbergii</i> ) Autumn Olive ( <i>Elaeagnus umbellata</i> ) Burning Bush ( <i>Euonymus alatus</i> ) Morrow's Honeysuckle ( <i>Lonicera morrowii</i> ) Tatarian Honeysuckle ( <i>Lonicera tatarica</i> ) Showy Bush Honeysuckle ( <i>Lonicera x bella</i> ) Common Buckthorn ( <i>Rhamnus cathartica</i> ) Glossy Buckthorn ( <i>Frangula alnus</i> )		Prior to fruit/seed ripening	Seedlings and small plants. <ul style="list-style-type: none"> <li>Pull or cut and leave on site with roots up. No special care needed.</li> </ul> Larger plants <ul style="list-style-type: none"> <li>Use as firewood.</li> <li>Make a brush pile.</li> <li>Chip.</li> <li>Burn.</li> </ul>
		After fruit/seed is ripe	Don't remove from site. <ul style="list-style-type: none"> <li>Burn.</li> <li>Make a covered brush pile.</li> <li>Chip once all fruit has dropped from branches.</li> <li>Leave resulting chips on site and monitor.</li> </ul>
<b>Woody Plants*</b>	<b>Fruits/Seeds/Plant Fragments</b>		
Oriental Bittersweet ( <i>Celastrus orbiculatus</i> ) Multiflora Rose ( <i>Rosa multiflora</i> )		Prior to fruit/seed ripening	Seedlings and small plants. <ul style="list-style-type: none"> <li>Pull or cut and leave on site with roots up. No special care needed.</li> </ul> Larger plants <ul style="list-style-type: none"> <li>Make a brush pile.</li> <li>Burn.</li> </ul>
		After fruit/seed is ripe	Don't remove from site. <ul style="list-style-type: none"> <li>Burn.</li> <li>Make a covered brush pile.</li> <li>Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</li> </ul>

Plant Name	Method of Reproducing	Time of Year To Dispose	Methods of Disposal
<b>Non-woody plants</b>	<b>Fruits/Seeds</b>		
Garlic Mustard ( <i>Alliaria petiolata</i> ) Spotted Knapweed ( <i>Centaurea maculosa</i> ) ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. Black Swallow-wort ( <i>Cynanchum nigrum</i> ) ▪ May cause skin rash. Wear gloves and long sleeves when handling. Pale swallow-wort ( <i>Cynanchum rossicum</i> ) Giant Hogweed ( <i>Heracleum mantegazzianum</i> ) ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. Dame's Rocket ( <i>Hesperis matronalis</i> ) Perennial Pepperweed ( <i>Lepidium latifolium</i> ) Purple loosestrife ( <i>Lythrum salicaria</i> ) Japanese Stilt Grass ( <i>Microstegium vimineum</i> ) Mile-a-Minute Weed ( <i>Polygonum perfoliatum</i> )		Prior to flowering	Depends on scale of infestation  Small infestation: ▪ Remove and scatter  Large infestation: ▪ Remove and pile. (You can pile on or cover with plastic sheeting) ▪ Monitor. Remove any re-sprouting material
		During and following flowering	Do nothing until the following year; Or Remove flowering heads and bag and let rot.  Small infestation: ▪ Remove and scatter remaining material  Large infestation: ▪ Remove and pile remaining material. (You can pile on or cover with plastic sheeting) ▪ Monitor. Remove any re-sprouting material
<b>Non-woody plants *</b>	<b>Fruits/seeds/plant parts</b>		
Common Reed ( <i>Phragmites australis</i> ) Japanese Knotweed ( <i>Polygonum cuspidatum</i> ) Bohemian Knotweed ( <i>Polygonum x bohemicum</i> )	Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.		Small infestation: ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn  Large infestation: ▪ Remove material to unsuitable habitat (dry, hot sunny or dry shaded location) and scatter or pile. • Monitor and remove any sprouting material. • Pile, let dry, and burn.

October, 2009

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**Attachment "F"**

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

www.MeridianLandServices.com

# LeClair Dr Extension Wastewater Report

Property Tax            Tax map 327 Lot 22-8 & Map 324 Lot 22-1  
Map:  
Property Address:    12 LeClair Dr  
                                 Hudson, NH

Owner:                    MJ Builders, LLC  
Owners Address:        9 Scenic Lane  
                                 Hudson, NH 03051



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LeClair Dr Extension  
Project #12916.01

May 13, 2026  
Page 2 of 20

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## Table of Contents

Narrative	3
Design and Calculation	4
Recommended Pump	10



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LeClair Dr Extension  
Project #12916.01

May 13, 2026  
Page 3 of 20

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## Narrative

The subject property is located at 12 LeClair Drive (Map 147 - Lot 6), Hudson, New Hampshire. The property is currently a 12.5-acre parcel with one single family home situated along the Merrimack River. The site currently exists as single family home and is served by an onsite septic and well. MJ Builders, LLC intends to subdivide the parcel into 7 lot subdivision (6 new lots + 1 remaining lot). By regulation these lots can either be used for single family or two-family structure.

The lots are proposed to be connected to the existing sewer located at the end of the LeClair Drive roadway stub. Due to the shallow depth of the existing sewer the proposed sewer extension is a combination of gravity sewer and low-pressure force main. At this time the existing home is proposed to remain on the existing well and septic system, however the system has been designed to accommodate the future connection if future homeowners choose to do so.

The system is expected to operate with no more than 3 pumps operating simultaneously. The system was analysis to in three scenarios; all pumps on, 3 pumps on closes to the connection manhole, and 3 pumps on furthest from the connection manhole. These three scenarios provide a range of potential system operations to analysis the pipe network. In the 3 pumps operation scenarios the pipes were designed to have a cleaning velocity of close 6 ft/s. By designing the 3 pumps on scenarios to have a cleaning velocity of close to 6 ft/s, this allows a scenario with one pump on to maintain a lower end cleaning velocity. The All Pumps On scenario was utilized to make sure the pressures in the forcemain do not exceed manufacture maximum pressure ratings.

The pump stations were designed to have a storage capacity that allows for 3 pump starts per day. As a factor of safety additional storage capacity has been provided between "alarm on" elevation and the invert-in. This capacity allows for 40 hours at the average daily inflow, providing home owners enough time to correct the problem or have the system pumped.



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## Attachment "F"

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Mailing: PO Box 118, Milford, NH 03055

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May 13, 2026  
Page 4 of 20

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## Design and Calculation

**All pumps on  
3 Pumps on "A"  
3 Pumps on "B"**



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Page 5 of 20

### SEWER PUMP STATION FLOW CALCULATIONS

		REV:	
		FLOW	
<b>1</b>	<b>SEWER DESIGN CALCULATIONS</b>		
<b>A PROPOSED CONDITION</b>			
	FLOW PER REQUIRED DEMAND (150 GPD * 3 UNITS) per household		450 GPD
		SUBTOTAL	450 GPD
<b>B INFILTRATION ALLOWANCE</b>			
	0 LF, 6" PVC	300 GPD/IN. DIA./ MI	0.00
	0 VLF, SMH	1 GPD/VLF	0.00
		SUBTOTAL	0.00 GPD
<b>C SUBTOTAL - AVERAGE DAILY FLOW (ADF)</b>			<b>450 GPD</b>
<b>D SUMMARY OF EXTREME DISCHARGES</b>			
		PEAKING FACTORS	
	PEAK ON MAXIMUM DAY	6	2700 GPD    1.88 GPM
	MAXIMUM 24 HR FLOW	3.0	1350 GPD    0.94 GPM
	AVERAGE DAILY FLOW (ADF)	1.0	450 GPD    0.31 GPM
	MINIMUM 24 HR FLOW	0.33	149 GPD    0.10 GPM
	EXTREME MINIMUM ON MINIMUM DAY	0.14	63 GPD    0.04 GPM
<b>2</b>	<b>WET WELL CALCULATIONS</b>		
<b>A EQUATIONS</b>			
	$T = (V/Q-S) \div (V/S) \text{ AND } V = T \div ((1/Q-S) + (1/S))$		
	WHERE	T = TIME FOR ONE PUMP CYCLE (MIN.)	
		V = EFFECTIVE WET WELL VOLUME (GAL)	
		Q = PUMPING RATE - OUTFLOW RATE (GPM)	
		S = WET WELL INFLOW RATE (GPM)	
<b>B ASSUMPTIONS</b>			
	INITIAL TRIAL		
	Q AVE =		<b>0.31 GPM</b>
	Q PEAK =		<b>1.88 GPM</b>
	1 SET WETWELL VOLUME SUCH THAT T = 10 MIN		
	2 LIMIT MAXIMUM NUMBER OF PUMP CYCLES/ HR. ( UNDER PEAK CONDITIONS ) TO 6		
<b>C CALCULATIONS</b>			
	WITH S = Q AVE =		0.3 GPM (ONE PUMP)
	WITH Q = Q PEAK =		1.9 GPM



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May 13, 2026  
Page 6 of 20

### 3 STATIC HEAD CALCULATION

PROPOSED ELEVATION, FORCE MAIN TIE-IN AT EXISTING SEWER MANHOLE ON UNION AVE=	<u>115.00</u>
PROPOSED ELEVATION, MINIMUM LOW WATER AT SEWER PUMP STATION =	<u>107.00</u>
	<b>8.00</b>

### 4 DYNAMIC HEAD CALCULATION

193 LF OF 2" FORCE MAIN

ESTABLISH "K" FACTOR FOR STATION LOSSES

	NO.	"K" FACTOR	
DISCHARGE CONNECTION	1	0.6	0.6
90 BENDS	0	0.3	0.0
VALVES	2	1.5	3.0
CHECK VALVES	1	2.0	2.0
TEE CONNECTION	1	0.4	0.4
OUTLET	1	1.7	1.7
		<u>1.7</u>	<u>1.7</u>
		TOTAL "K" FACTOR	<b>7.7</b>

SEE NEXT PAGE (SYSTEM CURVE CALCULATIONS) FOR TDH

### 5 CHECK PREVIOUS ASSUMPTIONS

$S=Q(\text{AVG.})$	$T = V/(Q-S) + V/S$	<b>10.00 MINUTES</b>
$S=Q(\text{PEAK})/2$	$T = V/(Q-S) + V/S$	<b>5.56 MINUTES</b>

NOTE: WORST CASE CONDITION FOR WET WELL DESIGN OCCURS AT  $Q(\text{PEAK})/2$



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May 13, 2026  
Page 7 of 20

### Wet Well Design

Wet Well Overall Dimensions		
Well Interior Diameter	5	ft
Top Elevation	0.00	ft, NGVD
Base Elevation	-16.57	ft, NGVD
Total Height	16.57	ft
Lid Thickness	12	inches
Wall thickness	6	inches
Flow Criteria		
Average Inflow	0.31	gpm
Peak Inflow	1.88	gpm
Pump Rate (Out flow)	18	gpm
Internal Elevation		
Minimum Pipe Cover	60	inches
Invert out	-5	ft, NGVD
Lowest Invert (In)	-5	ft, NGVD
Gravity Invert (In)	-5	ft, NGVD
Depth between invert and alarm on	60	inches
Alarm on	-10	ft, NGVD
Depth between Alarm and all pumps on	12	inches
First pump on	-11	ft, NGVD
Depth between 1st pump on and all pumps off	12	inches
All pumps off	-12.00	ft, NGVD
Depth between all pumps off and top of pump elevation	6	inches
Top Pump elevation	-12.50	ft, NGVD
Depth between top of pump and discharge invert	11.7	inches
Pump Discharge Invert	-13.48	ft, NGVD
Depth between discharge invert to bottom of wet well	5.9	inches
Interior Bottom of Wet Well	-13.97	ft, NGVD
Ballest Thickness	19.18	inches
Internal Bottom Minus (-) Ballest	-15.57	ft, NGVD
Base Thickness	12	inches
Base Elevation	-16.57	ft, NGVD
Pump Analysis		
Storage Volume	146.87	gal
Fill time (for avg. flows) =	473.77	min
Ave. Run time (for avg. flows) =	8.30 min.	min
Cycle time (for avg. flows) =	482.07 min.	min
Pump cycles / hour (for avg. flows) =	0.12	cycles/hour
Fill time (for peak flows) =	78.12 min.	min
Run time (for peak flows) =	9.11 min.	min
Cycle time (for peak flows) =	87.23 min.	min
Pump cycles / hour (for peak flows) =	0.69	cycles/hour
System Failure Check		
System failure storage (volume between alarm and invert in)=	734.35	gal
System failure Time (System failure storage/average daily inflow)=	39.48	hours



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Page 8 of 20

### Wet Well Ballest Design

CONCRETE AS SHOWN ON FOLLOWING PAGE

#### SEWAGE PUMP STATION CHAMBER

Assumed water table at proposed grade

Inside Diameter	5 FT
Wall Thickness	6 IN
Lid Thickness	12 IN
Base Thickness	12 IN
Height	
Top	0.00 Elev.
- Bottom	-14.97 Elev.
	<u>14.97 ft</u> = Height prior to ballest

Cross-Sectional Area =	28.27 SF
Volume Dispalced =	423.17 CF
Hydro Lifting Force (62.4 lbs/CF) =	26,406 lbs Bouyancy Force (Upward Force)
	*assuming water table is at the surface*

#### VOLUME OF CONCRETE (WET WELL):

Riser:	112.02 CF
Lid:	28.27 CF
Bottom (Inside Dia):	28.27 CF
Slope Ring:	
Height	1 FT
Slope	1:1
	6.28 CF
Total	174.86 CF

#### BUOYANCY

Downward Force	150 lbs/CF =	26,228 lbs	
Hydro Lifting Force (Upward) - Downward Force =		178 lbs	Required for 1 to 1 factor of safety

Design Factor of Safety: 1.25

Additional concrete required to obtain design factor of safety:

(Hydro Lifting Force x 1.25) - Downward Force =	6,779 LBS
=	45 CF of concrete
=	1.60 ft of concrete required at outside diameter

**ADD 1.60 FT OF CONCRETE AT 6.00 FT DIA. FOR BALLEST**

## Recommended Pump



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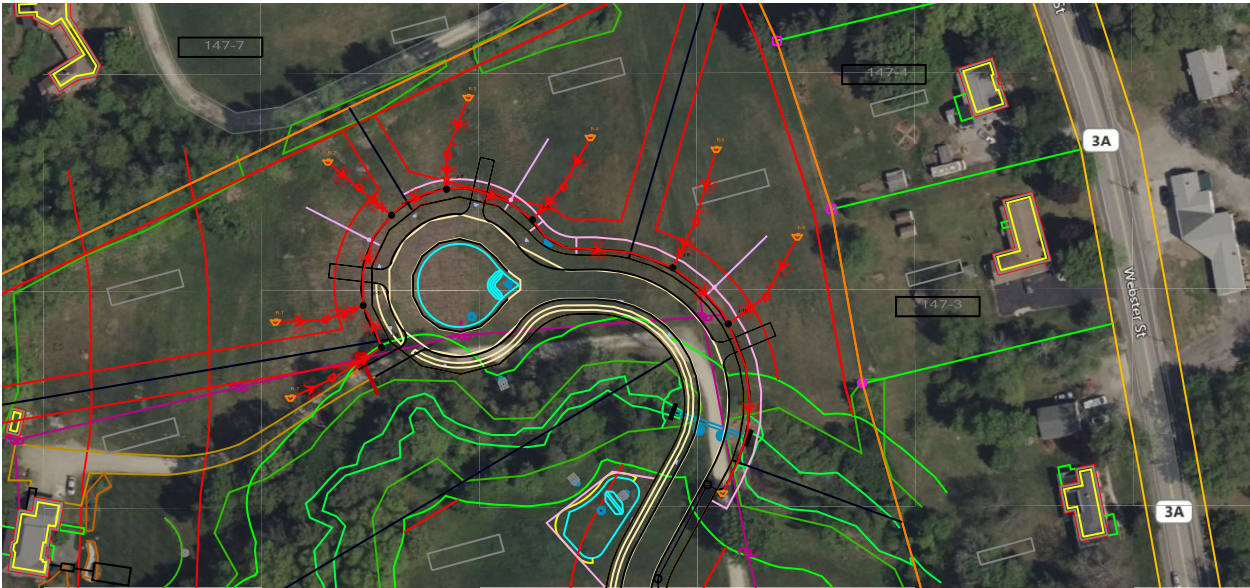
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May 13, 2026  
Page 9 of 20

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**All pumps on**

Scenario: Scenario - ALL PUMPS ON



## Attachment "F"

Scenario: Scenario - ALL PUMPS ON

Current Time Step: 0.000 h

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
56	P-8	36	PMP-2	J-6	2.0	HDPE	150.0	True	10	1.05
57	P-9	49	PMP-7	J-4	2.0	HDPE	150.0	True	9	0.92
58	P-10	34	PMP-1	J-5	2.0	HDPE	150.0	True	9	0.94
59	P-11	30	PMP-3	J-7	2.0	HDPE	150.0	True	12	1.19
60	P-12	39	PMP-4	J-8	2.0	HDPE	150.0	True	15	1.54
61	P-13	44	PMP-5	J-9	2.0	HDPE	150.0	True	23	2.32
62	P-14	39	PMP-6	J-10	2.0	HDPE	150.0	False	29	2.94
70	P-15	40	R-7	PMP-7	2.0	HDPE	150.0	False	9	0.92
71	P-16	43	R-1	PMP-1	2.0	HDPE	150.0	False	9	0.94
72	P-17	34	R-2	PMP-2	2.0	HDPE	150.0	False	10	1.05
73	P-18	51	R-3	PMP-3	2.0	HDPE	150.0	False	12	1.19
74	P-19	47	R-4	PMP-4	2.0	HDPE	150.0	False	15	1.54
75	P-20	63	R-5	PMP-5	2.0	HDPE	150.0	False	23	2.32
76	P-21	57	R-6	PMP-6	2.0	HDPE	150.0	False	29	2.94
80	P-22	39	J-4	J-5	2.0	HDPE	150.0	False	9	0.92
81	P-23	83	J-5	J-6	2.0	HDPE	150.0	False	18	1.86
82	P-24	53	J-6	J-7	2.0	HDPE	150.0	False	28	2.91
83	P-25	80	J-7	J-8	2.0	HDPE	150.0	False	40	4.10
84	P-26	131	J-8	J-9	2.0	HDPE	150.0	False	55	5.65
85	P-27	68	J-9	J-10	2.0	HDPE	150.0	False	78	7.96
89	P-30	151	J-10	R-8	2.0	HDPE	150.0	False	107	10.90

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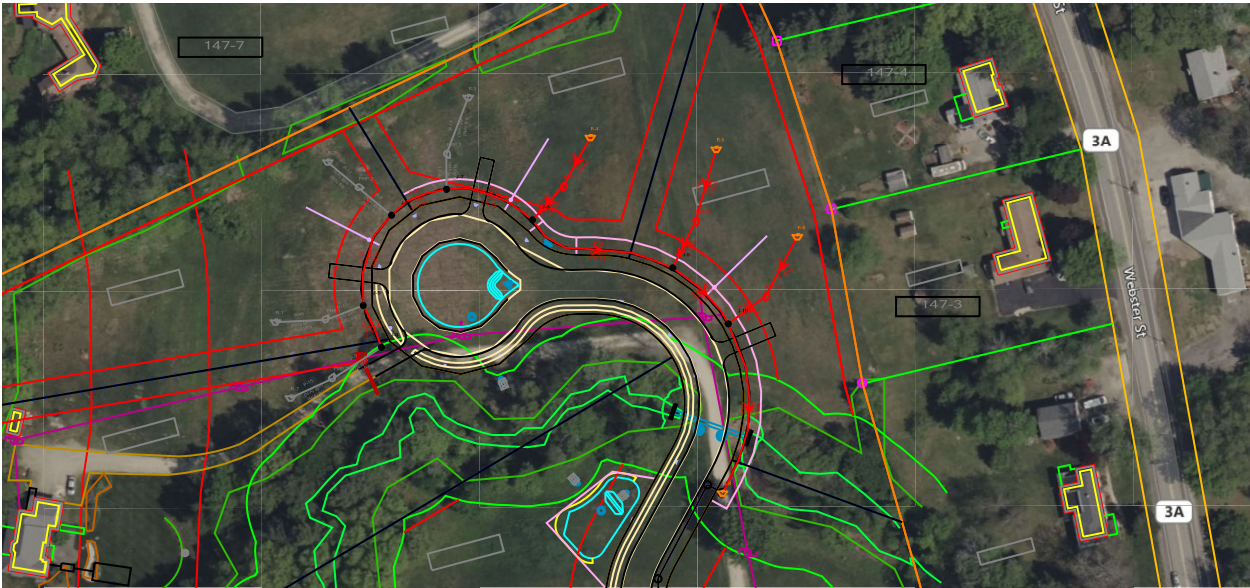
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Project #12916.01

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Page 12 of 20

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### 3 Pumps on "A"

Scenario: Scenario - PARTIAL PUMPS ON - FRONT 3



## Attachment "F"

Scenario: Scenario - PARTIAL PUMPS ON - FRONT 3

Current Time Step: 0.000 h

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
56	P-8	36	PMP-2	J-6	2.0	HDPE	150.0	True	(N/A)	(N/A)
57	P-9	49	PMP-7	J-4	2.0	HDPE	150.0	True	(N/A)	(N/A)
58	P-10	34	PMP-1	J-5	2.0	HDPE	150.0	True	(N/A)	(N/A)
59	P-11	30	PMP-3	J-7	2.0	HDPE	150.0	True	(N/A)	(N/A)
60	P-12	39	PMP-4	J-8	2.0	HDPE	150.0	True	29	2.96
61	P-13	44	PMP-5	J-9	2.0	HDPE	150.0	True	30	3.10
62	P-14	39	PMP-6	J-10	2.0	HDPE	150.0	False	34	3.42
70	P-15	40	R-7	PMP-7	2.0	HDPE	150.0	False	(N/A)	(N/A)
71	P-16	43	R-1	PMP-1	2.0	HDPE	150.0	False	(N/A)	(N/A)
72	P-17	34	R-2	PMP-2	2.0	HDPE	150.0	False	(N/A)	(N/A)
73	P-18	51	R-3	PMP-3	2.0	HDPE	150.0	False	(N/A)	(N/A)
74	P-19	47	R-4	PMP-4	2.0	HDPE	150.0	False	29	2.96
75	P-20	63	R-5	PMP-5	2.0	HDPE	150.0	False	30	3.10
76	P-21	57	R-6	PMP-6	2.0	HDPE	150.0	False	34	3.42
80	P-22	39	J-4	J-5	2.0	HDPE	150.0	False	0	0.00
81	P-23	83	J-5	J-6	2.0	HDPE	150.0	False	0	0.00
82	P-24	53	J-6	J-7	2.0	HDPE	150.0	False	0	0.00
83	P-25	80	J-7	J-8	2.0	HDPE	150.0	False	0	0.00
84	P-26	131	J-8	J-9	2.0	HDPE	150.0	False	29	2.96
85	P-27	68	J-9	J-10	2.0	HDPE	150.0	False	59	6.05
89	P-30	151	J-10	R-8	2.0	HDPE	150.0	False	93	9.48

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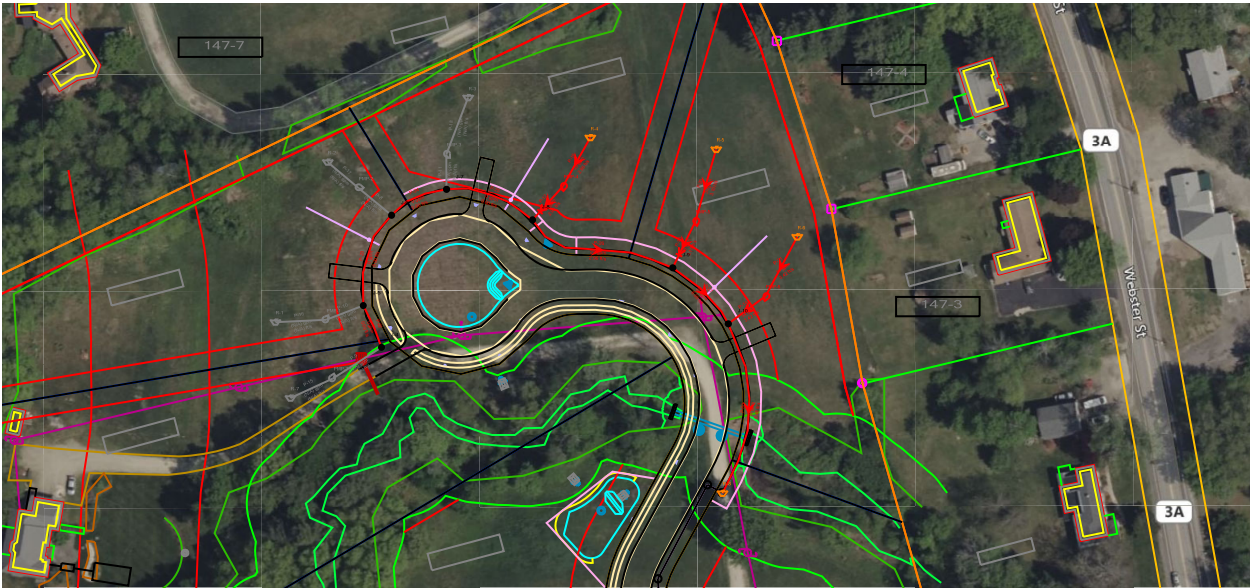
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Project #12916.01

May 13, 2026  
Page 15 of 20

---

**3 Pumps on "B"**

Scenario: Scenario - PARTIAL PUMPS ON - BACK 3



## Attachment "F"

Scenario: Scenario - PARTIAL PUMPS ON - BACK 3

Current Time Step: 0.000 h

FlexTable: Pipe Table

ID	Label	Length (Scaled) (ft)	Start Node	Stop Node	Diameter (in)	Material	Hazen- Williams C	Has Check Valve?	Flow (gpm)	Velocity (ft/s)
56	P-8	36	PMP-2	J-6	2.0	HDPE	150.0	True	(N/A)	(N/A)
57	P-9	49	PMP-7	J-4	2.0	HDPE	150.0	True	(N/A)	(N/A)
58	P-10	34	PMP-1	J-5	2.0	HDPE	150.0	True	(N/A)	(N/A)
59	P-11	30	PMP-3	J-7	2.0	HDPE	150.0	True	(N/A)	(N/A)
60	P-12	39	PMP-4	J-8	2.0	HDPE	150.0	True	29	2.96
61	P-13	44	PMP-5	J-9	2.0	HDPE	150.0	True	30	3.10
62	P-14	39	PMP-6	J-10	2.0	HDPE	150.0	False	34	3.42
70	P-15	40	R-7	PMP-7	2.0	HDPE	150.0	False	(N/A)	(N/A)
71	P-16	43	R-1	PMP-1	2.0	HDPE	150.0	False	(N/A)	(N/A)
72	P-17	34	R-2	PMP-2	2.0	HDPE	150.0	False	(N/A)	(N/A)
73	P-18	51	R-3	PMP-3	2.0	HDPE	150.0	False	(N/A)	(N/A)
74	P-19	47	R-4	PMP-4	2.0	HDPE	150.0	False	29	2.96
75	P-20	63	R-5	PMP-5	2.0	HDPE	150.0	False	30	3.10
76	P-21	57	R-6	PMP-6	2.0	HDPE	150.0	False	34	3.42
80	P-22	39	J-4	J-5	2.0	HDPE	150.0	False	0	0.00
81	P-23	83	J-5	J-6	2.0	HDPE	150.0	False	0	0.00
82	P-24	53	J-6	J-7	2.0	HDPE	150.0	False	0	0.00
83	P-25	80	J-7	J-8	2.0	HDPE	150.0	False	0	0.00
84	P-26	131	J-8	J-9	2.0	HDPE	150.0	False	29	2.96
85	P-27	68	J-9	J-10	2.0	HDPE	150.0	False	59	6.05
89	P-30	151	J-10	R-8	2.0	HDPE	150.0	False	93	9.48

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Page 18 of 20

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## Recommended Pump



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Page 19 of 20

## PRG-SERIES Grinder Pump

# Liberty Pumps®

A Family and Employee Owned Company

### 1 hp 2" Discharge

Designed for sewage applications

Higher flow rates allow use with  
2" discharge lines

Operates on standard 115V or 230V  
20A circuits

#### Features

- Heavy cast iron construction
- 115V or 230V 1-phase
- V-Slice® Cutter Technology
- Shreds difficult solids such as feminine products, rags, towels, and wipes that can jam a solids handling style pump
- Hardened stainless steel cutter and plate
- Oil-filled, thermally protected motor
- PRG-Series grinders can be used as a replacement pump in 2" discharge systems using LE40 and LE50-Series solids handling pumps.\*

*\*Consult factory with actual application and head specifications prior to replacing LE40 and LE50-Series pumps.*



Vertical Float Switch  
Model PRG101AV

## ProVore®



Model PRG101A

Patent: See  
LibertyPumps.com/en-us/patents



innovate. evolve.



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Page 20 of 20

### PRG-Series

#### Impeller

Cast iron, Class 25 vortex style

#### Paint

Powder coat

#### Max Fluid Temperature

140°F (60°C) Intermittent  
104°F (40°C) Continuous duty

#### Motor Specifications

1 hp 12A (115V) 6A (230V)  
CSCR style, Class B windings  
Oil-filled, thermally protected

#### Power Cord Type

SJTW Quick-connect design  
10' Standard length (25' and 50' optional)

#### Motor Housing

Class 25 cast iron

#### Shaft

303 Series stainless steel

#### Volute

Class 25 cast iron

#### V-Slice® Cutter Technology

Shreds difficult solids such as feminine products, wipes, rags, and other debris.



440 Series stainless steel hardened to Rockwell 57c

Patent: See  
LibertyPumps.com/en-us/patents

#### Hardware

Stainless steel

#### Mechanical Shaft Seal

Unitized graphite impregnated silicon carbide

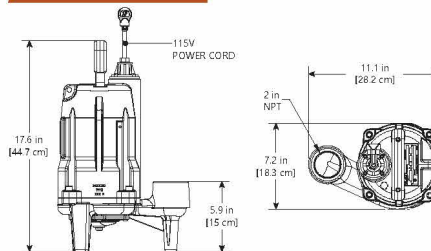
#### Bearings

Upper and lower ball bearings

#### Float Switch (automatic models)

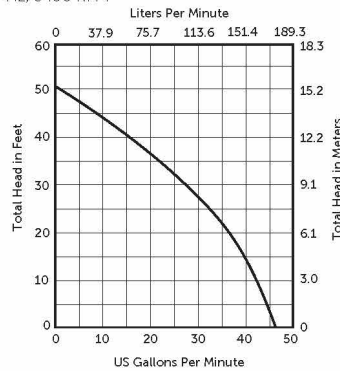
Mechanical wide-angle float switch with series (piggyback) plug

#### Dimensional Data



#### Performance Curve

60 Hz, 3450 RPM



#### Models

MODEL	HP	VOLTS	PHASE	Hz	AMPS	CORD LENGTH		DISCHARGE	AUTOMATIC	WEIGHT IN LBS
						IN FEET	DISCHARGE			
PRG101A	1	115	1	60	12	10	2"	2"	Wide-Angle	58
PRG101AV	1	115	1	60	12	10	2"	2"	Vertical Float Switch	58
PRG101M	1	115	1	60	12	10	2"	2"	No	57
PRG102A	1	230	1	60	6	10	2"	2"	Wide-Angle	58
PRG102M	1	230	1	60	6	10	2"	2"	No	57

For optional 25' power cords, add a "-2" suffix to model number. Example: PRG101A-2  
For optional 50' power cords (manual models only), add a "-5" suffix to model number. Example: PRG101M-5  
Consult factory for 50' automatic power cord options.

Specifications subject to change without notice.

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April 24, 2026

Ms. Brooke Dubowik  
Town Planner  
Town of Hudson  
12 School Street  
Hudson, NH 03051

RE: Town of Hudson Planning Board Review  
LeClair Subdivision Plan, 12 LeClair Drive  
Tax Map 147, Lot 6, Acct. #1350-732  
Fuss & O'Neill Reference No. 20030249.262

Dear Ms. Dubowik:

Fuss & O'Neill, Inc. has reviewed the second submission of materials related to the above-referenced project which was received on April 10, 2026. Authorization to proceed was received on April 13, 2026. A list of items reviewed is enclosed. The scope of our review is based on the Subdivision Plan Review Codes, Stormwater Codes, Driveway Review Codes, Sewer Use Ordinance 77, Zoning Regulations, and criteria outlined in the CLD Consulting Engineers Proposal approved September 16, 2003, revised September 20, 2004, June 4, 2007, September 3, 2008, and October 2015.

The project consists of subdividing an existing residential lot and creating a seven-lot subdivision out of the 12.5-acre existing lot. A roadway extension with a cul-de-sac is also proposed as part of the subdivision. The subject lots are proposed to be serviced via Town water and sewer connections.

The following items have outstanding issues:

## 1. Administrative and Subdivision Review Codes (HR 276 & HR 289)

- a. *Former Fuss & O'Neill Comment: Hudson Regulation (HR) 276-11.1.B.(2). The plan set provided is greater than the maximum scale allowed by the Regulations (1"=50'). The applicant has provided scales between 1"=60' and 1"=80' on several sheets.*

**Current Fuss & O'Neill Comment:** The applicant has updated the plan scales to meet the maximum allowable. We note that the bar scale on the Submission Plans should be updated to match the new scale.

- b. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(4). & 289-27.A.(3). The applicant should add the Planning Board approval block to all sheets of the plan set. We note that it is currently not shown on the Existing Conditions Plan and detail sheets.*

**Current Fuss & O'Neill Comment:** The applicant has added the approval block to the recommended sheets; however, the approval block should be added to the Plan and Profile sheet as well.

Ms. Brooke Dubowik

April 24, 2026

Page 2 of 13

- h. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(20). The applicant should note existing building heights on the plan set.*

**Current Fuss & O'Neill Comment:** The applicant has stated that they are unable to confirm the height of the existing building. The applicant should review the need for a waiver from this requirement.

- m. *Former Fuss & O'Neill Comment: HR 289-27.B.(3). The applicant should provide street cross sections and a typical cross section on the plan.*

**Current Fuss & O'Neill Comment:** The applicant has stated that cross sections will be provided in the final plans. We continue to recommend that at minimum a typical cross section be shown on the plans as required.

- p. *Former Fuss & O'Neill Comment: HR 289-27.B.(7). The applicant should provide benchmark data on the plan set.*

**Current Fuss & O'Neill Comment:** The applicant has added a note to the plan set stating benchmarks to be set prior to construction. We continue to recommend that the benchmarks be shown on the plans as required.

- q. *Former Fuss & O'Neill Comment: HR 289-37.A. The applicant has not provided any information on the phasing of subdivision construction on the plan set. We note that subdivisions with six or more lots must be developed over two years per the Regulation.*

**Current Fuss & O'Neill Comment:** The applicant has stated that a waiver request was submitted. We note that a waiver request was not provided with the package received for review and was not noted on the waiver list on the plan set.

### 3. Roadway Design

- b. *Former Fuss & O'Neill Comment: HR 289-18.B.(3). The applicant should label the cul-de-sac pavement and right-of-way radii on the plan. We note that the proposed radii appear to meet the dimensions in the 289 Attachment 2:1 detail, which is inconsistent with the dimensions in Detail R-2 included in the plans. The applicant should confirm with the Town Engineer the appropriate pavement width and radius dimensions for the cul-de-sac.*

**Current Fuss & O'Neill Comment:** We understand that the applicant has coordinated with the Town Engineer and will update the cul-de-sac radii to be consistent with the Regulation. Further review and confirmation can be provided if new plans are received.

- c. *Former Fuss & O'Neill Comment: HR 289-18.B.(5). The applicant should add the required signage to the plan or provide existing information that the signage currently exists.*

**Current Fuss & O'Neill Comment:** The applicant has stated that an existing stop sign and stop bar are located at the end of LeClair Drive. We recommend that these be shown as an existing feature on the plan.

- f. *Former Fuss & O'Neill Comment: HR 289-18.D. The applicant should review the roadway side slopes to be sure they are all constructed outside of the right-of-way.*

**Current Fuss & O'Neill Comment:** The applicant has stated that the grading has been revised to a consistent 2% slope within the ROW. We note that roadway cross sections would further clarify and confirm slope grading and design.

- g. *Former Fuss & O'Neill Comment: HR 289-18.M.(1). The Roadway Plan & Profile does not match the scale required by the Regulations.*

**Current Fuss & O'Neill Comment:** The applicant appears to have updated the scale of the plan to match the Regulation, however, the bar scale and scale noted on the plan do not reflect this change.

- h. *Former Fuss & O'Neill Comment: HR 289-18.R.(1). The applicant has not proposed any sidewalks within the subdivision. We note that sidewalks do not currently exist on LeClair Drive but do exist on the intersecting street Shoreline Drive.*

**Current Fuss & O'Neill Comment:** The applicant has stated that a waiver request was attached. We note that a waiver request was not provided as part of the package received for review and was not noted in the waiver list on the plan.

#### 4. Drainage Design /Stormwater Management (HR 289-20.C. /Chapter 290)

- a. *Former Fuss & O'Neill Comment: HR 289-18.A.4. The applicant should confirm the proposed basin floor and side slopes material/treatment at the cul-de-sac infiltration basin IB-2, and review with and gain acceptance from the Town for that proposed material/treatment. Plantings and grass mix must be able to be inundated by stormwater for up to 72 hours.*

**Current Fuss & O'Neill Comment:** The applicant has stated that they will discuss with the Town if plantings are acceptable. The applicant should document those discussions and adjust the design accordingly.

- b. *Former Fuss & O'Neill Comment: HR 289-18.A.4. The cul-de-sac roadway elevation has a low point at the center of roadway of 123.32 per the Roadway Plan and Profile sheet P-5. The plans do not include a typical roadway section, but the Town of Hudson Typical Roadway Cross Section required 3.5" of pavement with 18" of selects. This results in a bottom of roadway box at 121.5±. Peak water elevations for the infiltration basin are 121.94, 122.67, 122.78, and 122.84 for the 2-year, 10-year, 25-year, and 50-year storm events respectively. The applicant should review with the Town Engineer if the implementation of an infiltration basin in the center of the cul-de-sac would be permitted, considering that the peak elevations of the storms are within the roadway selects in these storms.*

**Current Fuss & O'Neill Comment:** We recommend that the applicant coordinate with the Town Engineer to obtain documented acceptance of the proposed stormwater infiltration basin where peak elevations extend into the adjacent gravel select material.

- c. *Former Fuss & O'Neill Comment: HR 289-20.A.2. The applicant should revise stormwater subcatchment area DVS4, as stormwater is not permitted to sheet flow across a street.*

**Current Fuss & O'Neill Comment:** The applicant has implemented a roadway culvert to alleviate the sheet flow across roadways. The applicant should provide drainage easements outside of the proposed ROW for all stormwater features and show those on the proposed Subdivision Plan.

- d. **Former/Current Fuss & O'Neill Comment:** HR 289-20.C.1. & 290-5.A.4. The applicant should review with the Town Engineer if a waiver is required to increase the Peak Rate at Observation Point OP3 in all storms analyzed.

- f. **Former/Current Fuss & O'Neill Comment:** HR 289-20.C.1. & 290-5.A.4. The applicant should review with the Town Engineer if a waiver is required to increase the Peak Volume at Observation Point OP3 in the provided 2-year storm.

Ms. Brooke Dubowik

April 24, 2026

Page 4 of 13

- i. *Former Fuss & O'Neill Comment: HR 290-5.A.7. The applicant should provide additional information regarding downstream properties and how the proposed increase of runoff and volume may be detrimental to those properties.*

**Current Fuss & O'Neill Comment:** The applicant has responded "See Stormwater Management Narrative" and has not provided downstream information. The applicant should provide additional information on downstream systems, specifically OP-3, which increases flow and volume across abutting property lines.

- j. *Former Fuss & O'Neill Comment: HR 290-5.A.11. The applicant should provide additional information on the proposed form of pre-treatment required prior to the treatment.*

**Current Fuss & O'Neill Comment:** The applicant has provided sediment forebays within Infiltration Basins IB-1 and IB-2. The applicant should provide additional information as to the pre-treatment provided for the cul-de-sac pavement. The applicant should also model the forebays as required by typical NHDES engineering standards, as to ensure that stormwater does not overtop the top forebay stone in the 10-year storm event. Refer to NHDES AoT Email Bulletin from March of 2025 for additional information.

- l. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should coordinate with the Town for an LTMA of the proposed stormwater practices.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will coordinate LTMA with the Town prior to final approval.

- m. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should provide a detailed BMP location plan in the I&M Manual. This will ensure all proposed drainage features are noted for their proper maintenance, including but not limited to; specific locations of individual catch basins, outlet structures, closed drainage networks, and infiltration basins.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will provide this after discussion of LTMA with the Town.

- n. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should provide project specific information in the I&M document, including but not limited to; procedures, protocols, frequency, roles, reporting, and responsible parties during and after construction.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will provide this after discussion of LTMA with the Town.

- q. **Former/Current Fuss & O'Neill Comment:** HR 290-6.A.1. The applicant should provide rip rap calculations within the Stormwater Management Report.

- u. *Former Fuss & O'Neill Comment: HR 290-7.A.7. The applicant should review with the Merrimack Local River Advisory Committee (LRAC) if additional coordination is required.*

**Current Fuss & O'Neill Comment:** The applicant stated this is to be coordination with LRAC.

- w. *Former Fuss & O'Neill Comment: HR 290-7.B.16. The applicant should provide locations upon the plan set for proposed snow storage areas. We note snow storage is not allowed within the treatment bays of stormwater basins, and snow should be directed to forebays for pre-treatment prior to entering the treatment bay.*

**Current Fuss & O'Neill Comment:** The applicant noted that snow is to be stored in grass areas adjacent to roadways within the limits of the Right-of-Way. The applicant should provide snow storage locations upon the I&M Manual with any winter management notes. We note the proximity of the project in relation to The Merrimack River, and the applicant should look into salt reduction practices if required by the Town or the LRAC.

- x. *Former Fuss & O'Neill Comment: HR 290-7.B.18. The applicant should provide additional information on the use of the 0.3 in/hr infiltration rates utilized. If these rates are a Ksat conversion, please provide a calculation or explanation in the write up portion within the report.*

**Current Fuss & O'Neill Comment:** The applicant should note if the 1.65 in/hr and 0.55 in/hr take into account a typical factor of safety, as required by NHDES and typical engineering standards.

- ad. *Former Fuss & O'Neill Comment: ETGTD 930. The applicant should provide the drainage design information including but not limited to material, inverts, size, length, slope, cover, and FES/HW.*

**Current Fuss & O'Neill Comment:** The applicant should provide all pipe length and slope information upon the plan set.

- af. *Former Fuss & O'Neill Comment: ETGTD 930.1 and Detail D-3. Drainage Plan P-3 includes note #6 stating that all drainage pipes require 1 foot of minimum cover. The Town standards and detail require 4 feet of cover in paved areas and 2 feet of cover in off pavement areas. Cover over the drain between CB-1 and CB-2 is less than 4 feet, and invert information is not provided for the pipe out of OCS-2.*

**Current Fuss & O'Neill Comment:** We note CB-1 has approximately 1.8' of cover over the 15" HDPE. The applicant should provide exact pipe cover under pavement locations and coordinate with the Town Engineer for waiver requirements of cover. The applicant should consider RCP in situations less than 4' of cover under roadways.

- ag. *Former Fuss & O'Neill Comment: ETGTD 930.10. We note the Town Requirement of curb inlet drainage structures at all vertical sags.*

**Current Fuss & O'Neill Comment:** The applicant should provide a curb inlet detail, as well as note the requirement upon the plan set.

- ah. **Former/Current Fuss & O'Neill Comment:** ETGTD 930.11. The applicant should review roadway spread calculations at the low point of the unnamed CBs at STA 6+40± and review with the Town Engineer. If calculations warrant additional grate area is necessary for stormwater collection, the applicant should review if a double catch basin is warranted in this particular situation.

## 5. Zoning (HR 334)

- b. *Former Fuss & O'Neill Comment: HR 334-27. The applicant should list each proposed lot on the plan, in chart form, indicating in square feet/acreage the total lot area, wetland, slope area greater than 25% and total net contiguous useable upland area.*

**Current Fuss & O'Neill Comment:** The applicant has added the recommended table to the plan set. We recommend that the table be shown in square feet instead of acres to match the dimension table in the Ordinance.

## 6. Sewer/Water Design/Conflicts & Utility Design/Conflicts (HR 276-13.E.)

- b. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant should label the type and size of the water main on the utility plan and the roadway profile.*

**Current Fuss & O'Neill Comment:** The applicant has labeled the reducer on the plan but we were unable to locate the type and size of the proposed water main on the plan.

- d. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has not provided any information regarding the pump station(s) that will be connected to the private force main on the plan set. Also, the applicant should provide information as to who will be responsible for maintenance of the force main.*

**Current Fuss & O'Neill Comment:** The applicant has stated that this information will be provided separately for review.

Ms. Brooke Dubowik

April 24, 2026

Page 6 of 13

- f. **Former/Current Fuss & O'Neill Comment:** HR 276-13.E. The applicant has noted in the narrative that the existing home will remain on the current well and septic system. The applicant should review with the Town whether connecting to the new water and sewer systems is required for this lot/home.
- h. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has shown a new water main running the length of LeClair Drive to the intersection with Shoreline Drive, but there is no connection to a water main at Shoreline Drive shown. The applicant should show the location of the proposed connection and valving arrangement.*

**Current Fuss & O'Neill Comment:** The applicant has added the existing water main information to the plan. There are no valves shown at the connection to the water main on Shoreline Drive. The applicant should confirm with the Town the location of any valves at this connection and show those on the plans, and coordinate with the Town regarding operation of any valves for the connection, testing, and placing in service of the new water main.

- i. *Former Fuss & O'Neill Comment: HR 289-26.B.(4). The applicant should provide information on the existing sewer main shown on the plan including type and size.*

**Current Fuss & O'Neill Comment:** The applicant has stated to see the Existing Conditions Plan and Roadway Plan & Profile. We note that an Existing Conditions Plan was not received as part of the package received for review, and the Roadway Plan & Profile does not include type or size information on the existing sewer main. The applicant should confirm the size of the existing sewer to confirm it is adequate for proposed sewer flows and at least 8" to match the proposed piping.

- m. *Former Fuss & O'Neill Comment: The applicant has provided invert and rim elevation information for only one of the two proposed sewer manholes at station 6+00.*

**Current Fuss & O'Neill Comment:** The applicant has noted that this has been revised with the new layout, but the plans still show 2 sewer manholes at station 6+00 and invert and rim elevations are only provided for one SMH.

- r. **New Fuss & O'Neill Comment:** The applicant has revised the proposed routing of the water main within the LeClair Drive Right-of-Way, and in several locations the water main is directly on the proposed Right-of-Way line. The applicant should confirm with the Town that this is acceptable, or revise the layout as needed.

The following items require Town evaluation or input:

### 1. Administrative and Subdivision Review Codes (HR 276 & HR 289)

- c. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(6). The owner's signature was not provided on the plan set. A location for a future signature has been provided.*

**Current Fuss & O'Neill Comment:** The applicant has confirmed that the signature will be added to the final plans.

### 3. Roadway Design

- d. *Former Fuss & O'Neill Comment: HR 289-18.C.(1). The applicant has requested a waiver for the horizontal curve minimum. The applicant should show the horizontal curve information on the plan.*

**Current Fuss & O'Neill Comment:** The applicant has added the horizontal curve information on the plan. We note that the waiver request is listed on the plan.

Ms. Brooke Dubowik

April 24, 2026

Page 7 of 13

**5. Zoning (HR 334)**

- e. *Former Fuss & O'Neill Comment: HR 334-36.C. The applicant has included a Conditional Use Permit Application to allow disturbance within the wetland and wetland buffer for the construction of the proposed roadway. We note that the construction of the proposed driveway for the existing home on lot 5 would also impact this area and should be shown on the plan.*

**Current Fuss & O'Neill Comment:** The applicant has stated that the CUP information has been updated. We note that revised CUP documents were not provided as part of this review to confirm the revisions.

The following items are resolved or have no further Fuss & O'Neill input:

**1. Administrative and Subdivision Review Codes (HR 276 & HR 289)**

- d. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(13). The applicant has not shown any sign locations or details on the plan set.*

Current Fuss & O'Neill Comment: The applicant has stated that a stop sign and stop bar at the end of LeClair Drive is existing and no additional signage is necessary. No further Fuss & O'Neill comment.

- e. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(14). The applicant has not shown any lighting on the plan set. The applicant should add the required note if lighting is not proposed.*

Current Fuss & O'Neill Comment: The applicant has added a note to the plan stating that there will be no exterior lighting. No further Fuss & O'Neill comment.

- f. *Former Fuss & O'Neill Comment: Former Fuss & O'Neill Comment: HR 276-11.1.B.(16). The applicant should provide the locations of driveways and travel ways within 200 feet of the site or include an aerial photograph at the required scale to meet this requirement.*

Current Fuss & O'Neill Comment: The applicant has provided an aerial photograph that meets this Regulation. No further Fuss & O'Neill comment.

- g. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(18). The applicant has provided proposed grading of the roadway but has not provided any lot grading information. We recommend that the applicant add preliminary driveway information and grading to be sure that the lots can be accessed. We also recommend that the driveway location and grading be shown for the existing house.*

Current Fuss & O'Neill Comment: The applicant has added driveway locations to the plan set. No further Fuss & O'Neill comment.

- i. *Former Fuss & O'Neill Comment: HR 289-4. The applicant should note or detail monument requirements on the plan set. The applicant should also include proposed monumentation symbols in the legend.*

Current Fuss & O'Neill Comment: The applicant has added the monumentation information on the plan. No further Fuss & O'Neill comment.

- j. *Former Fuss & O'Neill Comment: HR 289-15. & 334-83. The applicant had noted that a portion of the site is located within the flood hazard area along the Merrimack River. We note that the Existing Conditions Plan and Overview Plan show the Flood Hazard Area to end approximately 60 feet to the west of the proposed roadway crossing. The applicant should confirm that grading changes and replacement of the existing stream crossing will not impact or extend the flood hazard area.*

Ms. Brooke Dubowik

April 24, 2026

Page 8 of 13

Current Fuss & O'Neill Comment: The applicant has stated that the grading changes and replacement of the existing stream crossing will not impact the flood hazard area due to the flood hazard area ending prior to the proposed crossing. No further Fuss & O'Neill comment.

- k. *Former Fuss & O'Neill Comment: HR 289-22. The applicant has not proposed any open space as part of this Subdivision plan.*

Current Fuss & O'Neill Comment: The applicant has confirmed that no open space is proposed. No further Fuss & O'Neill comment.

- l. *Former Fuss & O'Neill Comment: HR 289-26.B.(5). The applicant should provide the required information within 200 feet of the tract or provide aerial photography and the required scale to satisfy this requirement.*

Current Fuss & O'Neill Comment: The applicant has provided the requested information. No further Fuss & O'Neill comment.

- n. *Former Fuss & O'Neill Comment: HR 289-27.B.(6). The applicant has not shown the length and bearing of all proposed property lines and right-of-way.*

Current Fuss & O'Neill Comment: The applicant has provided the required information on the plan. No further Fuss & O'Neill comment.

- o. *Former Fuss & O'Neill Comment: HR 289-27.B.(6). The applicant should provide an error of closure on the plan set.*

Current Fuss & O'Neill Comment: The applicant has provided the required information on the plan. No further Fuss & O'Neill comment.

## 2. Driveway Review Codes (HR 193-80)

- a. *Former Fuss & O'Neill Comment: HR 193-8. The applicant has not shown the locations of proposed driveways for each lot on the plan set. The applicant should show the driveway location for the existing home and also provide a typical driveway detail on the plan set.*

Current Fuss & O'Neill Comment: The applicant has added the driveway locations and detail on the plan set. No further Fuss & O'Neill comment.

## 3. Roadway Design

- a. *Former Fuss & O'Neill Comment: HR 289-18.A. & B.(1). The applicant should label pavement and right-of-way widths on the plan.*

Current Fuss & O'Neill Comment: The applicant has added the required information. No further Fuss & O'Neill comment.

- e. *Former Fuss & O'Neill Comment: HR 289-18.C.(2). The applicant has not met any of the vertical curve minimum requirements for the roadway. We note that the k values are proposed to be 19 for crests when 30 is required and proposed to be 20 and 37.5 for sags when 40 is required.*

Current Fuss & O'Neill Comment: The applicant has updated the vertical curve design to meet the requirements. No further Fuss & O'Neill comment.

Ms. Brooke Dubowik

April 24, 2026

Page 9 of 13

**4. Drainage Design /Stormwater Management (HR 289-20.C. /Chapter 290)**

- e. *Former Fuss & O'Neill Comment: HR 289-20.C.1. & 290-5.A.4. The applicant should provide a similar comparison table of runoff volumes to ensure no net increase for all storms analyzed.*  
Current Fuss & O'Neill Comment: The applicant has provided the requested table. No further Fuss & O'Neill comment.
- g. *Former Fuss & O'Neill Comment: HR 290-5.A.4. The applicant should provide the GRV BMP worksheet, illustrating required GRV is met.*  
Current Fuss & O'Neill Comment: The applicant has provided the GRV BMP worksheet. No further Fuss & O'Neill comment.
- h. *Former Fuss & O'Neill Comment: HR 290-5.A.6. The applicant should ensure and note if the design utilizes Extreme Precipitation.*  
Current Fuss & O'Neill Comment: The applicant has provided extreme precipitation information. No further Fuss & O'Neill comment.
- k. *Former Fuss & O'Neill Comment: HR 290-5.A.11. The applicant should keep the Town informed of all communication with NHDES in relation to the required Wetland Permit being requested to ensure NHDES comments/requirement do not alter drainage design/calculations.*  
Current Fuss & O'Neill Comment: The applicant has noted the requirement. No further Fuss & O'Neill comment.
- o. *Former Fuss & O'Neill Comment: HR 290-5.B.1.b. The applicant should provide support material or calculations showing the required 80% TSS and 50% TP pollutant removals.*  
Current Fuss & O'Neill Comment: The applicant has provided the requested information showing 90% TSS and 65% TP removal. No further Fuss & O'Neill comment.
- p. *Former Fuss & O'Neill Comment: HR 290-6.A. The applicant should add Observation Points (OPs) to the Existing and Developed Conditions Drainage Area Plans.*  
Current Fuss & O'Neill Comment: The applicant has added Observation Points to the Watershed Plans. No further Fuss & O'Neill comment.
- r. *Former Fuss & O'Neill Comment: HR 290-6.A.8. The applicant should ensure the plans note a pre-construction meeting is required with the Town Engineer.*  
Current Fuss & O'Neill Comment: The applicant has noted this requirement on the plan. No further Fuss & O'Neill comment.
- s. *Former Fuss & O'Neill Comment: HR 290-7.A.5. The applicant should provide the required NHDES BMP worksheets.*  
Current Fuss & O'Neill Comment: The applicant has provided the requested worksheet. No further Fuss & O'Neill comment.
- t. *Former Fuss & O'Neill Comment: HR 290-7.A.6. The applicant should provide information regarding how the project design accounts for frozen ground conditions.*  
Current Fuss & O'Neill Comment: The applicant as provided the requested information. No further Fuss & O'Neill comment.
- v. *Former Fuss & O'Neill Comment: HR 290-7.B.13. The applicant should provide information on the soils utilized on site.*  
Current Fuss & O'Neill Comment: The applicant has provided NRCS Soils within the Stormwater Report. No further Fuss & O'Neill comment.

Ms. Brooke Dubowik

April 24, 2026

Page 10 of 13

- y. *Former Fuss & O'Neill Comment: HR 290-8.A.4. & 5. We note the requirement of the applicant to coordinate the need for a Bond or Escrow with the Town Engineer.*

Current Fuss & O'Neill Comment: The applicant has acknowledged the requirement. No further Fuss & O'Neill comment.

- z. *Former Fuss & O'Neill Comment: HR 290-8.B.5. The applicant should coordinate with the Town if additional documentation is required to establish an HOA for the stormwater Long Term Maintenance and inspection requirements of the proposed road.*

Current Fuss & O'Neill Comment: The applicant has noted coordination with the Town for an HOA. No further Fuss & O'Neill comment.

- aa. *Former Fuss & O'Neill Comment: HR 290-10.B. The applicant should provide the typical EPA NPDES disturbance note of over 1 acre, to ensure the contractor is aware of the ENOI SWPPP requirement.*

Current Fuss & O'Neill Comment: The applicant has provided the EPA NPDES Note. No further Fuss & O'Neill comment.

- ab. *Former Fuss & O'Neill Comment: Engineering Technical Guidelines and Typical Details (ETGTD) 920.4.1 & 2. The applicant should provide locations of stockpiles and equipment storage upon the erosion and control plan.*

Current Fuss & O'Neill Comment: The applicant has updated the Erosion Control Plan. No further Fuss & O'Neill comment.

- ac. *Former Fuss & O'Neill Comment: ETGTD 920.4.9. The applicant should coordinate the grate elevation on the Outlet Control Structure OCS-1 between the Detail Plan Sheet D-5 and the HydroCAD Pond IB-1.*

Current Fuss & O'Neill Comment: The applicant has updated the Plan and HydroCAD to match. No further Fuss & O'Neill comment.

- ae. *Former Fuss & O'Neill Comment: ETGTD 930. FES-B is not labeled on the Drainage Plan but is included in the table on sheet D-5.*

Current Fuss & O'Neill Comment: The applicant has updated the chart on D-5. No further Fuss & O'Neill comment.

- ai. *Former Fuss & O'Neill Comment: The applicant will be required to comply with all provisions of the Town of Hudson's MS4 permit, including but not limited to annual reporting requirements, construction site stormwater runoff control, and record keeping requirements.*

Current Fuss & O'Neill Comment: The applicant has acknowledged the requirement. No further Fuss & O'Neill comment.

- aj. *Former Fuss & O'Neill Comment: Please note that this review was carried out in accordance with applicable regulations and standards in place in New Hampshire at this time. Note that conditions at the site, including average weather conditions, patterns and trends, and design storm characteristics, may change in the future. In addition, future changes in federal, state or local laws, rules or regulations, or in generally accepted scientific or industry information concerning environmental, atmospheric and geotechnical conditions and developments may affect the information and conclusions set forth in this review. In no way shall Fuss & O'Neill be liable for any of these changed conditions that may impact the review, regardless of the source of or reason for such changed conditions. Other than as described herein, no other investigation or analysis has been requested by the Client or performed by Fuss & O'Neill in preparing this review.*

Ms. Brooke Dubowik

April 24, 2026

Page 11 of 13

**5. Zoning (HR 334)**

- a. *Former Fuss & O'Neill Comment: HR 334-20. The site is located in the Residential-Two (R2) District. The applicant has noted the proposed use of the new lots. We note that per the Ordinance lots could be single- or two-family dwellings.*
- c. *Former Fuss & O'Neill Comment: HR 334-27.1.D. The applicant should list the frontage of the proposed lots on the plan set.*  
  
Current Fuss & O'Neill Comment: The applicant has added the required information on the plan. No further Fuss & O'Neill comment.
- d. *Former Fuss & O'Neill Comment: HR 334-35. The applicant has shown the fifty-foot wetlands buffer on the plan set, and has proposed both temporary and permanent development within this buffer.*

**6. Sewer/Water Design/Conflicts & Utility Design/Conflicts (HR 276-13.E.)**

- a. *Former Fuss & O'Neill Comment: HR 276-13.A. The applicant has shown utility poles and overhead wires along the proposed roadway on the plan, and noted in the narrative that proposed lots will be served by underground power and cable. The Regulation requires all new developments to have underground wiring.*  
  
Current Fuss & O'Neill Comment: The applicant has revised the plans showing underground power and cable. No further Fuss & O'Neill comment.
- c. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant should label the type and size of the sewer force main and gravity main on the utility plan.*  
  
Current Fuss & O'Neill Comment: The applicant has added the information to the plan set. No further Fuss & O'Neill comment.
- e. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant should show preliminary water and sewer connection locations for each lot on the plan set including curb stops and sewer cleanouts.*  
  
Current Fuss & O'Neill Comment: The applicant has added the recommended information to the plan. No further Fuss & O'Neill comment.
- g. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has proposed one fire hydrant within the subdivision at the end of the cul-de-sac of LeClair Drive. The applicant should coordinate with the Hudson Fire Department to verify that they are satisfied with the placement of the fire hydrant and there is adequate fire protection coverage for the proposed lots.*  
  
Current Fuss & O'Neill Comment: The applicant has revised the plan to show two hydrant locations. No further Fuss & O'Neill comment.
- i. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has shown the proposed water main within LeClair Drive to be immediately adjacent to existing SMH-1 and the existing sewer main to Shoreline Drive. Water is required to have a 10-foot lateral separation from sewer.*  
  
Current Fuss & O'Neill Comment: The applicant has revised water and sewer locations to maintain separation. No further Fuss & O'Neill comment.
- j. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has proposed the new water main to have two 90-degree bends at approximate station 3+82 where it crosses the sewer main. The applicant should confirm with the Town that this arrangement is acceptable or provide a revised layout.*  
  
Current Fuss & O'Neill Comment: The applicant has revised the utility layout. No further Fuss & O'Neill comment.

Ms. Brooke Dubowik

April 24, 2026

Page 12 of 13

- k. *Former Fuss & O'Neill Comment: HR 289-21.A. The applicant has proposed a 10-foot-wide sewer easement for the private force main. The Regulation requires utility easements to be 15-feet-wide. The applicant should also note on the plan who the easement will benefit since the main is proposed to be private.*

Current Fuss & O'Neill Comment: The applicant has revised the easement width to meet the Regulation. No further Fuss & O'Neill comment.

- n. *Former Fuss & O'Neill Comment: The applicant should provide invert information for the existing catch basins at station 1+50 to confirm that the proposed water main does not conflict with the pipe connecting these structures. Also, the proposed water main is shown immediately adjacent to the eastern catch basin. The applicant should review if insulation or other means of protection of the water main at this location will be needed.*

Current Fuss & O'Neill Comment: The applicant has revised the location of the proposed water main and has noted the approximate location of the existing water main on LeClair Drive, which is now shown immediately adjacent to the western catch basin. No further Fuss & O'Neill comment.

- o. *Former Fuss & O'Neill Comment: ETGTD Section 801. The applicant should verify with the Town that the existing water main on Shoreline Drive has adequate flow and pressure to meet both domestic and fire hydrant needs for the project.*

Current Fuss & O'Neill Comment: The applicant has stated that they confirmed with the Town that adequate flow and pressure is available. No further Fuss & O'Neill comment.

- p. *Former Fuss & O'Neill Comment: The applicant should remove the reference to Walmart from the Utility notes on the Utility Plan.*

Current Fuss & O'Neill Comment: The applicant revised the note. No further Fuss & O'Neill comment.

- q. *Former Fuss & O'Neill Comment: Utilities Note 15 on Sheet GN-1 states that all lots are to be served by individual sewage disposal systems and onsite wells. This note should be updated to reflect the proposed utility connections.*

Current Fuss & O'Neill Comment: The applicant has revised the note. No further Fuss & O'Neill comment.

## **7. Erosion Control/Wetland Impacts**

- a. *Former Fuss & O'Neill Comment: The Town should reserve the right to require additional erosion control measures.*

## **8. State and Local Permits**

- a. *Former Fuss & O'Neill Comment: The applicant has listed the required permits on the plan set. The applicant should also review the need for an NHDES Sewer Connection permit and Wetlands permit.*

Current Fuss & O'Neill Comment: The applicant has added these permits to the list on the plan. No further Fuss & O'Neill comment.

- b. *Former Fuss & O'Neill Comment: Additional local permitting may be required.*

Ms. Brooke Dubowik

April 24, 2026

Page 13 of 13

**9. Other**

- a. *Former Fuss & O'Neill Comment: ETGTD Section 565.1.1. The applicant is reminded that the Town of Hudson has specific requirements for the importing of off-site fill materials for use in constructing this project. We recommended that these requirements be stated on the plans for the Contractors attention.*

Current Fuss & O'Neill Comment: The applicant has noted this requirement on the plan. No further Fuss & O'Neill comment.

Please feel free to call if you have any questions.

Very truly yours,



Steven W. Reichert, PE

SWR:elc

Enclosure

cc: Town of Hudson Engineering Division – File  
Meridian Land Services, Inc. – SRFoisie@meridianlandservices.com



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "H"

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Brooke Dubowik  
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Hudson, NH 03051  
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Email: [bdubowik@hudsonnh.gov](mailto:bdubowik@hudsonnh.gov)

May 13, 2026

**Re: LeClair Drive Extension  
12 LeClair Dr, Tax Map 147 - Lot 6  
Lot 228-7  
Hudson, NH**

**Planning Department Submittal RMI 2**

**Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District**

Brooke:

Please find the following items as they relate to the above-mentioned project to be distributed to the Planning Board members and their review:

1. One (1) copy of Waiver Request #2. - Sidewalk - HR 289-18.R.(1)(b)One (1) copy of Drainage Report;
2. One (1) copy of Waiver Request #3. - Lot Phasing HR 289-37.A
3. One (1) copy of Waiver Request #4&5.a - Stormwater 289-20.C.1. & 290-5.A.4
4. One (1) copy of Low Pressure Forcemain Design Report;
5. One (1) copy of the Drainage Report;
6. One (1) copy of Inspection and Maintenance Manual;
7. One (1) 11" x 17" Buffer Disturbance Exhibit;
8. One (1) 11" x 17" Buffer Reestablishment Exhibit;
9. One (1) 22" x 34" sets of Construction Plans prepared by Meridian Land Services, Inc.;
10. One (1) 11" x 17" sets of Construction Plans prepared by Meridian Land Services, Inc.;
11. One (1) pdf digital copy of the plan set and supporting documents (via email);

In response to the planning board sign off letter received April 24<sup>th</sup>, 2026, Meridian offers the following responses.

### **1. Administrative and Subdivision Review Codes (HR 276 & HR 289):**

- a. *Former Fuss & O'Neill Comment: Hudson Regulation (HR) 276-11.1.B.(2). The plan set provided is greater than the maximum scale allowed by the Regulations (1"=50'). The applicant has provided scales between 1"=60' and 1"=80' on several sheets.*



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 2 of 11

---

**Current Fuss & O'Neill Comment:** The applicant has updated the plan scales to meet the maximum allowable. We note that the bar scale on the Submission Plans should be updated to match the new scale.

**Scale bars have been updated on necessary sheets.**

- b. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(4). & 289-27.A.(3). The applicant should add the Planning Board approval block to all sheets of the plan set. We note that it is currently not shown on the Existing Conditions Plan and detail sheets.*

**Current Fuss & O'Neill Comment:** The applicant has added the approval block to the recommended sheets; however, the approval block should be added to the Plan and Profile sheet as well.

**Planning board block has been added to plan and profile sheet.**

- h. *Former Fuss & O'Neill Comment: HR 276-11.1.B.(20). The applicant should note existing building heights on the plan set.*

**Current Fuss & O'Neill Comment:** The applicant has stated that they are unable to confirm the height of the existing building. The applicant should review the need for a waiver from this requirement.

**See updated existing conditions plan.**

- m. *Former Fuss & O'Neill Comment: HR 289-27.B.(3). The applicant should provide street cross sections and a typical cross section on the plan.*

**Current Fuss & O'Neill Comment:** The applicant has stated that cross sections will be provided in the final plans. We continue to recommend that at minimum a typical cross section be shown on the plans as required.

**Typical cross section has been added to plan set on sheet D-1.**

- p. *Former Fuss & O'Neill Comment: HR 289-27.B.(7). The applicant should provide benchmark data on the plan set.*

**Current Fuss & O'Neill Comment:** The applicant has added a note to the plan set stating benchmarks to be set prior to construction. We continue to recommend that the benchmarks be shown on the plans as required.

**Benchmarks have been added to the plan set.**



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 3 of 11

---

q. *Former Fuss & O'Neill Comment: HR 289-37.A. The applicant has not provided any information on the phasing of subdivision construction on the plan set. We note that subdivisions with six or more lots must be developed over two years per the Regulation.*

**Current Fuss & O'Neill Comment:** The applicant has stated that a waiver request was submitted. We note that a waiver request was not provided with the package received for review and was not noted on the waiver list on the plan set.

**See attached waiver request.**

### 3. Roadway Design

b. *Former Fuss & O'Neill Comment: HR 289-18.B.(3). The applicant should label the cul-de-sac pavement and right-of-way radii on the plan. We note that the proposed radii appear to meet the dimensions in the 289 Attachment 2:1 detail, which is inconsistent with the dimensions in Detail R-2 included in the plans. The applicant should confirm with the Town Engineer the appropriate pavement width and radius dimensions for the cul-de-sac.*

**Current Fuss & O'Neill Comment:** We understand that the applicant has coordinated with the Town Engineer and will update the cul-de-sac radii to be consistent with the Regulation. Further review and confirmation can be provided if new plans are received.

**Per discussion with the town engineer, the engineering technical guidelines layout has been utilized in the design. See D-1 detail 1.**

c. *Former Fuss & O'Neill Comment: HR 289-18.B.(5). The applicant should add the required signage to the plan or provide existing information that the signage currently exists.*

**Current Fuss & O'Neill Comment:** The applicant has stated that an existing stop sign and stop bar are located at the end of LeClair Drive. We recommend that these be shown as an existing feature on the plan.

**See existing conditions plan.**

f. *Former Fuss & O'Neill Comment: HR 289-18.D. The applicant should review the roadway side slopes to be sure they are all constructed outside of the right-of-way.*

**Current Fuss & O'Neill Comment:** The applicant has stated that the grading has been revised to a consistent 2% slope within the ROW. We note that roadway cross sections would further clarify and confirm slope grading and design.

**Typical cross section has been added to plan set on sheet D-1.**



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CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 4 of 11

- g. *Former Fuss & O'Neill Comment: HR 289-18.M.(1). The Roadway Plan & Profile does not match the scale required by the Regulations.*

**Current Fuss & O'Neill Comment:** The applicant appears to have updated the scale of the plan to match the Regulation, however, the bar scale and scale noted on the plan do not reflect this change.

**Bar scale has been revised.**

- h. *Former Fuss & O'Neill Comment: HR 289-18.R.(1). The applicant has not proposed any sidewalks within the subdivision. We note that sidewalks do not currently exist on LeClair Drive but do exist on the intersecting street Shoreline Drive.*

**Current Fuss & O'Neill Comment:** The applicant has stated that a waiver request was attached. We note that a waiver request was not provided as part of the package received for review and was not noted in the waiver list on the plan.

**See attached waiver request.**

#### 4. Drainage Design /Stormwater Management (HR 289-20.C. /Chapter 290)

- a. *Former Fuss & O'Neill Comment: HR 289-18.A.4. The applicant should confirm the proposed basin floor and side slopes material/treatment at the cul-de-sac infiltration basin IB-2, and review with and gain acceptance from the Town for that proposed material/treatment. Plantings and grass mix must be able to be inundated by stormwater for up to 72 hours.*

**Current Fuss & O'Neill Comment:** The applicant has stated that they will discuss with the Town if plantings are acceptable. The applicant should document those discussions and adjust the design accordingly.

**See sheet D-7 Detail 1 for basin seed mixture from New England Wetland Plants, Inc.**

- b. *Former Fuss & O'Neill Comment: HR 289-18.A.4. The cul-de-sac roadway elevation has a low point at the center of roadway of 123.32 per the Roadway Plan and Profile sheet P-5. The plans do not include a typical roadway section, but the Town of Hudson Typical Roadway Cross Section required 3.5" of pavement with 18" of selects. This results in a bottom of roadway box at 121.5±. Peak water elevations for the infiltration basin are 121.94, 122.67, 122.78, and 122.84 for the 2-year, 10-year, 25-year, and 50-year storm events respectively. The applicant should review with the Town Engineer if the implementation of an infiltration basin in the center of the cul-de-sac would be permitted, considering that the peak elevations of the storms are within the roadway selects in these storms.*



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CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 5 of 11

---

**Current Fuss & O'Neill Comment:** We recommend that the applicant coordinate with the Town Engineer to obtain documented acceptance of the proposed stormwater infiltration basin where peak elevations extend into the adjacent gravel select material.

**To coordinate written approval.**

- c. *Former Fuss & O'Neill Comment: HR 289-20.A.2. The applicant should revise stormwater Subcatchment area DVS4, as stormwater is not permitted to sheet flow across a street.*

**Current Fuss & O'Neill Comment:** The applicant has implemented a roadway culvert to alleviate the sheet flow across roadways. The applicant should provide drainage easements outside of the proposed ROW for all stormwater features and show those on the proposed Subdivision Plan.

**See subdivision plans for easements.**

- d. **Former/Current Fuss & O'Neill Comment:** HR 289-20.C.1. & 290-5.A.4. The applicant should review with the Town Engineer if a waiver is required to increase the Peak Rate at Observation Point OP3 in all storms analyzed.

**See waiver request.**

- f. **Former/Current Fuss & O'Neill Comment:** HR 289-20.C.1. & 290-5.A.4. The applicant should review with the Town Engineer if a waiver is required to increase the Peak Volume at Observation Point OP3 in the provided 2-year storm.

**See waiver request.**

- i. *Former Fuss & O'Neill Comment: HR 290-5.A.7. The applicant should provide additional information regarding downstream properties and how the proposed increase of runoff and volume may be detrimental to those properties.*

**Current Fuss & O'Neill Comment:** The applicant has responded "See Stormwater Management Narrative" and has not provided downstream information. The applicant should provide additional information on downstream systems, specifically OP-3, which increases flow and volume across abutting property lines.

**The narrative has been revised to provide additional information regarding downstream properties. An additional observation point has been modeled to show that the increased runoff will not affect the abutting parcels and will be entirely within the roadway.**



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## LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 6 of 11

- j. *Former Fuss & O'Neill Comment: HR 290-5.A.11. The applicant should provide additional information on the proposed form of pre-treatment required prior to the treatment.*

**Current Fuss & O'Neill Comment:** The applicant has provided sediment forebays within Infiltration Basins IB-1 and IB-2. The applicant should provide additional information as to the pre-treatment provided for the cul-de-sac pavement. The applicant should also model the forebays as required by typical NHDES engineering standards, as to ensure that stormwater does not overtop the top forebay stone in the 10-year storm event. Refer to NHDES AoT Email Bulletin from March of 2025 for additional information.

**The drainage report has been adjusted to model the sediment forebays as required by NHDES.**

- i. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should coordinate with the Town for an LTMA of the proposed stormwater practices.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will coordinate LTMA with the Town prior to final approval.

**To be coordinated with the town.**

- m. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should provide a detailed BMP location plan in the I&M Manual. This will ensure all proposed drainage features are noted for their proper maintenance, including but not limited to; specific locations of individual catch basins, outlet structures, closed drainage networks, and infiltration basins.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will provide this after discussion of LTMA with the Town.

**To be coordinated with the town.**

- n. *Former Fuss & O'Neill Comment: HR 290-5.A.12. The applicant should provide project specific information in the I&M document, including but not limited to; procedures, protocols, frequency, roles, reporting, and responsible parties during and after construction.*

**Current Fuss & O'Neill Comment:** The applicant has stated they will provide this after discussion of LTMA with the Town.

**To be coordinated with the town.**

- q. **Former/Current Fuss & O'Neill Comment:** HR 290-6.A.1. The applicant should provide rip rap calculations within the Stormwater Management Report.



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 7 of 11

---

### **Riprap calculations have been completed. See drainage report.**

- u. *Former Fuss & O'Neill Comment: HR 290-7.A.7. The applicant should review with the Merrimack Local River Advisory Committee (LRAC) if additional coordination is required.*

**Current Fuss & O'Neill Comment:** The applicant stated this is to be coordination with LRAC.

### **To be coordinated with the LRAC.**

- w. *Former Fuss & O'Neill Comment: HR 290-7.B.16. The applicant should provide locations upon the plan set for proposed snow storage areas. We note snow storage is not allowed within the treatment bays of stormwater basins, and snow should be directed to forebays for pre-treatment prior to entering the treatment bay.*

**Current Fuss & O'Neill Comment:** The applicant noted that snow is to be stored in grass areas adjacent to roadways within the limits of the Right-of-Way. The applicant should provide snow storage locations upon the I&M Manual with any winter management notes. We note the proximity of the project in relation to The Merrimack River, and the applicant should look into salt reduction practices if required by the Town or the LRAC.

### **To be coordinated with the LRAC.**

- x. *Former Fuss & O'Neill Comment: HR 290-7.B.18. The applicant should provide additional information on the use of the 0.3 in/hr infiltration rates utilized. If these rates are a Ksat conversion, please provide a calculation or explanation in the write up portion within the report.*

**Current Fuss & O'Neill Comment:** The applicant should note if the 1.65 in/hr and 0.55 in/hr take into account a typical factor of safety, as required by NHDES and typical engineering standards.

**The paragraph in the drainage report discussing the infiltration rate has been revised to specify that the factor of safety of 2 has been applied.**

- ad. *Former Fuss & O'Neill Comment: ETGTD 930. The applicant should provide the drainage design information including but not limited to material, inverts, size, length, slope, cover, and FES/HW.*

**Current Fuss & O'Neill Comment:** The applicant should provide all pipe length and slope information upon the plan set.

### **Pipe table has been added to sheet P-3.**

- af. *Former Fuss & O'Neill Comment: ETGTD 930.1 and Detail D-3. Drainage Plan P-3 includes note #6 stating that all drainage pipes require 1 foot of minimum cover. The Town standards and detail require 4*



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 8 of 11

*feet of cover in paved areas and 2 feet of cover in off pavement areas. Cover over the drain between CB-1 and CB-2 is less than 4 feet, and invert information is not provided for the pipe out of OCS-2.*

**Current Fuss & O'Neill Comment:** We note CB-1 has approximately 1.8' of cover over the 15" HDPE. The applicant should provide exact pipe cover under pavement locations and coordinate with the Town Engineer for waiver requirements of cover. The applicant should consider RCP in situations less than 4' of cover under roadways.

**Cover has been revised to be approximately 2.6' and RCP pipe has been specified in areas of less than 4' or cover.**

*ag. Former Fuss & O'Neill Comment: ETGTD 930.10. We note the Town Requirement of curb inlet drainage structures at all vertical sags.*

**Current Fuss & O'Neill Comment:** The applicant should provide a curb inlet detail, as well as note the requirement upon the plan set.

**Curb inlet has been called out on sheet P-3 and detail has been added to sheet D-5.**

*ah. Former/Current Fuss & O'Neill Comment: ETGTD 930.11. The applicant should review roadway spread calculations at the low point of the unnamed CBs at STA 6+40± and review with the Town Engineer. If calculations warrant additional grate area is necessary for stormwater collection, the applicant should review if a double catch basin is warranted in this particular situation.*

### 5. Zoning (HR 334)

*b. Former Fuss & O'Neill Comment: HR 334-27. The applicant should list each proposed lot on the plan, in chart form, indicating in square feet/acreage the total lot area, wetland, slope area greater than 25% and total net contiguous useable upland area.*

**Current Fuss & O'Neill Comment:** The applicant has added the recommended table to the plan set. We recommend that the table be shown in square feet instead of acres to match the dimension table in the Ordinance.

**The table has been updated to be shown in square feet instead of acres.**

### 6. Sewer/Water Design/Conflicts & Utility Design/Conflicts (HR 276-13.E.)

*b. Former Fuss & O'Neill Comment: HR 276-13.E. The applicant should label the type and size of the water main on the utility plan and the roadway profile.*

**Current Fuss & O'Neill Comment:** The applicant has labeled the reducer on the plan but we were unable to locate the type and size of the proposed water main on the plan.



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 9 of 11

**See sheets P-4 and P-5 for waterline size.**

- d. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has not provided any information regarding the pump station(s) that will be connected to the private force main on the plan set. Also, the applicant should provide information as to who will be responsible for maintenance of the force main.*

**Current Fuss & O'Neill Comment:** The applicant has stated that this information will be provided separately for review.

**See attached force main calculations.**

- f. **Former/Current Fuss & O'Neill Comment:** HR 276-13.E. The applicant has noted in the narrative that the existing home will remain on the current well and septic system. The applicant should review with the Town whether connecting to the new water and sewer systems is required for this lot/home.

**The existing well and septic are currently functioning and are going to remain. A sewer and water stub has been provided, and the existing house has been accounted for in the calculations.**

- h. *Former Fuss & O'Neill Comment: HR 276-13.E. The applicant has shown a new water main running the length of LeClair Drive to the intersection with Shoreline Drive, but there is no connection to a water main at Shoreline Drive shown. The applicant should show the location of the proposed connection and valving arrangement.*

**Current Fuss & O'Neill Comment:** The applicant has added the existing water main information to the plan. There are no valves shown at the connection to the water main on Shoreline Drive. The applicant should confirm with the Town the location of any valves at this connection and show those on the plans, and coordinate with the Town regarding operation of any valves for the connection, testing, and placing in service of the new water main.

**Waterline has been shown per GIS provided by town engineer. Valve has been located on the opposite side of Leclair Drive, this should be confirmed prior to start of any construction.**

- i. *Former Fuss & O'Neill Comment: HR 289-26.B.(4). The applicant should provide information on the existing sewer main shown on the plan including type and size.*

**Current Fuss & O'Neill Comment:** The applicant has stated to see the Existing Conditions Plan and Roadway Plan & Profile. We note that an Existing Conditions Plan was not received as part of the package received for review, and the Roadway Plan & Profile does not include type or



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LeClair Dr Extension  
Subdivision Application  
Conditional Use Permit Application: Wetland Conservation Overlay District

May 13, 2026

Page 10 of 11

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size information on the existing sewer main. The applicant should confirm the size of the existing sewer to confirm it is adequate for proposed sewer flows and at least 8" to match the proposed piping.

**This has been confirmed via conversation with the town engineer as well as field verified.**

*m. Former Fuss & O'Neill Comment: The applicant has provided invert and rim elevation information for only one of the two proposed sewer manholes at station 6+00.*

**Current Fuss & O'Neill Comment:** The applicant has noted that this has been revised with the new layout, but the plans still show 2 sewer manholes at station 6+00 and invert and rim elevations are only provided for one SMH.

**Callout has been added for second manhole located at 6+00.**

*r. New Fuss & O'Neill Comment:* The applicant has revised the proposed routing of the water main within the LeClair Drive Right-of-Way, and in several locations the water main is directly on the proposed Right-of-Way line. The applicant should confirm with the Town that this is acceptable, or revise the layout as needed.

**To be coordinated with the town.**

The following items require Town evaluation or input:

### 1. Administrative and Subdivision Review Codes (HR 276 & HR 289)

*c. Former Fuss & O'Neill Comment: HR 276-11.1.B.(6). The owner's signature was not provided on the plan set. A location for a future signature has been provided.*

**Current Fuss & O'Neill Comment:** The applicant has confirmed that the signature will be added to the final plans.

**Signature to be added to final plans.**

### 3. Roadway Design

*d. Former Fuss & O'Neill Comment: HR 289-18.C.(1). The applicant has requested a waiver for the horizontal curve minimum. The applicant should show the horizontal curve information on the plan.*

**Current Fuss & O'Neill Comment:** The applicant has added the horizontal curve information on the plan. We note that the waiver request is listed on the plan.



# MERIDIAN LAND SERVICES, INC.

CIVIL ENGINEERING | LAND SURVEYING | PERMITTING | SOIL & WETLAND MAPPING | SEPTIC DESIGN | ENVIRONMENTAL

## Attachment "H"

Office: 31 Old Nashua Road, Suite 2, Amherst, NH 03031

Mailing: PO Box 118, Milford, NH 03055

Phone: 603-673-1441 \* Fax 603-673-1584

[www.MeridianLandServices.com](http://www.MeridianLandServices.com)

LeClair Dr Extension  
Subdivision Application  
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May 13, 2026

Page 11 of 11

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### Acknowledged.

#### 5. Zoning (HR 334)

- e. *Former Fuss & O'Neill Comment: HR 334-36.C. The applicant has included a Conditional Use Permit Application to allow disturbance within the wetland and wetland buffer for the construction of the proposed roadway. We note that the construction of the proposed driveway for the existing home on lot 5 would also impact this area and should be shown on the plan.*  
**Current Fuss & O'Neill Comment:** The applicant has stated that the CUP information has been updated. We note that revised CUP documents were not provided as part of this review to confirm the revisions.

If there are any questions or concerns, please do not hesitate to contact Meridian Land Services, Inc.

Sincerely,

Samuel R. Foisie, P.E.  
Project Manager  
Meridian Land Services, Inc.  
[srfoisie@MeridianLandServices.com](mailto:srfoisie@MeridianLandServices.com)  
(603) 673-1441

Project No.: 12916.01

Cc: Mike Lacasse and James Silverthon with attachments

The following is a summary of some OBSERVATIONS and associated QUESTIONS I have after the Conservation Commission site walk was held on 04-27-2026 for the SB# 01-26 & CUP# 03-26 LeClaire subdivision Map 147/Lot 006 application.

1. General notes

- a. Per the site walk and associated plans, the Existing Grade (EG) uplands for the Map 147/Lot 006 parcel are grassed and noticeably flat. The proposed Finished Grade (FG) of the cul-de-sac roadway will be raised above the EG.

2. Site drainage

- a. **OBSERVATION-DRN:** When viewing stormwater management report tables comparing peak runoff and volume comparisons for exit point OP-3 both have an increase in post over preconditions.
  - i. **QUESTION:** Can the applicant provide the PB with supporting documentation that the existing section of Leclair Drive drainage system can accommodate the increase in stormwater flow and not cause an offsite drainage problem.
  - ii. **QUESTION:** Will the applicant provide the PB with a waiver request for the proposed increase of peak runoff and volume for exit point OP-3.
- b. **OBSERVATION-DRN:** There is NO internal conceptual proposed grading of any lots shown on the sheet P-3 Drainage Plan. I'm always puzzled about the validity of Stormwater Management Report calculations for the developed condition when even minimal conceptual finished grading of lots on subdivision plans is missing. I agree the primary goal of subdivision plans is to establish new lots and that the final as-built foundation can be placed anywhere inside the allowed building setback area. However, without at least some conceptual finished grading, how can the applicant demonstrate with confidence that the stormwater management report developed drainage work sheet layout will even work as modeled in standard Hydro CAD calculations.
  - i. **QUESTION:** Does the Stormwater Management Report also include imperious area quantities beyond cul-de-sac pavement for future individual lot driveways and single-family homes?
- c. **OBSERVATION--DRN:** When reviewing sheet S-5 Roadway Plan and Profile the FG for the roadway is higher along its northern and eastern edges than the EGs shown on the plans. There is a culvert near station 8+80. On sheet P-3 it has a FES-C with an Inv-in = 121.90 to receive stormwater drainage from the developed sub catchment area DV 3S.
  - i. **QUESTION:** Does that culvert meet minimum cover requirements for drainage pipe in Hudson ROWs?
- d. **OBSERVATION-DRN:** Per **HTC 289-20** "LOTs shall be laid out and graded to eliminate flood or stagnant water pools." The raised roadway at approximate station 7+40, which per Developed Drainage worksheet is the outlet for developed sub catchment area DV 2S. Per my understanding at that location, the approximate FG = 124.8 and EG 124.1.

Water flows downhill starting from offsite lots 147-4 and 147-5 for sub catchment area DV 2S. I'm concerned that if new lot 147-6-2 EG is raised obtaining a higher FG for lot development and constructing a foundation and driveway it will block current stormwater runoff from the abutting lots.

- i. **QUESTION:** Will the applicant comment on how does the total Developed Drainage area DV 2S outlet onto the cul-de-sac pavement and finally into CB101 when the FG of the roadway is higher than the lower EG drainage route for the DV 2S sub catchment area at that spot?
3. Proposed foundation elevations
  - a. **OBSERVATION-FNDS:** As mentioned previously, current plans do not propose any proposed FG for the interior of new lots shown on the plans. Per **HTC 289-20.A.(1)** Where a building foundation is less than one foot above finished road grade, suitable mechanical or natural drains shall be installed, subject to approval of the Selectmen.(#4 Editor's Note) The type of construction and size of pipe shall be clearly designated on the final plot plan, as approved by the BOARD. #4 Editor's Note: Approval of the PLANNING BOARD is the requirement for installation of drains.
    - i. **QUESTION:** Will the applicant agree to identify on the plans all lots that will have proposed foundations at an elevation a minimum one foot above finished road grade?
    - ii. **QUESTION:** Will the applicant agree to identify on the plans all lots that the proposed foundation will NOT have an elevation a minimum one foot above finished road grade?
      1. **QUESTION:** Will the applicant agree to add typical details to the plans for installation of foundation drains.
      2. **QUESTION:** Will the applicant agree to update the Stormwater Management Report for any additional type of construction of drainage for foundations not meeting HTC 289-20. A. (1) elevation requirements?
4. Other Items
  - a. **OBSERVATION:** It appears at the previous 04-22-2026 PB meeting the applicant has already noted additional information will be added to the plans.
  - b. **OBSERVATION:** It appears the Hudson Conservation Commission will supply CUP input for the 05-27-2026 PB meeting.

End of additional review comments by Planning Board member Crowley.



# TOWN OF HUDSON

## Planning Board

Timothy Malley, Chairman



12 School Street · Hudson, New Hampshire 03051 · Tel: 603-886-6008 · Fax: 603-594-1142

### CAP FEE WORKSHEET - 2026

Date: 04-13-26 Zone # 1 Map/Lot: 147/006-000

12 Leclair Drive

Project Name: 12 Leclair Drive 7-Lot Subdivision

Proposed ITE Use #1: Single Family Residential Lot

Proposed Building Area (square footage): N/A S.F.

#### CAP FEES: (ONE CHECK NEEDED)

1.	(Bank 09) 2070-701	Traffic Improvements	\$ <u>2,306.00</u>
2.	(Bank 09) 2050-182	Recreation	\$ <u>400.00</u>
3.	(Bank 09) 2080-051	School	\$ <u>3,578.00</u>
		<b>Total CAP Fee</b>	\$ <u>6,230.00</u>

\*\*\* This CAP Fee to be paid prior to issuance of a Certificate of Occupancy. \*\*\*

Check should be made payable to the Town of Hudson.

Thank you,

*Brocke Dubowik*

Town Planner



# TOWN OF HUDSON

## Planning Board

Timothy Malley, Chairman



12 School Street · Hudson, New Hampshire 03051 · Tel: 603-886-6008 · Fax: 603-594-1142

### CAP FEE WORKSHEET - 2026

Date: 05-20-26 Zone # 1 Map/Lot: 147/006-000

12 Leclair Drive

Project Name: 12 Leclair Drive 7-Lot Subdivision

Proposed ITE Use #1: Single Family Duplex (Per Side)

Proposed Building Area (square footage): N/A S.F.

#### CAP FEES: (ONE CHECK NEEDED)

1.	(Bank 09) 2070-701	Traffic Improvements	\$ <u>2,306.00</u>
2.	(Bank 09) 2050-182	Recreation	\$ <u>400.00</u>
3.	(Bank 09) 2080-051	School	\$ <u>3,063.00</u>
		<b>Total CAP Fee</b>	\$ <u>5,769.00</u>

\*\*\* This CAP Fee applies to each unit of the duplex and is to be paid prior to issuance of a Certificate of Occupancy. \*\*\*

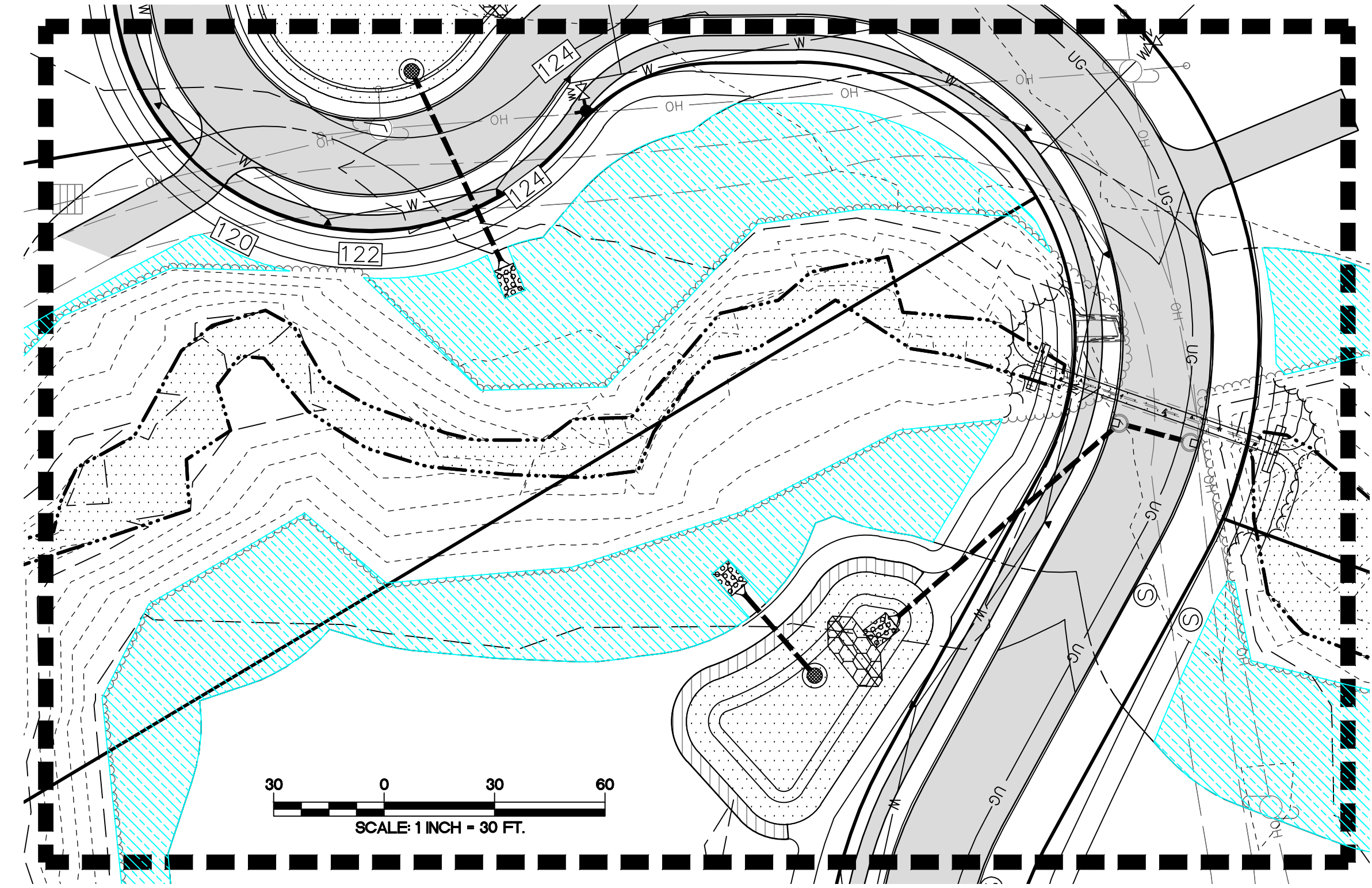
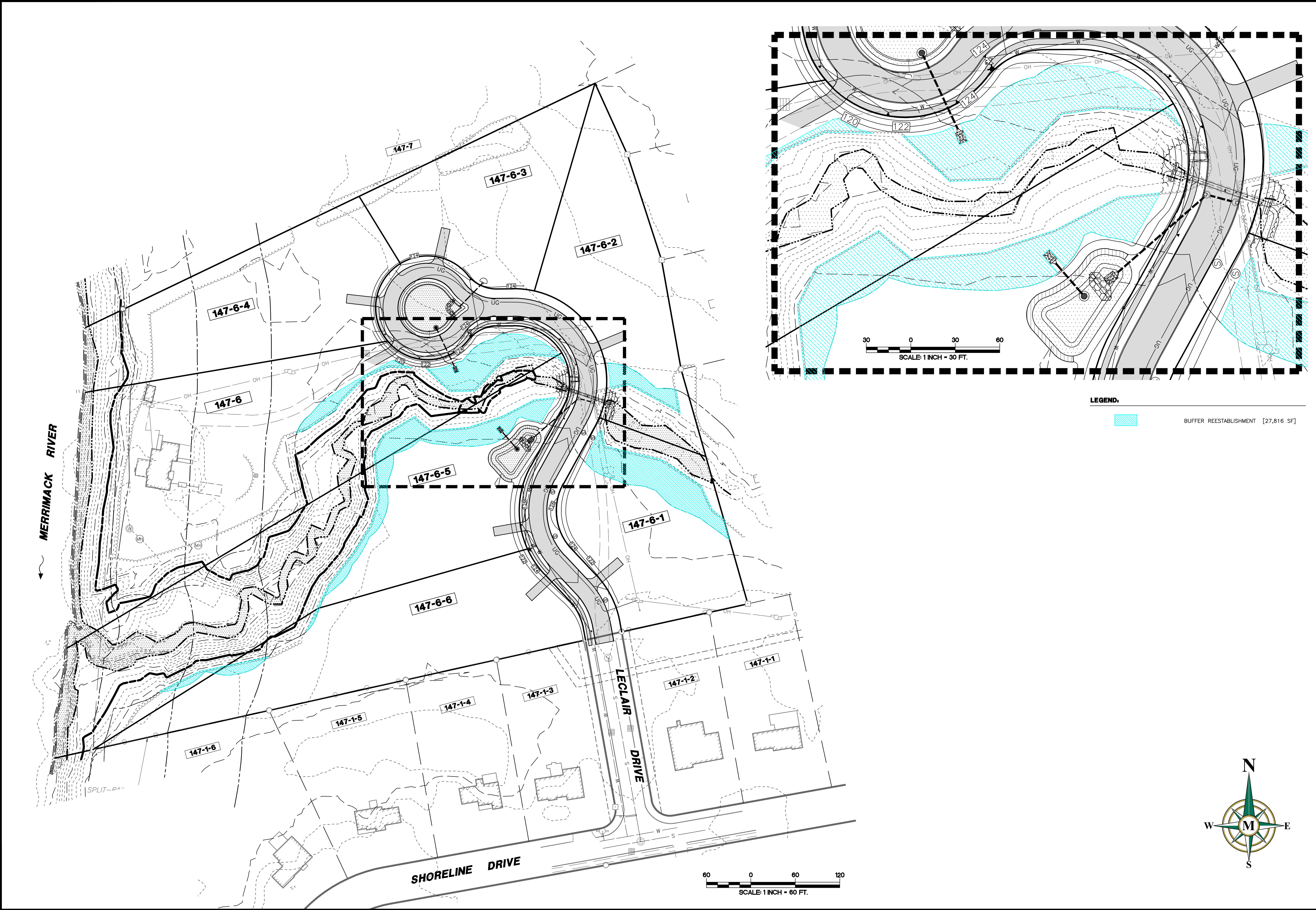
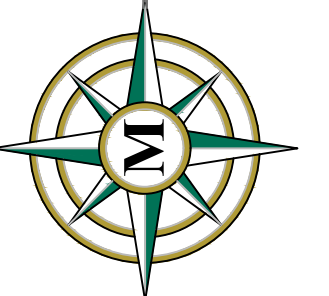
Check should be made payable to the Town of Hudson.

Thank you,

*Brocke Dubowik*

Town Planner





**LEGEND:**  
 BUFFER REESTABLISHMENT [27,816 SF]

REV.	DATE	DESCRIPTION	DR	CK
A				
B				
C				
D				
E				
F				
G				
H				

SUBDIVISION OF  
 TAX MAP 147 LOT 6  
 BUFFER REESTABLISHMENT EXHIBIT

RON LECLAIR  
 12 LECLAIR DRIVE  
 MAP 147 LOT 6  
 HUDSON, NEW HAMPSHIRE

**EX-2**  
 SHEET  
 FILE 12916EX01C.dwg  
 PROJECT 12916.01  
 SHEET NO. 1 OF 1