Town of Brewster Planning Board

2198 Main St., Brewster, MA 02631
brewplan@brewster-ma.gov
(508) 896-3701 x1133

PLANNING BOARD MEETING AGENDA

2198 Main Street
August 9, 2023 at 6:30 PM

This meeting will be conducted in person at the time and location identified above. This means that at least a quorum of the members of the public body will attend the meeting in person and members of the public are welcome to attend in person as well. **As a courtesy only, access to the meeting is also being provided via remote means in accordance with applicable law. Please note that while an option for remote attendance and/or participation is being provided as a courtesy to the public, the meeting/hearing will not be suspended or terminated if technological problems interrupt the virtual broadcast or affect remote attendance or participation, unless otherwise required by law.** Members of the public with particular interest in any specific item on this agenda, which includes an applicant and its representatives, should make plans for in-person vs. virtual attendance accordingly.

Members of the public who wish to access the meeting may do so in the following manner:

Phone: Call (312) 626 6799 or (301) 715-8592. Webinar ID: 841 0778 1002. Passcode: 612505.
To request to speak: Press *9 and wait to be recognized.
Zoom Webinar: https://us02web.zoom.us/j/84107781002?pwd=VTVSV1ExaUNCL253NmNZV21Gdmo4dz09
Passcode: 612505.
To request to speak: Tap Zoom "Raise Hand", then wait to be recognized.

When required by law or allowed by the Chair, persons wishing to provide public comment or otherwise participate in the meeting, may do so by accessing the meeting remotely, as noted above. Additionally, the meeting will be broadcast live, in real time, via ***Live broadcast*** (Brewster Government TV Channel 18), ***Livestream*** (livestream.brewster-ma.gov), or ***Video recording*** (tv.brewster-ma.gov).

The Planning Board packet can be found on the Calendar on the Town of Brewster website (www.brewster-ma.gov). Please note that the Planning Board may take official action, including votes, on any item on this agenda.

1. Call to Order.
2. Declaration of a Quorum.
3. Meeting Participation Statement.
4. Recording Statement. As required by the Open Meeting Law we are informing you that the Town will be video and audio taping as well as broadcasting this public meeting. In addition, if anyone else intends to either video or audio tape this meeting they are required to inform the Chair.
5. Public Announcements and Comment. Members of the public may address the Planning Board on matters not on the meeting's agenda for a maximum of 3-5 minutes at the Chair's discretion. The Planning Board will not reply to statements made or answer questions raised during public comment but may add items presented to a future agenda.
6. **Major Stormwater Management Permit, Case No. 2023-35:** Applicant/Owner: Reiss Wolf and Dana Levy through their representative Baxter Nye Engineering & Surveying has submitted a major stormwater permit application for property located at 50 Fisherman's Landing Road, formerly known as 0 Jolly's Crossing Road, and shown on Tax Map 62, Parcel 29, pursuant to Brewster Town Code Chapter 272 and its accompanying Regulations. The Planning Board will consider and potentially vote whether to approve the major stormwater permit, as well as any waivers from said Regulations deemed necessary and applicable.
7. Continued review and discussion on the Accessory Dwelling Unit (ADU) provisions of the zoning bylaw including review and discussion of potential amendments.
8. Approval of Meeting Minutes: July 26, 2023.
9. Committee Reports.
10. For Your Information.

Planning Board

Amanda Bebrin
Chair

Alexander
Wentworth
Vice Chair

Robert Michaels
Clerk

Charlotte Degen

Madalyn Hillis-
Dineen

Antone Freitas

Elizabeth Taylor

Town Planner
Jonathon Idman

Senior Department Assistant
Lynn St. Cyr

11. Matters Not Reasonably Anticipated by the Chair.
12. Next Meetings: August 23, 2023 and September 13, 2023.
13. Adjournment.

Date Posted:	**Date Revised:**	**Received by Town Clerk:**
08/03/23		

BREWSTER TOWN CLERK
'23 AUG 3 9:16AM

MAJOR STORMWATER MANAGEMENT PERMIT
CASE NO. 2023-35

APPLICANT/OWNER: REISS WOLF AND DANA LEVY

PROPERTY: 50 FISHERMANS LANDING ROAD
FKA 0 JOLLYS CROSSING ROAD

Town of Brewster

2198 Main Street
Brewster, MA 02631-1898
Phone: (508) 896-3701 x. 1133

Office of:
Planning Board
Planning Dept.

STAFF REPORT

TO: Planning Board
FROM: Jon Idman, Town Planner
RE: Major Stormwater Permit SWMP23-35
50 Fisherman's Landing Road fka 0 Jolly's Crossing (Map 62 Parcel 29)
Applicant: Wolf/ Levy
c/o Matt Eddy, P.E., Baxter Nye Engineering & Surveying
DATE: July 26, 2023

Recommendation
The stormwater permit application meets the applicable performance standards and submission requirements set out in the town's Stormwater Management Regulations for issuance and approval of a Major Stormwater Permit.

Approval should be granted subject to the continuing obligations set out in said Regulations, including Sections 5.7, 5.8, 5.9 (Certificates of Compliance), 6.1B (Construction practices), Section 7.2 (Inspections), 8.3 (Recording of stormwater permit and O&M plan) and 8.5 therein.

Major Stormwater Management Permit
The underlying project is the development of a currently undeveloped/ wooded lot for single family residential use: a new home, gravel driveway, swimming pool and sports court.

The project triggers a Major Stormwater Permit according to Chapter 272 of the Brewster Code (Stormwater Management Bylaw) and Section 4 of the Bylaw's supporting regulations, as the project involves net new impervious surface of 2500 sq ft or greater. Major Stormwater Permits are subject to review at a public meeting, including for any waivers requested. No waivers have been requested or identified as necessary. No portion of the project is located in a special flood hazard area or wetland resource areas. The property is not located in a Zone II or the DCPC. Because the project is not subject to wetlands jurisdiction, the Planning Board is the stormwater permitting authority.

The Applicant has provided the required application materials for a Major Stormwater Permit as set out in Appendix B of the Stormwater Management Regulations, including a site plan set (dated 7/14/23) and Stormwater Management Report, including HydroCad analysis of pre- and post-development conditions (dated 7/14/23).

The Applicant has provided construction-period BMPs consistent with the performance standards for Major Stormwater Permits set out in Section 6.1B of the Stormwater Management Regulations. The site plan set contains the specific details of the proposed erosion and sedimentation controls.

The post-construction stormwater management system is consistent with the Major Stormwater Permits performance standards for new construction set out in Section 6.2B of the Stormwater Management Regulations, addressing BMPs and management for both stormwater quantity and quality:

- The system meets the applicable standards in the Massachusetts Stormwater Handbook.

- The system will not increase off-site flooding and does not increase peak run-off rates over existing conditions including for the 100 yr. storm.
- The system will recharge all run-off from the development on-site, preserving existing recharge volume/ capacity on-site requir4ed for development of the project.
- The Applicant has provided a corresponding Operations and Maintenance Plan, which adequately addresses the long-term maintenance of the post-construction BMPs.
- The Applicant considered Low Impact Development-type (LID) stormwater design elements and incorporated them into the system design. The system includes a number of vegetated swales and channels, and uses existing natural depressions on the site for treatment and infiltration basins. Run-off from roof areas will be conveyed directly through gutters, downspouts and piping to an infiltration basin. Other impervious areas or landscape areas will conveyed to swales and depressions through channels for collection, treatment and recharge. Some of the infiltration basins also have small subsurface infiltration chambers underneath them to address resident ponding time and further treat stormwater quality. Native seed will be used to revegetate swales and basins, as necessary and applicable. The system also include a stone check dams as part of the conveyance path to slow velocities and provide pre-treatment prior to collection in basins.
- In addition to the MA handbook stormwater standards, the system meets the TSS and Total Phosphorus treatment requirements (TSS) set out in the Brewster Regulations, through pretreatment and the water quality volume/ holding capacity of the infiltration facilities. There is also associated Nitrogen treatment assumed with system performance.
- The system treats the 'first flush' (first inch) of run-off.
- The Applicant's soil tests on the property, and NRCS mapping, have revealed well-draining soils.
- Test pits suggest that there is significant separation between stormwater infiltration facilities and the groundwater table.

Town of Brewster
Code Chapter 272
Stormwater Management Permit Application Form

FOR TOWN OFFICIAL USE ONLY

TOWN CLERK RECEIVED:

SWM PERMIT NUMBER ASSIGNED:

SWMP2023-35

1. Project Location:

50 Fishermans Landing Road (aka 0 Jolly's Crossing Road)

Street Address

Map 62 Parcel 29

Assessors Map and Parcel(s)

Bk 35546 Page 111

Deed Reference

2. Applicant:

Reiss Wolf and Dana Levy

Name

747 S 7th Street Philadelphia, PA 19147

Legal Mailing Address

215 200 8664

Phone Number

reissclausonwolf@gmail.com

Email Address

3. Property Owner (if different than Applicant):

Name

Legal Mailing Address

Phone Number

Email Address

4. Professional Representative:

Baxter Nye Engineering & Surveying - Matthew Eddy, P.E.

Name

1597 Falmouth Road - Suite 1, Centerville, MA 02632

Legal Mailing Address

508-771-7502

Phone Number

meddy@baxter-nye.com

Email Address

5. Type of Application (Check as applicable):

_____ **Minor Stormwater Permit-** Any combination or series of construction or land disturbance activities that, over a two-year period, will result in a net increase in impervious area of 500 sq.ft. to 2,500 sq.ft. and/or will result in land disturbances of 10,000 sq.ft. to 20,000 sq.ft.

X
_____ **Major Stormwater Permit-** Any alteration, disturbance, development, or redevelopment that does not meet the eligibility criteria for a Minor Stormwater Permit.

_____ **SWM Permit Amendment-**
List existing Stormwater Management permit number/ type _____.

_____ **Stormwater Management Certificate of Compliance (SMCC) Request-**
List relevant Stormwater Management permit number _____.

6. Brief Project Description, including any waiver requests:

Single family detached home construction with proposed pool and tennis court on an approximate 6 acre parcel.

7. Signatures:

Applicant	Date 07/12/2023
Property Owner (if different than Applicant)	Date
Professional Representative (as applicable)	Date 7/14/23

NOTES:

- *Please refer to Appendix B of the Stormwater Management Regulations for detailed application submittal and supporting material requirements for Minor and Major Stormwater Management Permits, respectively.*
- *The application fee schedule is contained in Appendix C of the Regulations.*
- *Certain activities are exempt from review and permitting (See §272-6 of the Stormwater Management Bylaw).*
- *If the project is located, in whole or part, within an area subject to state or local wetlands protection law, the review and permitting authority is the Brewster Conservation Commission/ Conservation Department.*
- *No permit review shall occur nor shall review periods commence until the application is deemed complete.*

CONSTRUCTION SEQUENCE

1. INSTALL WATTLES/SILT FENCING TO ESTABLISH THE LIMIT OF WORK AROUND THE PERIMETER OF THE PROJECT AND ANY AREAS WHICH HAVE GROUND DISTURBANCE BASED ON THE PROJECT WORK AND CONTRACTORS STAGING AREAS. SILT FENCE SHALL BE INSTALLED TO PREVENT TRANSPORT OF SEDIMENT OUTSIDE OF THE PROJECT AREA. SILT FENCE MAY BE REQUIRED BEYOND WHAT IS SHOWN ON THE PLANS SO AS TO PROVIDE THE NECESSARY PROTECTION.

2. CONSTRUCT TEMPORARY CONSTRUCTION ENTRANCE/EXIT AREAS WHERE EVER CONSTRUCTION TRAFFIC ENTERS OR EXITS THE PROJECT AREA.

3. DISCHARGES FROM DEWATERING OF EXCAVATIONS SHALL NOT BE DIVERTED DIRECTLY INTO ANY WETLANDS OR EXISTING STORM DRAINS WITHOUT PRETREATMENT VIA SETTLING BASINS.

4. INSTALL HAYBALE CHECK DAMS ALONG CENTER OF SWALES AT 100' O.C., AS NECESSARY.

5. CLEAR AND GRUB SITE WITHIN THE LIMIT OF WORK.

6. ESTABLISH ROUGH SUBGRADES FOR SITE.

7. PERFORM BUILDING, UTILITY AND SITE CONSTRUCTION.

8. IN ORDER TO PRESERVE THE INFILTRATION RATE OF THE SOIL IN THE SWM BASINS, BASINS SHALL BE PROTECTED FROM TRAFFIC AND SEDIMENT DURING CONSTRUCTION. PROVIDE SILT FENCE AROUND INFILTRATION AREAS TO PROVIDE PROTECTION. IF BASINS ARE USED AS SEDIMENT BASINS DURING CONSTRUCTION, THE BASIN GROUND ELEVATION SHALL BE KEPT ONE FOOT ABOVE THE FINAL ELEVATION. THESE BASINS SHALL THEN BE CLEANED, EXCAVATED, AND CONSTTRUCTED TO FINAL ELEVATIONS UPON COMPLETION OF THE CONSTRUCTION PROJECT.

9. INSPECT AND MAINTAIN EROSION CONTROL MEASURES AFTER RAINFALL EVENTS AND A MINIMUM OF ONCE PER WEEK.

10. REMOVE SEDIMENT BUILDUP AT EROSION CONTROL DEVICES AS NEEDED. REDISTRIBUTE MATERIAL OVER SITE IN CONFORMANCE WITH EARTHWORK SPECIFICATIONS.

11. ONCE ALL DRAINAGE STRUCTURES ARE INSTALLED, INSTALL SILT SACKS, OR FILTER FABRIC AND STONE OR HAYBALES AROUND ALL NEW STRUCTURES AND MAINTAIN THEM UNTIL GROUND IS STABILIZED AND VEGETATION IS ESTABLISHED. ALL OUTFALLS SHALL BE STABILIZED WITH STONE PROTECTION AS REQUIRED.

12. ALL CUT AND FILL SLOPES SHALL BE TEMPORARILY STABILIZED WITH TOP SOIL, SEED AND MULCH OR CURLEX AS REQUIRED IF CONSTRUCTION ACTIVITY CEASES ON SAID SLOPES FOR A PERIOD OF 14 DAYS OR GREATER. ALL SLOPES SHALL BE PERMANENTLY STABILIZED AS REQUIRED IMMEDIATELY UPON COMPLETION OF FINAL GRADING.

13. COMPLETE FINISH GRADING AND STABILIZATION OF SITE.

14. REMOVE SEDIMENT FROM ALL DRAINAGE STRUCTURES, LEACH BASINS, AND PIPES AFTER COMPLETION OF CONSTRUCTION. REMOVE AND REGRADE TEMPORARY BERMS, SWALES, CHECK DAMS, ETC. STABILIZE DISTURBED AREAS.

15. CLEAN OUT ALL SEDIMENT FROM SWM BASIN AND OUTLET STRUCTURES. REGRADE TO CONTOURS PER DESIGN. STABILIZE ALL SLOPES AS REQUIRED. REPLACE AND/OR CLEAN FILTER FABRIC AND STONE AT SWM FOREBAYS. ALL AREAS CONTRIBUTING RUNOFF TO THE PROPOSED INFILTRATION DEVICES/BASINS SHALL BE STABILIZED PRIOR TO THE REMOVAL OF SEDIMENT AND EROSION CONTROL DEVICES PROTECTING THESE INFILTRATION AREAS.

16. UPON ESTABLISHMENT OF PERMANENT GROUND COVER AND APPROVAL BY THE ENGINEER, REMOVE WATTLES & SILT FENCE. STABILIZE ALL AREAS WHERE EROSION CONROL BARRIERS WERE REMOVED.

OPERATION/MAINTENANCE PLAN

1. THIS OPERATION AND MAINTENANCE PLAN SHALL BE PERFORMED BY THE GENERAL CONTRACTOR DURING CONSTRUCTION OPERATIONS AND BY THE OWNER ONCE THE FACILITIES ARE COMPLETED AND PUT INTO OPERATION:

2. PERSONNEL ASSOCIATED WITH THE CONSTRUCTION OF THIS PROJECT SHALL BE INFORMED THAT THE MAINTENANCE OF SILTATION CONTROLS TAKES PRECEDENCE OVER NORMAL CONSTRUCTION ACTIVITIES. ADJACENT PROPERTIES AND STREETS SHALL BE PROTECTED FROM EROSION OR SILTATION CONDITIONS.

3. INSPECTION AND MAINTENANCE, AS OUTLINED HEREIN, SHALL BE PERFORMED WEEKLY AND AFTER RAINFALL EVENTS DURING CONSTRUCTION. THENCE, INSPECTIONS AND MAINTENANCE SHALL BE CONDUCTED ON A SEMIANNUAL BASIS (2 TIMES A YR.) AND AFTER ALL LARGE STORMS. AN INSPECTION REPORT SHALL BE MAINTAINED.

4. ACCUMULATED DEBRIS IN CATCH BASINS, SEDIMENT FOREBAYS AND LEACHING BASINS SHALL BE REMOVED BEFORE IT EXCEEDS 12 INCHES IN DEPTH AND DISPOSED OF PROPERLY.

5. A VISUAL INSPECTION SHALL BE MADE AT ALL ACCESS MANHOLES, CATCH BASINS, LEACHING BASINS, PIPES AND DRAINAGE CHANNELS FOR THE ENTIRE STORM DRAINAGE SYSTEM. THE GENERAL CONDITION OF THESE STRUCTURES SHOULD BE REVIEWED AND ACCUMULATED DEBRIS SHALL BE REMOVED. THE CONDITION OF ALL OUTLETS SHALL BE NOTED AND A DESCRIPTION OF THE DRAINAGE STRUCTURES SHALL BE INCLUDED IN THE REPORT. DELETERIOUS MATERIALS SHALL BE REMOVED FROM THESE STRUCTURES AND THE DRAINAGE CHANNELS IN ORDER FOR THE SYSTEM TO FUNCTION PROPERLY.

6. ALL OUTLETS, DRAINING CHANNELS, AND SLOPES SHALL BE KEPT STABILIZED. ANY EROSION SHALL BE REPAIRED IMMEDIATELY.

7. ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE SWM BASINS BEFORE IT EXCEEDS 1' IN DEPTH, OR AT LEAST ONCE EVERY 5 YEARS. ALL DEBRIS OR DELETERIOUS MATERIAL SHALL BE REMOVED FROM OUTLET STRUCTURES. BASIN SLOPES SHALL BE MAINTAINED WITH A GRASS STAND OF AT LEAST 3". GRASS SHALL BE MOWED AT LEAST TWICE A YEAR AND CLIPPINGS SHALL NOT BE LEFT IN BASIN. ANY TREES OR OTHER WOODY VEGETATION GROWING IN EMBANKMENTS OR NEAR SWM STRUCTURES SHALL BE REMOVED.

8. THE FOLLOWING MINIMUM INFORMATION SHALL BE RECORDED:
   - DATE OF INSPECTION
   - GENERAL CONDITION OF THE ENTIRE SYSTEM
   - CORRECTIVE MAINTENANCE ACTIONS TAKEN TO ENSURE ADEQUATE FUNCTION AND WHEN PERFORMED.
   - A COPY OF THESE INSPECTION REPORTS SHALL BE FURNISHED TO THE PLANNING DEPTARTMENT UPON REQUEST.

9. MAINTENANCE OF THE STORMWATER MANAGEMENT FACILITY SHALL BE IN ACCORDANCE WITH THE EXECUTED INSPECTION AND MAINTENANCE AGREEMENT FOR PRIVATE STORMWATER MANAGEMENT FACILITIES AND SHALL BE THE RESPONSIBILITY OF THE OWNER AND THE ASSIGNEES. SEE SEPARATELY ATTACHED OPERATION AND MAINTENANCE DOCUMENT FOR THIS PROJECT.

GRADING AND DRAINAGE NOTES:

1. CAUTION: THE CONTRACTOR SHALL CONTACT DIG SAFE (AT 1-888-DIG-SAFE) AND UTILITY COMPANIES TO LOCATE ALL EXISTING UTILITIES, AT LEAST 72 HOURS PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION, BOTH HORIZONTALLY AND VERTICALLY, OF ALL EXISTING UTILITIES BEFORE THE START OF ANY WORK. THE LOCATION OF EXISTING UNDERGROUND SYSTEMS, INFRASTRUCTURE, UTILITIES, CONDUITS AND LINES ARE SHOWN IN AN APPROXIMATE WAY ONLY, MAY NOT BE LIMITED TO THOSE SHOWN HEREIN AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER, THE ENGINEER, OR ITS REPRESENTATIVE. THE CONTRACTOR AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO LOCATE SAID SYSTEMS, INFRASTRUCTURE AND UTILITIES EXACTLY. IF ELEVATION INFORMATION DIFFERS FROM PLAN INFORMATION, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY FOR POSSIBLE REDESIGN. AT UTILITY CROSSINGS, VERIFY IN FIELD THE LOCATION AND INVERTS OF WATER, ELECTRIC, GAS, TELEPHONE & DATA/COMM AND RELOCATE IF CONFLICTING WITH PROPOSED INVERTS PER THE ENGINEERS DIRECTION. THE CONTRACTOR SHALL PRESERVE ALL UNDERGROUND SYSTEMS, INFRASTRUCTURE AND UTILITIES AS REQUIRED.

2. DEBRIS, STUMPS, EXCESS, AND UNSUITABLE MATERIALS FROM THE CLEARING & DEMOLITION OPERATIONS SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL MANNER BY THE CONTRACTOR

3. DISTURBED AREAS SHALL BE PROTECTED AT ALL TIMES TO CONTROL SEDIMENT TRANSPORT BEYOND THE LIMIT OF WORK.

4. DISTURBED AREAS SHALL BE TREATED WITH WATER DURING EXCAVATION, OR APPROVED ALTERNATIVE, TO CONTROL THE DUST.

5. THE SITE SUBCONTRACTOR SHALL PROVIDE ALL EXCAVATION, BACKFILL AND COMPACTION NECESSARY TO ACHIEVE THE FINISH GRADES SHOWN ON THE PLANS AND FOR INSTALLATION OF BUILDING STRUCTURES, STORMWATER MANAGEMENT AND ALL UTILITIES.

6. ALL PIPE OUTFALLS, CURB OPENINGS, STONE WEIRS, CHECK DAMS, AND OTHER DRAINAGE OVERFLOW AND OUTLET AREAS SHALL HAVE RIPRAP EXTENDED FROM THE OUTLET TO THE BOTTOM OF SLOPE WITH A MINIMUM 10 FT x 10 FT RIPRAP LEVEL SPREADER, UNLESS OTHERWISE SPECIFICALLY DETAILED. ALL STONE OUTFALLS SHALL BE PROPERLY SHAPED SO THE RUNOFF IS CONTAINED WITH THE STONE LINING. SEE TYPICAL DETAILS FOR ADDITIONAL INFORMATION.

7. ALL DISTURBED AREAS NOT OTHERWISE TREATED SHALL BE STABILIZED WITH 4" LOAM, SEED, & MULCH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR AREAS UNTIL VEGETATION HAS BEEN PERMANENTLY ESTABLISHED. SLOPES IN EXCESS OF 3:1 AND AREAS THAT SHOW SIGNS OF EROSION FROM CONCENTRATED FLOWS SHALL BE FURTHER STABILIZED WITH EROSION CONTROL BLANKETS (ECB) OF CURLEX DOUBLE NET – CURLEX II .98 BY AMERICAN EXCELSIOR COMPANY OR EQUAL. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE REQUIRED ECB'S AND PROPERLY STABILIZE ALL AREAS OF THE SITE.

8. ALL DRAINAGE STRUCTURES AND PIPING SHALL BE DESIGNED/INSTALLED FOR H-20 LOADING.

9. A 25' MINIMUM SEPARATION SHALL BE MAINTAINED BETWEEN ALL STORMWATER MANAGEMENT INFILTRATION FACILITIES AND SANITARY SEWER/SEPTIC DISPOSAL AREAS. 10 FEET MINIMUM SEPARATION SHALL BE MAINTAINED BETWEEN ALL STORMWATER MANAGEMENT INFILTRATION FACILITIES AND SANITARY SEWER/SEPTIC LINES, MANHOLES AND TANKS.

10. FOR STORMWATER MANAGEMENT FACILITIES, THE CONTRACTOR SHALL VERIFY IN FIELD, WITH ENGINEER PRESENT, SOIL INFILTRATION RATE AND GROUNDWATER ELEVATION PRIOR TO ORDERING OF MATERIALS OR COMMENCEMENT OF CONSTRUCTION (ASSUMED 2.41 INCHES/HR. INFILTRATION RATE). IF RATE VARIES FROM ASSUMPTION OR GROUNDWATER IS PRESENT, SYSTEM MAY HAVE TO BE REDESIGNED AS DETERMINED BY THE ENGINEER. ANY MATERIALS ORDERED OR CONSTRUCTION COMMENCED PRIOR TO THIS OCCURRING IS AT THE CONTRACTORS OWN RISK. UNSUITABLE MATERIALS ENCOUNTERED ADJACENT TO SOIL INFILTRATION LAYERS SHALL BE REMOVED FOR 5 FT AROUND THE SWM INFILTRATION FACILITIES AND REPLACED WITH SAND BORROW PER MHD M.1.04.0 TYPE B.

11. CPP – HIGH DENSITY POLYETHYLENE CORRUGATED PIPE WITH SMOOTH INTERIOR WALL TO MEET ADS N-12 PIPE SPECIFICATION OR EQUAL. CPP PIPE USE SHALL BE ALLOWED AS NOTED, WITH A DIAMETER UP TO AND INCLUDING 24". BACK FILLING CPP MUST FOLLOW MANUFACTURER'S RECOMMENDATIONS AND SPECIAL CARE MUST BE EXERCISED (SEE ADS PRODUCT NOTE 3.115).

12. ALL ROOF DOWNSPOUTS SHALL BE TIED INTO ROOF DRAINS. REFER TO ARCHITECTURAL PLANS FOR ALL LOCATIONS OF DOWNSPOUTS. CONTRACTOR SHALL PROVIDE TIE-INS TO ALL DOWNSPOUT LOCATIONS. ROOF DRAINS TO BE AT LEAST 4" CPP AT 1.00% SLOPE MINIMUM, UNLESS OTHERWISE NOTED ON THE PLAN. MINIMUM TYPICAL COVER SHALL BE 2 FEET, U.O.N.

13. ALL GRADING WORK SHALL BE DONE IN A WORKMANLIKE MANNER ACCOMPLISHED TO CREATE POSITIVE DRAINAGE AND ELIMINATE ANY PUDDLING OR PONDING. WHERE NOT OTHERWISE NOTED OR DEFINED ON THE PLAN, ALL CUT AND FILL SHALL BE BLENDED TO DAYLIGHT AT EXISTING GRADE WITH A 3:1 SLOPE.

14. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WITH ANY DRAINAGE ISSUES OR QUESTIONS PRIOR TO PERFORMING THE FINISH GRADING WORK.

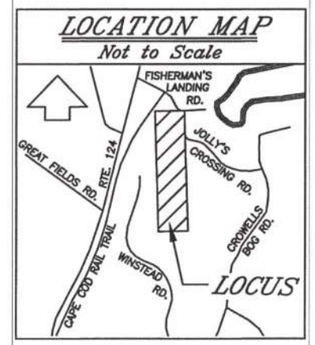
15. STORMWATER MANAGEMENT FACILITIES SHALL BE PROTECTED FROM SEDIMENT AND SILTATION AT ALL TIMES. JUST PRIOR TO COMPLETION, THE SITE SUBCONTRACTOR SHALL PERFORM A FINAL INSPECTION AND CLEANING OF THE STORM WATER MANAGEMENT SYSTEM. ALL SEDIMENT AND SILTATION SHALL BE REMOVED FROM THE BASINS, FOREBAYS, ETC. AND THESE AREAS SHALL BE SHAPED TO FINAL CONTOURS AND ELEVATION PER THE PLANS. ALL REPAIRS SHALL BE MADE AS NECESSARY TO THE SATISFACTION OF THE ENGINEER PRIOR TO PLACING FINAL TOPSOIL, MULCH, VEGETATION, SEEDING, ETC.

16. ANY DEWATERING OPERATION WHEN REQUIRED AS PART OF THE CONSTRUCTION PROCESS SHALL ENSURE ALL DEWATERING OCCURS THROUGH A PROPER DEWATERING BASIN (STONE, FILTER FABRIC AND HAYBALES OR OTHER ACCEPTABLE MEANS) PRIOR TO DISCHARGE FROM THE SITE.

17. ALL WORK WITHIN THESE PLANS SHALL BE PERFORMED AND PROVIDED BY THE CONTRACTOR IN ACCORDANCE WITH THE CONSTRUCTION DETAILS PROVIDED IN THIS PLAN SET WHETHER OR NOT THE DETAIL NUMBER IS SPECIFICALLY REFERENCED.

LOCATION MAP

Not to Scale



GENERAL NOTES:

1. *THE INTENT OF THIS PLAN IS TO DETAIL ONLY PROPOSED STORMWATER MANAGEMENT FEATURES AT LOCUS.*
2. *SEE "SITE PLAN FOR PROPOSED DWELLING", SHEETS 1 AND 2, DATED APRIL 26, 2023, BY RYDER & WILCOX, INC. FOR SEPTIC SYSTEM, SOILS, AND SITE DESIGN INFORMATION.*

TEST HOLE DATA

DATE OF TEST HOLES: 9/20/2022
NO WATER ENCOUNTERED
INSP. BY: D. QUINN (R&W), SHERRIE McCULLOUGH (HEALTH DEPT)

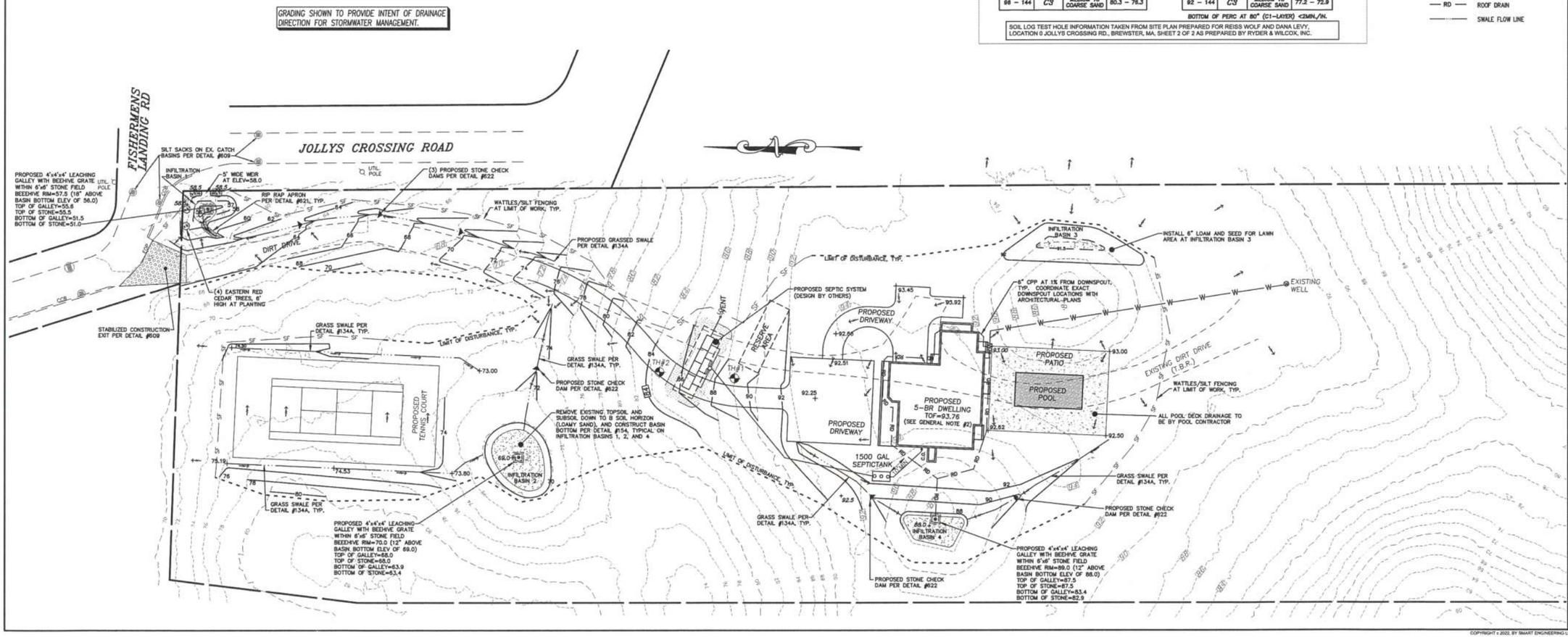
No.1			
DEPTH (IN.)	SOIL HORIZON	SOIL TEXTURE	ELEVATION (FT.)
0 – 6	O	FIBRIC	88.3 – 87.8
6 – 16	A	LOAMY SAND	87.8 – 87.0
16 – 32	B	LOAMY SAND	87.0 – 85.8
32 – 84	C1	MEDIUM TO COARSE SAND	85.8 – 81.3
84 – 96	C2	FINE SANDY LOAM	81.3 – 80.3
96 – 144	C3	MEDIUM TO COARSE SAND	80.3 – 78.3

No.2			
DEPTH (IN.)	SOIL HORIZON	SOIL TEXTURE	ELEVATION (FT.)
0 – 3	O	FIBRIC	84.9 – 84.7
3 – 8	A	LOAMY SAND	84.7 – 84.2
8 – 34	B	LOAMY SAND	84.2 – 82.1
34 – 84	C1	MEDIUM TO COARSE SAND	82.1 – 77.9
84 – 92	C2	FINE SANDY LOAM	77.9 – 77.2
92 – 144	C3	MEDIUM TO COARSE SAND	77.2 – 72.9

BOTTOM OF PERC AT 80" (C1-LAYER) <2MIN./IN.

SOIL LOG TEST HOLE INFORMATION TAKEN FROM SITE PLAN PREPARED FOR REISS WOLF AND DANA LEVY, LOCATION 0 JOLLYS CROSSING RD., BREWSTER, MA, SHEET 2 OF 2 AS PREPARED BY RYDER & WILCOX, INC.

GRADING SHOWN TO PROVIDE INTENT OF DRAINAGE DIRECTION FOR STORMWATER MANAGEMENT.



LEGEND

- DRAINAGE FLOW DIRECTION
- TYP. TYPICAL
- MINOR CONTOUR
- PROPOSED CONTOUR
- RD ROOF DRAIN
- SWALE FLOW LINE

BAXTER NYE
ENGINEERING & SURVEYING

BAXTER NYE ENGINEERING & SURVEYING

Registered Professional Engineers and Land Surveyors

1597 Falmouth Road – Unit 1
Centerville, Massachusetts 02632

Phone: (508) 771-7502
Fax: (508) 771-7622
www.baxter-nye.com

STAMP STAMP

COMMONWEALTH OF MASSACHUSETTS
MATTHEW W. EDDY
CIVIL
No. 43183
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT

CONSULTANT

PREPARED FOR:

Reiss Wolf and Dana Levy
747 South 7th Street
Philadelphia, PA 19147

PROJECT TITLE

Site Development
50 Fishermans Landing Road
(aka 0 Jollys Crossing Road)
Brewster, MA 02631

DATE	DESCRIPTION

SHEET TITLE

Stormwater Management Plan

SHEET NO

C1.0

DATE: JULY 14, 2023

30 0 30 60
SCALE IN FEET
SCALE: 1"=30'

DRAWN BY: JKL CHECKED BY: MWE

JOB NO: 2023-108 FILE: 2023-108 GD.dwg

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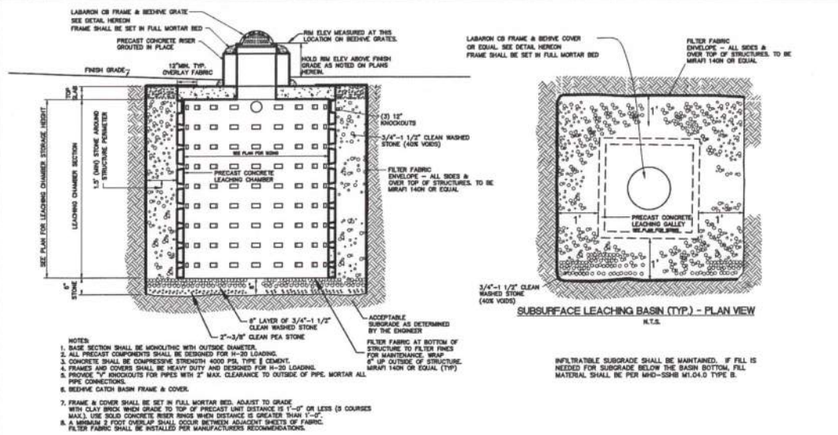


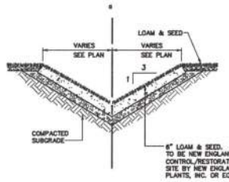
C-140-0 SUBSURFACE LEACHING GALLEY N.T.S.

DETAIL

SUBSURFACE LEACHING BASIN (TYP.) - PLAN VIEW

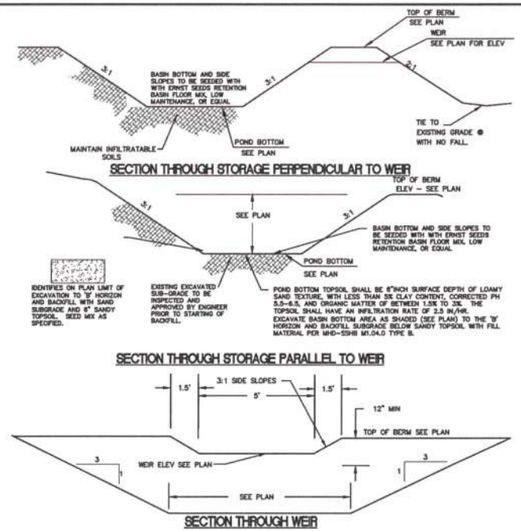
N.T.S.

INFILTRATABLE SUBGRADE SHALL BE MAINTAINED. IF FILL IS NEEDED FOR SUBGRADE BELOW THE BASIN BOTTOM, FILL MATERIAL SHALL BE PER MHD-SSH® M1.04.0 TYPE B.



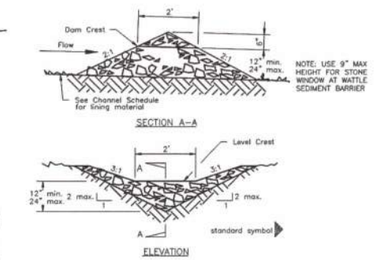
C-134A GRASS SWALE N.T.S.

DETAIL



C-154 INFILTRATION BASIN SECTIONS N.T.S.

DETAIL



SPECIFICATIONS

1. The stone shall be crushed stone which meets AASHTO designation M43 size No. 2 or 24 OR EQUIVALENT.

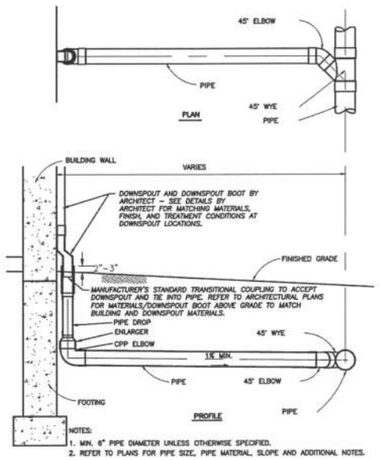
2. The crest of the check dam shall be six inches lower than the outer edges, with a maximum crest height of 24 inches and a minimum of 12 inches.

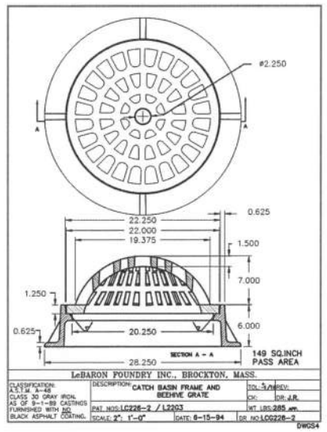
3. The minimum structure length shall be 5 feet.

4. All accumulated sediment shall be removed when its depth equals one-half of the original height of the structure.

C-622 STONE CHECK DAM N.T.S.

DETAIL





C-132 ROOF DRAIN N.T.S.

DETAIL

CONSTRUCTION INSPECTIONS/TESTING:

1. CONTRACTOR IS RESPONSIBLE TO COORDINATE WITH THE ENGINEER ON ALL NECESSARY INSPECTIONS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AT LEAST TWO (2) BUSINESS DAYS AHEAD OF REQUIRED INSPECTIONS.

2. AT A MINIMUM, THE FOLLOWING INSPECTIONS/TESTING WILL BE REQUIRED. IF ISSUES ARISE DURING CONSTRUCTION THE CONTRACTOR SHALL NOTIFY THE ENGINEER AS ADDITIONAL INSPECTIONS BEYOND WHAT IS NOTED MAY BE NEEDED.

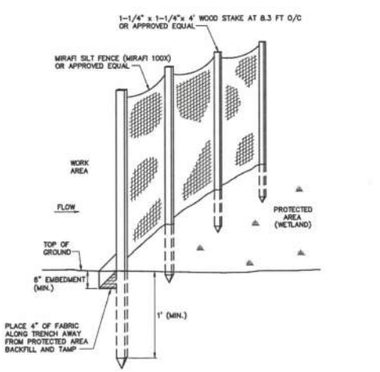
A. INSTALLATION OF SEDIMENT AND EROSION CONTROLS AT LIMIT OF WORK PRIOR TO COMMENCING CONSTRUCTION.

B. DRAINAGE AND STORMWATER MANAGEMENT:
- BOTTOM OF EXCAVATION FOR EACH STORMWATER MANAGEMENT (SWM) FACILITY.
- DURING INSTALLATION OF STRUCTURES/CHAMBERS TO SEE A CROSS SECTION VIEW OF INSTALLATION
- AT COMPLETION OF INSTALLATION OF EACH SWM FACILITY PRIOR TO BACKFILL.
- AT FINAL SHAPING OF STONE WEIRS, OUTFALLS AND EARTH BERMS

C. ENGINEER SHALL BE PROVIDED FOR REVIEW ALL TESTING AGENCY LABORATORY MATERIAL AND ON-SITE TESTING RESULTS AS REQUIRED UNDER THE PROJECT DOCUMENTS FOR COMPLETE REQUIREMENTS, INCLUDING BUT NOT LIMITED TO:
- SANDY TOPSOIL SIEVE ANALYSIS AND MATERIAL CHARACTERISTICS PER SPEC FOR SWM AREAS

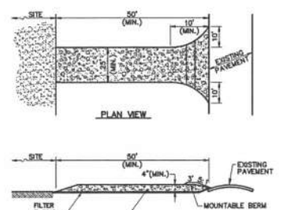
THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING MATERIAL SAMPLES TO AND COORDINATING WITH THE TESTING AGENCY AS REQUIRED.

D. FINAL STABILIZATION AND PLANTINGS PRIOR TO REMOVING ANY SEDIMENT AND EROSION CONTROL DEVICES.



C-602 SILT FENCE BARRIER N.T.S.

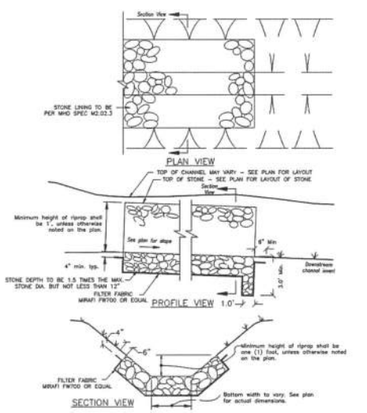
DETAIL



NOTES:
1. ENTRANCE WIDTH SHALL BE A TWENTY-FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.

C-609 STABILIZED CONSTRUCTION EXIT N.T.S.

DETAIL



CONSTRUCTION SPECIFICATIONS:
1. ANY FILL REQUIRED SHALL BE COMPACTED TO APPROPRIATE DENSITIES.
2. GEOTEXTILE SHALL BE PROTECTED FROM PUNCHING, CUTTING, OR TEARING. ANY DAMAGE SHALL BE REPAIRED BY OVERLAYING ANOTHER PIECE OF FABRIC OVER THE DAMAGED PORTION WITH A MIN OF 12" OVERLAP OR COMPLETELY REPLACING FABRIC.
3. THE STONE SHALL BE PLACED SO THAT IT BLENDS IN WITH THE SURROUNDING GROUND [IMPORTANT: IF THE STONE IS PLACED TOO HIGH THE FLOW WILL BE FORCED OUTSIDE OF THE CHANNEL CAUSING EROSION].

C-621 STONE CHANNEL PROTECTION N.T.S.

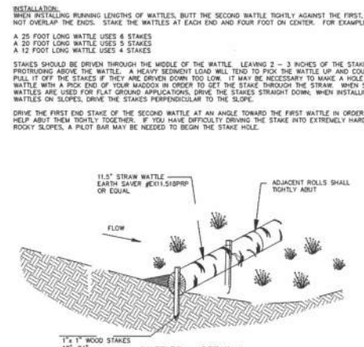
DETAIL

INSTALLATION:
WHEN INSTALLING RUNNING LENGTHS OF WATTLES, BUTT THE SECOND WATTLE TIGHTLY AGAINST THE FIRST, DO NOT OVERLAP THE ENDS. STAKE THE WATTLES AT EACH END AND FOUR FOOT ON CENTER. FOR EXAMPLE:

A 25 FOOT LONG WATTLE USES 6 STAKES
A 20 FOOT LONG WATTLE USES 5 STAKES
A 12 FOOT LONG WATTLE USES 4 STAKES

STAKES SHOULD BE DRIVEN THROUGH THE MIDDLE OF THE WATTLE, LEAVING 2 - 3 INCHES OF THE STAKE PROTRUDING ABOVE THE WATTLE. A HEAVY SEDIMENT LOAD WILL TEND TO PICK THE WATTLE UP AND COULD PULL IT OFF THE STAKES IF THEY ARE DRIVEN DOWN TOO LOW. IT MAY BE NECESSARY TO MAKE A HOLE IN THE WATTLE WITH A PICK END OF YOUR MADDOX IN ORDER TO GET THE STAKE THROUGH THE STRAW. WHEN STRAW WATTLES ARE USED FOR FLAT GROUND APPLICATIONS, DRIVE THE STAKES STRAIGHT DOWN. WHEN INSTALLING WATTLES ON SLOPES, DRIVE THE STAKES PERPENDICULAR TO THE SLOPE.

DRIVE THE FIRST END STAKE OF THE SECOND WATTLE AT AN ANGLE TOWARD THE FIRST WATTLE IN ORDER TO HELP ABUT THEM TIGHTLY TOGETHER. IF YOU HAVE DIFFICULTY DRIVING THE STAKE INTO EXTREMELY HARD OR ROCKY SLOPES, A PILOT BAR MAY BE NEEDED TO BEGIN THE STAKE HOLE.



WATTLES - DETAIL A

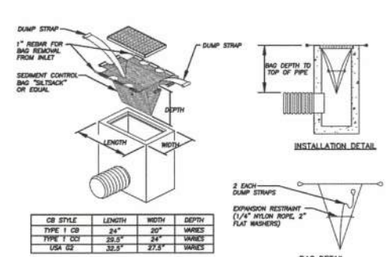
NOTES:
1. WATTLES SHALL CONSIST OF 11.5" STRAW WATTLE - EARTH-SAVERS #CE11.518PRP OR EQUAL.
2. NOT FOR USE IN CONCENTRATED FLOW AREAS.
3. THE WATTLES SHALL BE TRENCHED INTO THE GROUND A MINIMUM OF TWO (2) INCHES.
4. WATTLES SHALL BE INSTALLED PER MANUFACTURERS SPECIFICATIONS.
5. ON SLOPES, WATTLES SHOULD BE INSTALLED ON CONTOUR WITH A SLIGHT DOWNWARD ANGLE AT THE END OF THE ROW IN ORDER TO PREVENT PONDING AT THE MID SECTION.
6. RUNNING LENGTHS OF WATTLES SHOULD BE ABUTTED FIRMLY TO ENSURE NO LEAKAGE AT THE ABUTMENTS.
7. STAKING - USE WOOD STAKES TO SECURE THE WATTLES. 1/2" TO 5/8" REBAR IS ALSO ACCEPTABLE. USE A STAKE THAT IS LONG ENOUGH TO PROTRUDE SEVERAL INCHES ABOVE THE WATTLE. 18" LENGTH FOR HARD, ROCKY SOIL, 24" LENGTH FOR SOFT LOAMY SOIL.

WATTLE MAINTENANCE NOTES:

1. THE OWNER SHALL INSPECT WATTLES EVERY TWO WEEKS AND AFTER ANY SIGNIFICANT STORM EVENT AND MAKE REPAIRS OR REMOVE SEDIMENT ACCUMULATED BEHIND WATTLE AS NECESSARY.
2. SEDIMENT ACCUMULATED BEHIND WATTLE SHALL BE REMOVED WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DIAMETER OF THE WATTLE.

C-627 WATTLE SEDIMENT BARRIER N.T.S.

DETAIL



CB STYLE	LENGTH	WIDTH	DEPTH
TYPE 1 CB	24"	20"	VARIES
TYPE 'L' CO	28.5"	24"	VARIES
USA 02	32.5"	27.5"	VARIES

INLET SEDIMENT CONTROL DEVICE - SILT SACK

NOTES:

THE DIMENSION CHART ABOVE IS FOR STANDARD CATCH BASINS AND INLETS ONLY. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE CORRECT SIZE DEVICE FOR EACH INLET.

FOR NON-STANDARD CATCH BASINS AND INLETS, THE CONTRACTOR SHALL MEASURE DIMENSIONS IN THE FIELD AND ORDER THE APPROPRIATE SIZE(S).

THE INLET SEDIMENT CONTROL DEVICE SHALL BE OF HIGH FLOW DESIGN (200 GAL/MIN/FT), AS PER THE MANUFACTURER'S SPECS.

THE SEDIMENT CONTROL DEVICE SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED A MINIMUM ONCE PER MONTH OR WITHIN THE 48 HOURS FOLLOWING A STORM EVENT. FILTER SHALL BE CLEANED IN A MANNER WHICH ENSURES THAT ALL SEDIMENT REMAINS ON SITE.

SUBSTITUTION OF A SHEET OF FILTER FABRIC PLACED OVER THE OPENING OF THE INLET IS NOT APPROVED.

RECESSED CURB INLET CATCH BASINS MUST BE BLOCKED WHEN USING FILTER FABRIC INLET SACKS, SIZE OF FILTER INLET SACK TO BE DETERMINED BY MANUFACTURER.

THE FILTER SHALL BE REPLACED OR CLEANED WHEN THE BAG BECOMES HALF FULL.

C-628 SILT SACK N.T.S.

DETAIL

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BAXTER NYE ENGINEERING & SURVEYING

Registered Professional Engineers and Land Surveyors

1597 Falmouth Road - Unit 1
Centerville, Massachusetts 02632

Phone: (508) 771-7502
Fax: (508) 771-7622
www.baxter-nye.com

STAMP STAMP

COMMONWEALTH OF MASSACHUSETTS
MATTHEW W. EDDY
CIVIL
No. 43183
REGISTERED PROFESSIONAL ENGINEER

CONSULTANT

CONSULTANT

PREPARED FOR:

Reiss Wolf and Dana Levy
747 South 7th Street
Philadelphia, PA 19147

PROJECT TITLE

Site Development
50 Fishermans Landing Road (aka 0 Jollys Crossing Road)
Brewster, MA 02631

DATE	DESCRIPTION

SHEET TITLE

Details Plan

SHEET NO

C2.0

DATE: JULY 14, 2023

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SCALE IN FEET

SCALE: 1"=30'

DRAWN BY: JKL CHECKED BY: MWE

JOB NO: 2023-108 FILE: 2023-108 DT.dwg

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BAXTER NYE

ENGINEERING & SURVEYING

SITE OPERATION and MAINTENANCE PLAN

for

Proposed Dwelling

50 Fishermans Landing Road

Brewster, Massachusetts

Prepared for:

Reiss Wolf & Dana Levy

747 South 7th Street

Philadelphia, PA 19147

July 14, 2023

BAXTER NYE ENGINEERING & SURVEYING
Registered Professional Engineers, Land Surveyors & Scientists
1597 Falmouth Rd., Suite 1, Centerville, MA
Tel: (508) 771-7502 Email: info@baxter-nye.com

TABLE OF CONTENTS

INTRODUCTION

This plan is intended to provide guidelines for the single-family residence (the Project) for the proper Operation and Maintenance (O&M) of the stormwater management and drainage system (SMS).

The O&M Plan will be conducted for the Project by the homeowners or their assigns that have been educated and trained to understand the general functions of the O&M. The frequency and extent of minimum maintenance is outlined herein. More frequent cleaning, repair, or maintenance may be necessary based on weather and other conditions. Future development of the overall site area may result in changes to this plan.

SMS INSPECTIONS AND MAINTENANCE

A system for stormwater runoff collection and management has been designed using BMP's (Best Management Practices) as defined by Mass Dept. of Environmental Protection (MDEP) for the project. The collection and conveyance system is comprised of overland flow through vegetated swales to infiltration basins with beehive grated leaching galleys. These systems collect, treat, attenuate and convey the runoff to the infiltration basins. All the runoff from the dwelling roof area is captured and conveyed directly to the infiltration basin #4. These basins control and infiltrate through the 100 year storm events and assist in removing suspended solids including sediments, oil and grease from the stormwater run-off while allowing for nitrogen and phosphorus removal. The facilities as sized will retain and infiltration the runoff through the 100-year storm event. The devices described above are referred to as the stormwater management and drainage system (SMS).

To keep the SMS functioning properly and to ensure that the stormwater TSS and other pollutants are reduced, periodic maintenance is required. The owner/operator of the Project is responsible for the periodic maintenance requirements of the O&M Plan for the SMS. The following is a guideline of the minimum maintenance schedules and tasks required to keep the SMS functioning properly.

Unscheduled Maintenance

The following inspections and maintenance activities should be completed after each rain event in excess of two-and one-half inches (2.5"), or after any significant event accompanied by high winds. General judgment needs to be used. If there appears to be significant debris after a storm event, maintenance personnel should walk the site to inspect for and address the following:

1. Inspect the drainage swales and riprap areas for debris. Remove any branches, trash or other large debris.

2. Inspect roof downspouts, leaders and outfalls to ensure they are not clogged. If roof leaders are clogged they shall be cleaned out by snaking or other acceptable means.

3. Inspect the leaching galleys basins and infiltration basins for debris. Remove any branches, trash or other large debris.

General Maintenance

The permittee/owner shall conduct and document inspections of all erosion and sediment control measures no less than weekly or as specified in the permit, and prior to and following anticipated storm events.

The permittee or its agent shall submit monthly reports to the Planning Department.

The permittee/owner shall ensure that all components of the proposed Stormwater Management Plan are functioning according to design specifications for the life of the system. All components shall be maintained in good condition and promptly repaired in accordance with the approved Operation and Maintenance Plan.

The following inspections and maintenance activities must be completed on a regular basis as conditions warrant:

1. Maintain the vegetated side slopes and bottom of the infiltration basins. Areas that consist of grass standing are to be mowed at least once per year to prevent undesirable woody vegetation from taking hold. Remove any grass clippings and trimmings from the swm areas to prevent them from impeding the flow of stormwater or slowing infiltration rates.

2. In the fall remove any accumulated leaves from the catch basins and infiltration basins. Prevent fallen leaves from accumulating over and blocking any inlets.

3. In the spring perform a cleanup to remove any accumulated leaves, branches, or debris from the SMS. The vegetated swales and infiltration basins shall be inspected for cracking, erosion, and accumulated sediment. Sediment removal and repair of the area shall occur as needed. Sediment removal shall be done by either hand or vacuum. Damage to the area must absolutely be avoided. All areas shall be raked out and stabilized after removal of sediment or debris as needed.

4. Sediment from leaching galleys shall be removed when it's a depth of 12". Galleys should be inspected in the spring and sediment removed by vacuum or clam shell or other appropriate method.

Quarterly Maintenance

The following inspections and maintenance activities must be completed quarterly (generally January 15, April 15, July 15, October 15 or other acceptable quarterly dates):

1. Inspect leaching galleys and vegetated swales for debris. Remove any branches, trash or other large debris that could interfere with the proper operation of the outlet of the basins. Remove accumulated sediment around the opening.

2. Inspect the infiltration basins for debris. Remove any branches, trash or other large debris that could interfere with the proper operation. Remove any accumulated sediment, by the use of hand tools (shovels, rakes, wheelbarrows, etc.) when it exceeds six-inches (6") but not less than annually. Dead or dying vegetation shall be replaced in-kind or with equal plantings.

3. Inspect all stone riprap outfalls, roof drain connections, and overflow areas. The stone acts to stabilize the ground but also dissipate the erosive velocities and energy in the stormwater runoff. Stone check dams are intended to slow the stormwater runoff and allow it to permeate through the stone to downstream areas. To keep the stone functioning as intended is shall be cleaned of sediment and debris. If stone has moved or broken down it shall be replaced and chinked to interlock stones together. Add stone to these areas as needed as the stone settles or is transported to keep these areas stabilized. Any cracking, channeling in soil or erosion shall be repaired immediately.

4. Inspect all areas for erosion, cracking, or excessive sediment transport. Repair any erosion or cracking areas immediately.

Major Maintenance

The following inspections and maintenance activities must be completed annually (April 15 or another acceptable date):

1. Inspect the infiltration basin areas for accumulated sediment. Remove buildup of sediment in the basins when it reaches a maximum of 6 inches in depth. Restore the basin to the original elevation and volume per the design drawings. Dispose of the sediment in a legal and lawful manner.

2. The stone rip rap and check dams may require periodic reconstruction. This will need to occur when during the months of April through November (when the ground is not frozen). If the section upstream of a stone

riprap apron fails to drain within 48-hours (2-days) after the completion of a rainfall event. If this occurs, the stone riprap should be removed and reconstructed in accordance with the original design drawings.

3. Inspect the leaching galleys. This should be done at least 72 hours after any rainfall. Open the grate in each leaching galley. Look for standing water or excessive accumulated sediment (in excess of 4"). If standing water is seen in the basins after 72 from any rainfall the basins may not be infiltrating properly anymore. In this case, the basins should be inspected, and surrounding stone replaced if not draining within 72 hours.

Project Inspection Reporting

A site maintenance log will be kept. This log will record the dates of completion of maintenance task, the person or company who completed the task, and any observations of malfunctions in components of the stormwater management system (SMS).

Inspections are to be performed by the owners or their assigns educated with the general understanding of the SMS functions, maintenance and repair requirements. In addition to the inspection requirements identified above for the Project SMS, the inspector must look for evidence of, or the potential for, pollutants entering the storm water system and take action to remediate any of these potentials.

For each site inspection, a SMS Inspection Form in accordance with Attachment A shall be completed for the Project, and filed with the Planning Department if requested. The completed forms should be maintained for three years on the Project site.

Operation and Maintenance Annual Estimated Budget:

Site drainage systems Inspections: 2 times per year x $200 per site inspection = $400 per year.

Roof drain inspections with gutter cleaning: 2 times per year x $150 per cleaning = $300 per year

Infiltration Basin cleaning (litter and organic debris): 2 times per year x $100 per cleaning = $300 per year

Leaching galley cleaning: 1 time every five years x $200 per cleaning = $40 per year

Estimated Annual O & M Budget: $1,040

ATTACHMENT A – INSPECTION LOG

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SMS INSPECTION FORM
Proposed Dwelling - 50 Fishermans Landing Road, Brewster, MA

Inspection Item	Inspection Frequency	Date Inspected	Weather at Time of Inspection- Note of Weather Conds. Since Last Inspect.	Minimum Maintenance & Key Items to Check	Cleaning or Repair needed (list items)	Date of Cleaning/ Repair	Cleaning Repair Performed by:	Recommendations/ Corrective Actions
Leaching Galleys								
Riprap and Stone Check Dams								
Grassed Swales								
infiltration Basins								
Roof drains/leaders								
Erosion and Stabilization								
Vegetation - survival/health								
Mowing/trimming of SWM areas								

In the Event of a Spill refer to the spill response procedure and contact appropriate agencies.

Describe any Corrective action required at this time (attached figures to show location of concern): _____

Inspector: _____ Title: _____ Date: _____

BAXTER NYE

ENGINEERING & SURVEYING

Stormwater Management Report

for

Proposed Residence

50 Fishermans Landing Road

(aka 0 Jollys Crossing Rd)

Brewster, MA

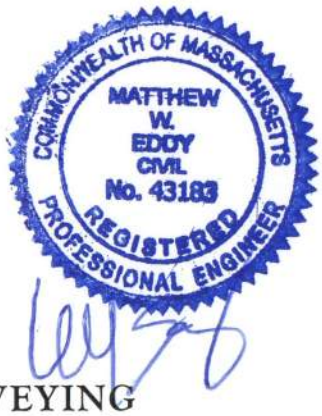
Prepared for:

Reiss Wolf and Dana Levy

747 S. 7th St.

Philadelphia, PA 19147

July 14, 2023



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PROJECT OVERVIEW

Please accept this application for a Stormwater Management Permit under Chapter 272 of the Town of Brewster Code. Baxter Nye Engineering (BN) submits this application on behalf of the landowner, Reiss Wolf and Dana Levy. The proposed Project results in the requirement of a Major SWM Permit based on proposed impervious area and land disturbance.

The Project consists of the proposed construction of a 5-bedroom dwelling with crushed stone driveway, tennis court, deck, swimming pool with patio, and on-site septic system. The site is located at 50 Fishermans Landing Road in Brewster, MA (formerly known as 0 Jollys Crossing Road) The site is also shown as Assessor Map 62, Lot 29 and comprises 6.1 acres. The lot is zoned RL. The existing use of the parcel is vacant undeveloped land, and is entirely wooded with the exception of a gravel cartway through the property.

The proposed construction will be a new development and will meet all the Town of Brewster Stormwater Management Regulations (BSW)), and the Massachusetts DEP Stormwater Management Policy.

There will be no impact to wetland resources as a result of construction as there are no wetlands on the site, nor buffer zones to any resource areas.

The proposed stormwater management system (SMS) will be installed to control stormwater runoff for water quality and quantity in accordance with BSW Regs. and MDEP SWM Policy. Under the proposed conditions, both stormwater quantity and quality are controlled. The post-development peak storm discharges are equal to or less than the 2, 10, 25, and 100-year storm events. The post-development water quality is treated through the SMS BMP's and provides 90% total suspended solid (TSS) removal rate (see Appendix D). Grassed swales with check dams will remove 50% TSS. The Infiltration Basins will remove 80% TSS, 60% Phosphorus, and 50% Nitrogen from the flows.

The water recharge for the site exceeds the MDEP recharge requirements and mimics the existing hydrologic conditions for the site. Runoff rates are attenuated reducing velocities and erosion.

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PROJECT STATEMENT

PROJECT: Proposed Residence
LOCATION: 50 Fishermans Landing Road, Brewster, MA
BN JOB NUMBER: 2023-108

CLIENT: Reiss Wolf and Dana Levy

SUBJECT: Stormwater Management & Drainage Calculations

OBJECTIVES:

1) Meet the objectives of the Brewster Stormwater Management Regulations & MA DEP SWM Policy
   (a) Evaluate the pre-development conditions and calculate the peak rate of runoff.
   (b) Evaluate the post-development conditions and provide stormwater management and treatment to prevent any increase in the 2, 10, 25 and 100 year storms, from the pre-development conditions peak discharge at the site study point.
   (c) Safely pass the 100 year storm event without causing any downstream detrimental impact.
   (d) Provide for Water Quality Treatment for the first flush 1" of rainfall in accordance with MDEP SWM Policy.
   (e) Provide for Groundwater Recharge in accordance with MDEP SWM Policy.

CALCULATION METHODS & DESIGN STORMS:

1) Soil information was taken from the SCS Soil Survey of Barnstable County. Field analysis of the soils was performed as identified herein.
2) Subcatchment areas, flow paths, and design points were delineated using standard engineering practice.
3) The existing and proposed conditions were modeled using HydroCAD, which incorporates the methodologies of SCS TR-55 and TR-20.
4) The proposed stormwater management system was designed to control the 2, 10, and 25-year storm event using the SCS TR-20 Method. The 100-year storm event will pass safely through the system with no detrimental impact to downstream areas.

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INTRODUCTION

Baxter Nye Engineering & Surveying (BN) performed a Stormwater Management (SWM) analysis of the subject site to evaluate the post-development impacts associated with the proposed development. The hydrology for both the pre and post development drainage areas was analyzed to determine the impact of development.

SCS TR-55 and HydroCAD Stormwater Modeling System were used to model the site for existing and proposed conditions and the associated runoffs. HyrdoCAD utilizes the SCS TR20 Method to determine peak rates of runoff, which were computed and compared to the existing conditions.

BN designed a system for storm runoff collection and management using BMP's (Best Management Practices) as defined by MDEP and Town of Brewster . The collection and conveyance system is comprised of grassed diversion swales with check dams, infiltration basins, and leaching galleys with beehive grates. The stormwater collection systems discharges to existing low areas at the site.

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METHODOLOGY & ANALYSIS

Hydrology and Hydraulics

Drainage calculations are performed to demonstrate that there is no increase in the rate of runoff (and therefore, no increase in downstream flooding) from the subject site due to the proposed improvements. The rate of runoff is compared at a common point referred to as the design point of interest, for both the pre and post development condition. The hydrologic and hydraulic model created to analyze the pre and post development condition was developed using the Soil Conservation Service (SCS) Technical Release No. 20 (TR 20, SCS unit hydrograph procedures), SCS Technical Release No. 55 (TR 55, Time of Concentration (T_c) and Curve Number (CN)), National Weather Service Technical Paper No. 40 (TP 40, rainfall intensity) or the "Northeast Regional Climate Center – Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada" (as identified herein), and the stormwater detention facilities were modeled using the SCS Storage Indication Method.

Time of Concentration (T_c) is the time required for stormwater runoff to travel from the most hydraulically distant point in a drainage area or subcatchment to the design point. The T_c is calculated based upon slope, distance, surface cover and type of flow. A longer time of concentration will generally result in a smaller rate of runoff.

The Curve Number (CN) represents the amount of runoff expected from a particular segment of the drainage area. A higher curve number represents a more impervious surface and hence will have a larger rate of runoff. The CN is based upon three characteristics: (1) The Hydrologic Soil Group (HSG) A, B, C, or D; A is the most infiltratable and has the lowest runoff potential, D is the least infiltratable and has the highest runoff potential; (2) The soil cover (vegetated, developed, farmland or impervious); impervious cover obviously having the highest runoff potential. The final factor is the condition of the surface cover, being classified as good, fair or poor; surface cover in good condition has the lowest runoff potential.

The soil types for the drainage areas were determined from the Soil Conservation Service Soil Survey for the appropriate County and State where the project is located. The soil survey contains maps, which delineate the extent of the various soil types and their characteristics.

To assist in the analysis, software entitled HydroCAD, (developed by Applied Microcomputer Systems) was utilized. The HydroCAD program calculates the runoff based on rainfall and watershed characteristics, and produces a runoff hydrograph (a runoff rate versus time curve). Then the stage-storage-discharge curves for a specific SWM facility are calculated. The stage-storage-discharge curves are a set of curves for a

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specific SWM facility that depict the outflow from the outlet control structure versus the volume of runoff stored in the facility. The stage-storage-discharge curves are used to compute an outflow hydrograph by hydraulically routing an inflow hydrograph through the detention facility.

The peak rates of runoff, at the design points, were calculated for the pre and post development conditions for the design storm events with Type III – 24 hour rainfall distribution. The peak rate of runoff was compared for each required design storm event to confirm that there was no increase from the pre to post development conditions for the required storm events.

Volumes were analyzed as well for comparison of pre to post-development levels. The "Discarded" number represented in the HyrdoCad/TR-20 Outputs represents the rate and volume of runoff, which is infiltrated into the ground through the bottom of the basin.

Assumptions

1) Shallow concentrated flow occurs at a maximum of 300 feet. If the slope is greater than two percent (2%), shallow concentrated flow occurs at a maximum of 200 feet. This is based on an assumed drainage area of several hundred acres. Smaller drainage areas should have their shallow concentrated flow occurrence adjusted to a lesser distance accordingly.
2) The minimum time of concentration (tc) value used shall be five (5) minutes.
3) Rainfall distribution is even over the drainage areas to be analyzed for a given storm event.
4) Base flow contribution has a negligible affect on the peak discharge.
5) Flows are steady, turbulent, and uniform.
6) Fluids are incompressible.

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DRAINAGE DESIGN CONDITIONS

The runoff for the pre-development condition was calculated for the 2, 10, 25 and 100-year storm events. The runoffs for post development conditions, routed through the stormwater management facilities, were calculated for the 2, 10, 25 and 100-year storm events.

The pre and post development rates of runoff were compared for each storm event. The SWM facilities were designed to control the post-development rates of runoff at the point of study to equal to or less than their pre-development levels for the required storms.

Pre-Development Conditions:

The subject site area for the proposed construction of a 5-bedroom dwelling with pool and tennis court. The lot is currently zoned RL. The subject plot area contains no impervious surface under existing conditions with the exception of the gravel road through the site.

The SCS Soil Surveys Soil Map Units, from the Barnstable County Soil Survey for the site area, indicate that the predominant soils on site where development is to occur are Carver coarse sands. Test pits performed by Ryder Wilcox, Inc. on September 20, 2022 revealed medium to coarse sands. The estimated seasonal high groundwater is greater than 12 feet below grade per the test pit locations as noted on the Stormwater Management plan. The soil material is classified as a HSG A and is suitable for infiltration.

The existing ground cover on the subject site is mainly fair woods and a gravel road on the 6.1 acre site. The topography is fairly steep in areas and has two large naturally occurring low depression areas on the site. The existing topographic and existing site conditions are as taken from the survey information completed by Ryder Wilcox, Inc. and noted on the BN plan. There are no wetland resource areas on the site.

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Post-Development Conditions:

The proposed single-family home project will consist of the construction of a five bedroom dwelling with pool and tennis court, and gravel driveway.

The proposed construction will be a new development. The proposed area of impervious cover, including the gravel driveway areas, will be approximately 0.44 ac.

There will be no impact to any wetland resources as there are none on site, nor wetland resource area buffer zones.

Proposed Drainage Facilities

Baxter Nye has designed a system for storm runoff collection and management using BMP's (Best Management Practices) as defined by MDEP. The collection and conveyance system is comprised of grassed swales, leaching galleys with beehive grate, and grassed infiltration basins. The vegetated swales will attenuate runoff, assist in removing suspended solids and allow for nitrogen uptake through the vegetation.

The stormwater collection systems discharge to four grassed infiltration basins, three of which are naturally occurring depressions in the topography. The basins are sized to detain the runoff for the 2, 10, 25 and 100-year storm events. Therefore, there is no flooding impact to downstream areas.

The proposed stormwater management system (SMS) will be installed to control stormwater runoff for water quality and quantity in accordance with MDEP SWM Policy. The rate of proposed loamy sand topsoil. This rate is entered into HydroCad in the format of velocity (ft/min) or flow rate (cfs – which is obtained by applying the velocity – or infiltration rate - over the infiltratable area of the SWM facility).

Roof runoff from the dwelling will be conveyed to the leaching basin at Infiltration Basin 4, via CPP piping. from each downspout. All the runoff from the roof (impervious area) is captured and conveyed directly to the underground leaching basin, where the water infiltrates into the surrounding ground.

Under the proposed conditions, both stormwater quantity and quality are controlled. The post-development peak storm discharges at Study Point 2, 3, and 4 are zero cfs and reduced to below existing condition flows at Study Point 1 for the 2, 10, 25 and 100 year storms. The Water Quality Volume (see Appendix D) is treated through multiple in line BMP's. The runoff is conveyed through grassed channels with stone check dams. Discharge is to infiltration basins with raise beehive greatest on leacing galleys creating additional forebay treatment. All the runoff from the impervious areas passes through these facilities. The combined BMP treatments are designed in accordance with the MDEP sizing requirements. This combination of

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BMP's results in the removal of 90% of the initial T.S.S. loading. This meets the BSW Regs and exceeds the MDEP requirement of 80%.

The Groundwater Recharge Volume required of 965 cf is based on the HSG A requirement of 0.6 inches of runoff. The project design well exceeds this with a recharge volume of over 3,000 cf provided.

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SUMMARY

Based on the analysis performed for the 2, 10, 25 and 100-year storm events, the infiltration basins are adequately sized to mitigate increases in the peak rates of runoff from the site.

The post development peak runoff rates for the entire contributing drainage areas (both "on-site" area and "off-site area) demonstrates that there is no increase in runoff released from the developed site in the post development condition for the 2, 10, 25 and 100 -year storm events. There is 0.10 cfs discharge from Infiltration Basin 1 on the 100-year storm, which is a decrease from the existing flow off the site of 0.18 cfs. The peak runoff rates meet the requirements of the Brewster Stormwater Management Regulations, which requires control through the 100-year design storm for the on-site runoff. The "Discarded" flows shown within the HydroCAD analysis represent flows and volumes infiltrated directly into the ground through the SWM structures and are not discharged or released over land.

Table 1 is a summary of expected release rates based on total contributing drainage areas (both on-site and off-site areas). This table shows the expected post development runoff rates are significantly decreased from the pre-development levels for the 2, 10, 25 and 100 year storms. The post-development 100-year storm has a peak discharge of 0.10 cfs, which is reduced from the pre-development condition. The control of the post-development runoff to equal or below pre-development levels mitigates any downstream flooding impacts. TSS and phosphorus removal as well as groundwater recharge requirements are met.

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TABLE 1: PEAK DISCHARGE AND VOLUME RELEASE

STORM (YEAR)	STUDY POINT	PRE-DEVELOPMENT	POST DEVELOPMENT
		PEAK DISCHARGE (cfs)	PEAK DISCHARGE (cfs)
2	SP1	0.00	0.00
	SP2	0.00	0.00
	SP3	0.00	0.00
	SP4	0.00	0.00
10	SP1	0.01	0.00
	SP2	0.00	0.00
	SP3	0.00	0.00
	SP4	0.00	0.00
25	SP1	0.03	0.01
	SP2	0.00	0.00
	SP3	0.00	0.00
	SP4	0.00	0.00
100	SP1	0.18	0.10
	SP2	0.00	0.00
	SP3	0.00	0.00
	SP4	0.00	0.00

Notes:

1. Rainfall used in calculations based upon NOAA ATLAS14 PDS-based precipitation frequency estimates with 90% confidence intervals.
2. By inspection, peak discharges through the 100-year storm for Pre-development conditions for SP2, SP3, and SP4 are 0 cfs as they discharge to large onsite depressions.

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FIGURE 1

Pre Development Drainage Plan

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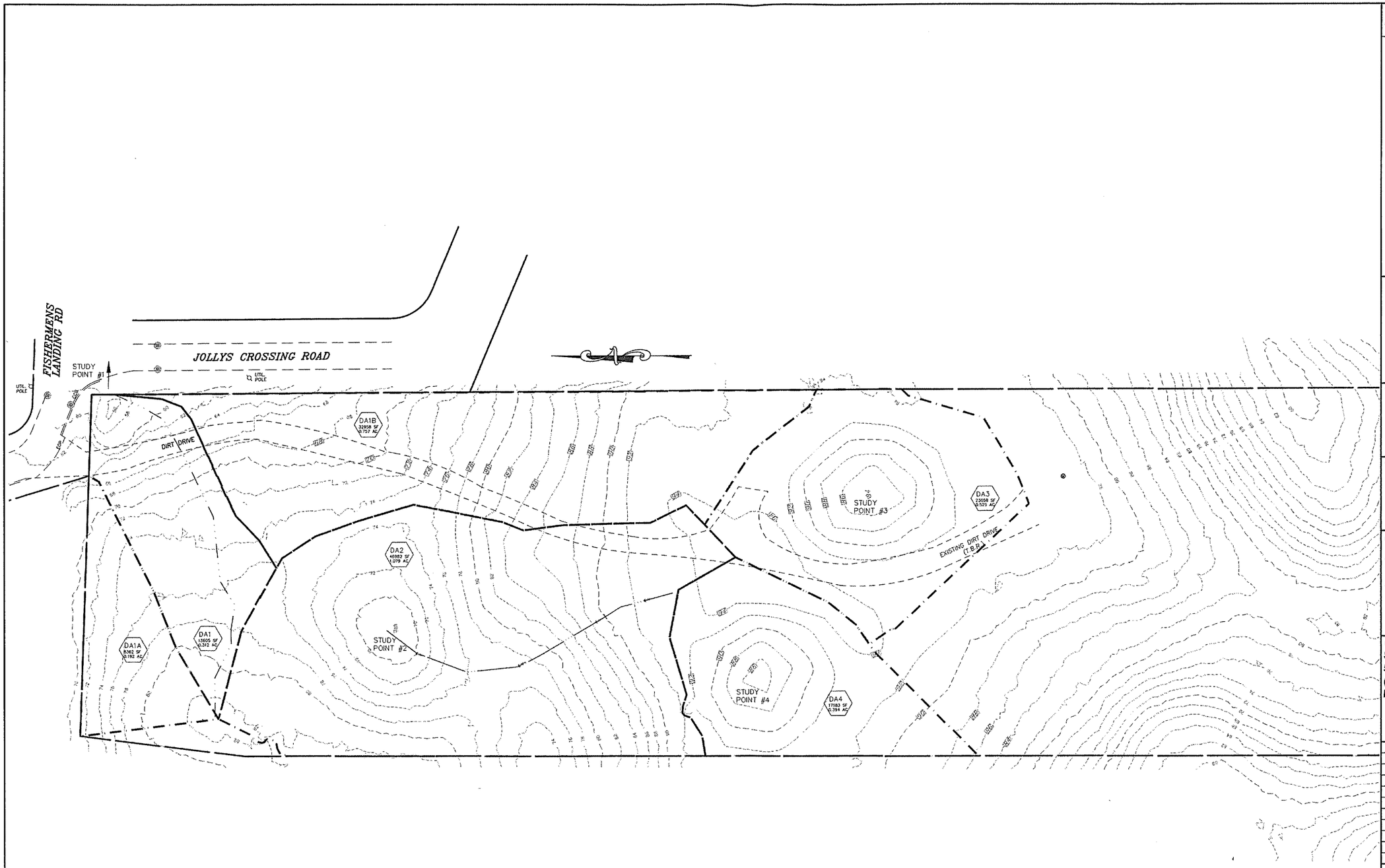

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STAMP | STAMP

CONSULTANT

CONSULTANT

PREPARED FOR:

Polhemus Savery DaSilva
157 Route 137
East Harwich, MA 02645

PROJECT TITLE

Site Development
50 Fishermans Landing Road
(aka 0 Jollys Crossing Road)
Brewster, MA 02631

DATE	DESCRIPTION

SHEET TITLE

Pre-Development Drainage Areas Plan

SHEET NO

EX 1.0

DATE: JULY 14, 2023

30 0 30 60
SCALE IN FEET

SCALE: 1"=30'

DRAWN BY: JKL CHECKED BY: MRE

JOB NO: 2023-108 FILE: 2023-108 DA-PRE.dwg

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FIGURE 2

Post Development Drainage Plan

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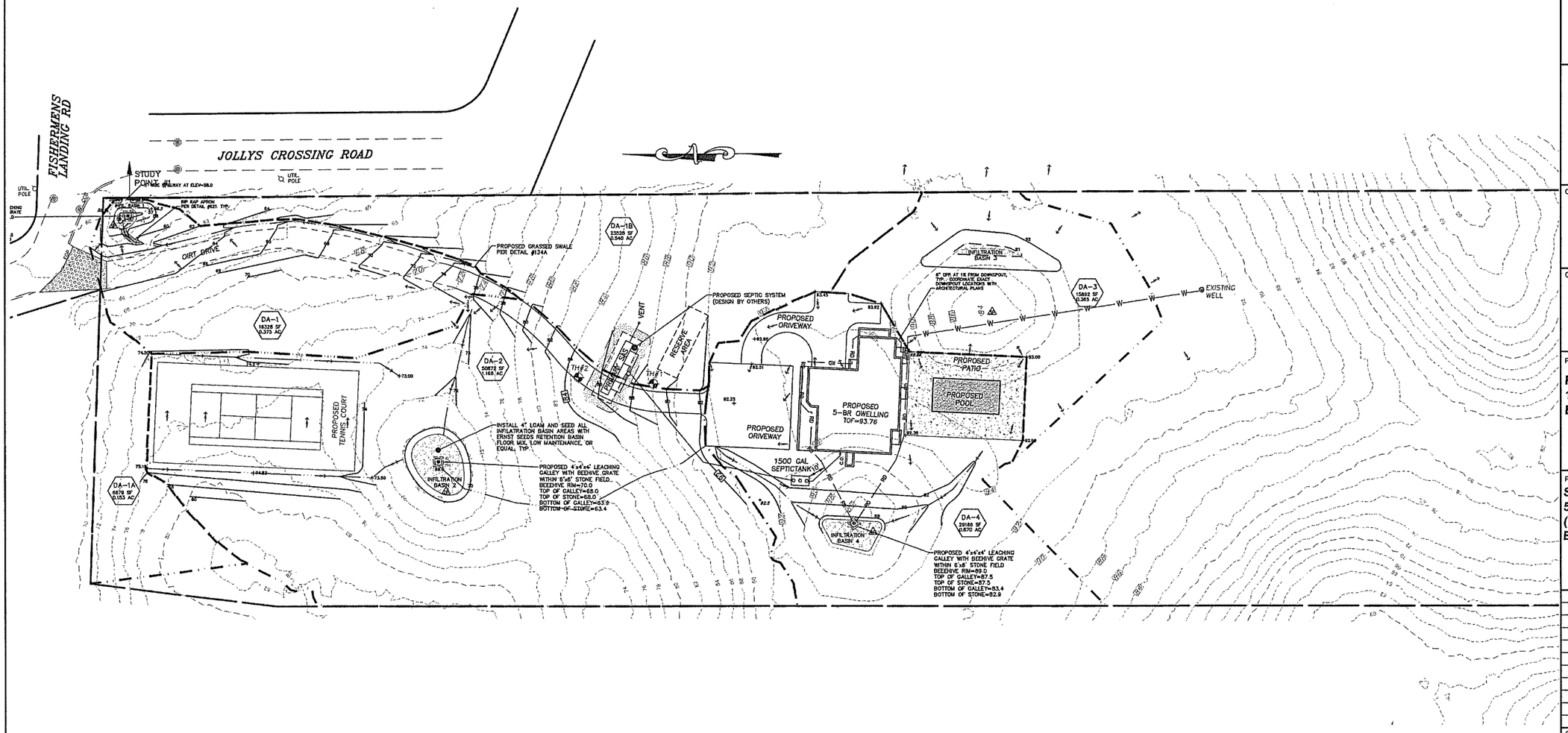

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Brewster, MA 02631

DATE	DESCRIPTION

SHEET TITLE

Post-Development Drainage Areas Plan

SHEET NO

EX 2.0

DATE: JULY 14, 2023

30 0 30 60
SCALE IN FEET

SCALE: 1"=30'

DRAWN BY: JKL CHECKED BY: MWE

JOB NO: 2023-108 FILE: 2023-108 DA-POST.dwg

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APPENDIX A

SITE SOIL INFORMATION

- SOIL SURVEY MAPS AND MAP UNITS
- CLASSIFICATION AND DESCRIPTION OF SOILS ON SITE
- TEST PIT SOIL LOGS BY RYDER WILCOX, INC 9-20-2022
- RATE OF INFILTRATION – RAWLS RATES
- RAINFALL DATA MAPS – Per NOAA Atlas 14

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SOILS DATA

The following Soil Map Units were located on USSCS Barnstable County Soil Survey. Based on these map units, a matching soil profile and description were determined.

The SCS Soil Survey for the analysis area indicates that the predominant soils are:

- Carver C
- Carver D

See following pages for the soil map and soil description.

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Soil Map—Barnstable County, Massachusetts
(Soil Map-0 Jollys Crossing Rd-50 Fishermans Landing Rd. Brewster)

Map Scale: 1:788 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

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

MAP LEGEND

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

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

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

Water Features
- Streams and Canals

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

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Barnstable County, Massachusetts
Survey Area Data: Version 19, Sep 9, 2022

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

Date(s) aerial images were photographed: Jun 10, 2022—Jun 30, 2022

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

MAP LEGEND

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

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

Special Point Features
- Blowout
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- Slide or Slip
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Please rely on the bar scale on each map sheet for map measurements.

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

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
252C	Carver coarse sand, 8 to 15 percent slopes	0.2	14.0%
252D	Carver coarse sand, 15 to 35 percent slopes	1.0	86.0%
Totals for Area of Interest		**1.1**	**100.0%**

Barnstable County, Massachusetts

252C—Carver coarse sand, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 2y07z
Elevation: 0 to 250 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Carver, coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver, Coarse Sand

Setting

Landform: Moraines, outwash plains
Landform position (two-dimensional): Shoulder, footslope, backslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw1 - 10 to 15 inches: coarse sand
Bw2 - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 10 percent
Landform: Kame terraces, outwash deltas, outwash terraces, outwash plains
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Eskers, kames, outwash deltas, outwash terraces, moraines, outwash plains, kame terraces
Landform position (two-dimensional): Footslope, shoulder, backslope, summit, toeslope
Landform position (three-dimensional): Nose slope, side slope, crest, head slope, riser, tread
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 5 percent
Landform: Kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Data Source Information

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 19, Sep 9, 2022

Barnstable County, Massachusetts

252D—Carver coarse sand, 15 to 35 percent slopes

Map Unit Setting

National map unit symbol: 2y07y
Elevation: 0 to 220 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Carver, coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Carver, Coarse Sand

Setting

Landform: Moraines, outwash plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Head slope, nose slope, side slope, riser
Down-slope shape: Convex, linear
Across-slope shape: Linear
Parent material: Sandy glaciofluvial deposits

Typical profile

Oi - 0 to 2 inches: slightly decomposed plant material
Oe - 2 to 3 inches: moderately decomposed plant material
A - 3 to 7 inches: coarse sand
E - 7 to 10 inches: coarse sand
Bw1 - 10 to 15 inches: coarse sand
Bw2 - 15 to 28 inches: coarse sand
BC - 28 to 32 inches: coarse sand
C - 32 to 67 inches: coarse sand

Properties and qualities

Slope: 15 to 35 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: F149BY005MA - Dry Outwash
Hydric soil rating: No

Minor Components

Deerfield

Percent of map unit: 10 percent
Landform: Outwash terraces, outwash plains, kame terraces, outwash deltas
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Concave
Hydric soil rating: No

Hinckley

Percent of map unit: 5 percent
Landform: Moraines, eskers, kames, outwash deltas, outwash terraces, outwash plains, kame terraces
Landform position (two-dimensional): Summit, toeslope, shoulder, backslope, footslope
Landform position (three-dimensional): Crest, head slope, nose slope, side slope, tread, riser
Down-slope shape: Convex
Across-slope shape: Convex
Hydric soil rating: No

Merrimac

Percent of map unit: 3 percent
Landform: Kame terraces, outwash deltas, outwash terraces
Landform position (three-dimensional): Riser, tread
Down-slope shape: Linear
Across-slope shape: Linear
Hydric soil rating: No

Freetown, coastal lowland

Percent of map unit: 2 percent
Landform: Bogs, marshes, swamps
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Concave
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Barnstable County, Massachusetts
Survey Area Data: Version 19, Sep 9, 2022

TEST HOLE DATA

DATE OF TEST HOLES: 9/20/2022
NO WATER ENCOUNTERED
INSP. BY: D. QUINN (R&W), SHERRIE McCULLOUGH (HEALTH DEPT)

No.1			
DEPTH (IN.)	SOIL HORIZON	SOIL TEXTURE	ELEVATION (FT.)
0 – 6	*O*	FIBRIC	88.3 – 87.8
6 – 16	*A*	LOAMY SAND	87.8 – 87.0
16 – 32	*B*	LOAMY SAND	87.0 – 85.6
32 – 84	*C1*	MEDIUM TO COARSE SAND	85.6 – 81.3
84 – 96	*C2*	FINE SANDY LOAM	81.3 – 80.3
96 – 144	*C3*	MEDIUM TO COARSE SAND	80.3 – 76.3

No.2			
DEPTH (IN.)	SOIL HORIZON	SOIL TEXTURE	ELEVATION (FT.)
0 – 3	*O*	FIBRIC	84.9 – 84.7
3 – 8	*A*	LOAMY SAND	84.7 – 84.2
8 – 34	*B*	LOAMY SAND	84.2 – 82.1
34 – 84	*C1*	MEDIUM TO COARSE SAND	82.1 – 77.9
84 – 92	*C2*	FINE SANDY LOAM	77.9 – 77.2
92 – 144	*C3*	MEDIUM TO COARSE SAND	77.2 – 72.9

BOTTOM OF PERC AT 80" (C1–LAYER) <2MIN./IN.

*Test pit data from soil testing by Ryder Wilcox , Inc. on September 20, 2022

Table 2.3.3. 1982 Rawls Rates[1]

Texture Class	NRCS Hydrologic Soil Group (HSG)	Infiltration Rate Inches/Hour
Sand	A	8.27
Loamy Sand	A	2.41
Sandy Loam	B	1.02
Loam	B	0.52
Silt Loam	C	0.27
Sandy Clay Loam	C	0.17
Clay Loam	D	0.09
Silty Clay Loam	D	0.06
Sandy Clay	D	0.05
Silty Clay	D	0.04
Clay	D	0.02

[1] Rawls, Brakensiek and Saxton, 1982

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Precipitation Frequency
Data Server
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Time Series
Temporals
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Probable Maximum Precipitation
Documents

Miscellaneous
Publications
Storm Analysis
Record Precipitation

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NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES: MA

Data description

Data type: Precipitation depth **Units:** English **Time series type:** Partial duration

Select location

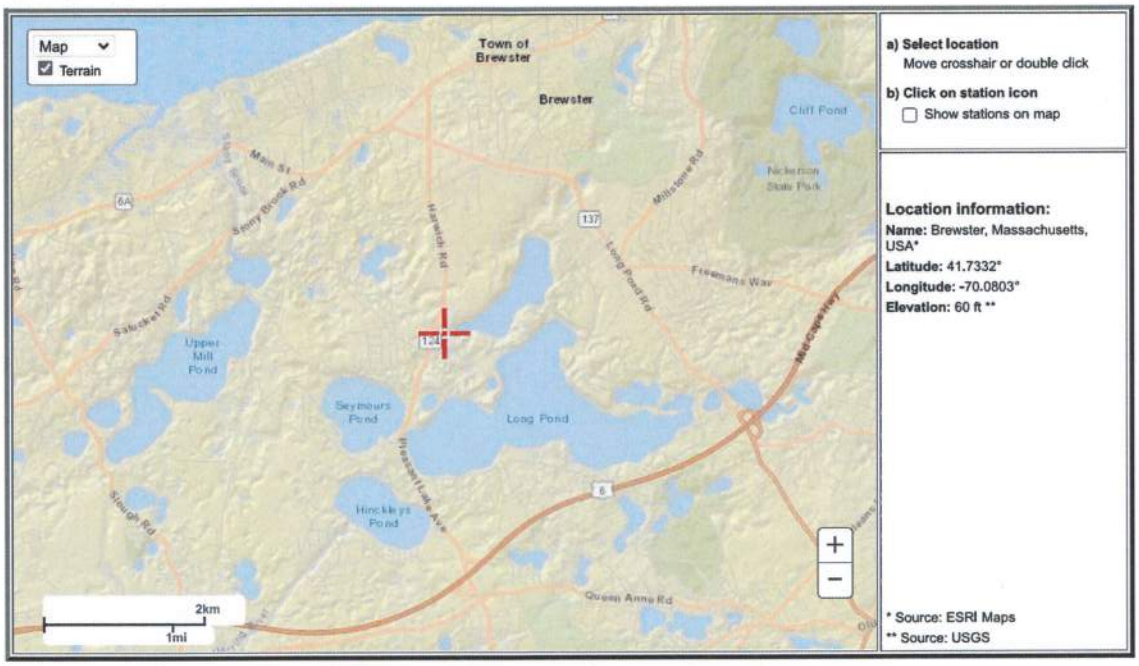
1) Manually:

a) By location (decimal degrees, use "-" for S and W): Latitude: Longitude: Submit

b) By station (list of MA stations): Select station

c) By address 50 Fishermans Landing Rd, Brewster,

2) Use map:



POINT PRECIPITATION FREQUENCY (PF) ESTIMATES

WITH 90% CONFIDENCE INTERVALS AND SUPPLEMENTARY INFORMATION
NOAA Atlas 14, Volume 10, Version 3

PF tabular | PF graphical | Supplementary information | Print page

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

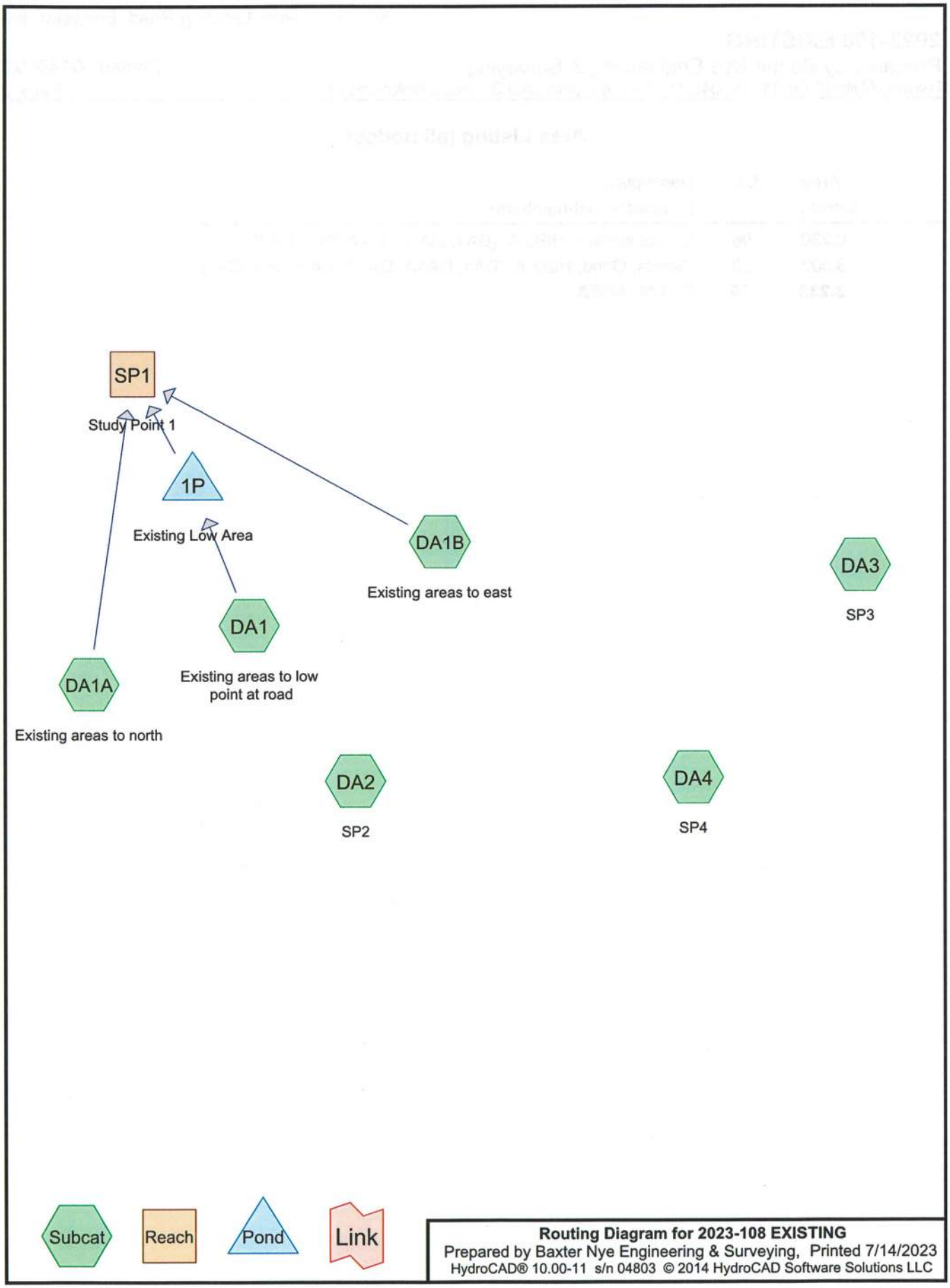
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.269** (0.208-0.340)	**0.340** (0.263-0.431)	**0.456** (0.351-0.580)	**0.553** (0.423-0.707)	**0.686** (0.511-0.920)	**0.785** (0.574-1.08)	**0.891** (0.637-1.27)	**1.02** (0.683-1.47)	**1.21** (0.782-1.80)	**1.37** (0.869-2.08)
10-min	**0.381** (0.294-0.482)	**0.482** (0.372-0.610)	**0.647** (0.498-0.822)	**0.784** (0.601-1.00)	**0.972** (0.723-1.30)	**1.11** (0.813-1.52)	**1.26** (0.902-1.80)	**1.44** (0.968-2.08)	**1.71** (1.11-2.56)	**1.94** (1.23-2.95)
15-min	**0.448** (0.346-0.567)	**0.567** (0.438-0.718)	**0.761** (0.586-0.967)	**0.922** (0.706-1.18)	**1.14** (0.851-1.53)	**1.31** (0.956-1.79)	**1.48** (1.06-2.12)	**1.70** (1.14-2.45)	**2.02** (1.30-3.01)	**2.29** (1.45-3.48)
30-min	**0.652** (0.504-0.825)	**0.822** (0.635-1.04)	**1.10** (0.848-1.40)	**1.33** (1.02-1.70)	**1.65** (1.23-2.22)	**1.89** (1.38-2.59)	**2.14** (1.53-3.06)	**2.45** (1.64-3.53)	**2.91** (1.88-4.34)	**3.30** (2.09-5.02)
60-min	**0.855** (0.661-1.08)	**1.08** (0.832-1.36)	**1.44** (1.11-1.83)	**1.74** (1.34-2.23)	**2.16** (1.61-2.90)	**2.47** (1.80-3.38)	**2.80** (2.00-4.00)	**3.20** (2.14-4.61)	**3.80** (2.46-5.67)	**4.32** (2.74-6.56)
2-hr	**1.19** (0.928-1.50)	**1.48** (1.15-1.86)	**1.94** (1.50-2.45)	**2.32** (1.79-2.94)	**2.85** (2.13-3.78)	**3.24** (2.38-4.40)	**3.66** (2.62-5.15)	**4.15** (2.80-5.92)	**4.88** (3.17-7.18)	**5.48** (3.49-8.23)
3-hr	**1.42** (1.11-1.78)	**1.74** (1.36-2.18)	**2.26** (1.76-2.84)	**2.69** (2.08-3.40)	**3.29** (2.47-4.34)	**3.74** (2.75-5.03)	**4.21** (3.02-5.87)	**4.75** (3.22-6.73)	**5.54** (3.61-8.10)	**6.19** (3.95-9.23)
6-hr	**1.85** (1.45-2.30)	**2.23** (1.75-2.78)	**2.85** (2.23-3.56)	**3.37** (2.62-4.23)	**4.08** (3.08-5.33)	**4.62** (3.41-6.14)	**5.18** (3.72-7.13)	**5.81** (3.96-8.14)	**6.71** (4.40-9.71)	**7.45** (4.78-11.0)
12-hr	**2.31** (1.83-2.85)	**2.75** (2.17-3.40)	**3.46** (2.73-4.30)	**4.06** (3.18-5.06)	**4.88** (3.71-6.32)	**5.50** (4.09-7.25)	**6.15** (4.44-8.36)	**6.87** (4.71-9.52)	**7.88** (5.20-11.3)	**8.71** (5.61-12.7)
24-hr	**2.76** (2.20-3.39)	**3.25** (2.59-3.99)	**4.05** (3.21-4.99)	**4.72** (3.72-5.83)	**5.63** (4.30-7.21)	**6.32** (4.72-8.24)	**7.04** (5.10-9.45)	**7.82** (5.39-10.7)	**8.91** (5.91-12.6)	**9.79** (6.34-14.1)
2-day	**3.21** (2.58-3.91)	**3.73** (2.99-4.55)	**4.59** (3.66-5.61)	**5.29** (4.20-6.50)	**6.27** (4.81-7.95)	**7.01** (5.26-9.04)	**7.77** (5.65-10.3)	**8.57** (5.95-11.6)	**9.68** (6.46-13.5)	**10.5** (6.86-15.0)
3-day	**3.52** (2.83-4.27)	**4.05** (3.26-4.92)	**4.91** (3.94-5.99)	**5.63** (4.49-6.89)	**6.62** (5.10-8.35)	**7.37** (5.56-9.45)	**8.14** (5.94-10.7)	**8.95** (6.23-12.1)	**10.1** (6.74-13.9)	**10.9** (7.14-15.4)
4-day	**3.78** (3.05-4.57)	**4.31** (3.48-5.22)	**5.18** (4.16-6.29)	**5.90** (4.72-7.20)	**6.89** (5.33-8.67)	**7.65** (5.78-9.77)	**8.42** (6.16-11.0)	**9.25** (6.45-12.4)	**10.4** (6.96-14.3)	**11.3** (7.36-15.8)

APPENDIX B

PRE-DEVELOPMENT WATERSHED RUNOFF & ROUTING

(2, 10, 25 and 100-year Storms)

BAXTER NYE ENGINEERING & SURVEYING
1597 Falmouth Road,, Suite 1 ■ Centerville, MA 02632
Tel: 508-771-7502 ■ Fax: 508-771-7622 ■ www.baxter-nye.com



Routing Diagram for 2023-108 EXISTING
Prepared by Baxter Nye Engineering & Surveying, Printed 7/14/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.230	96	Gravel surface, HSG A (DA1, DA1B, DA2, DA3, DA4)
3.003	30	Woods, Good, HSG A (DA1, DA1A, DA1B, DA2, DA3, DA4)
3.233	**35**	**TOTAL AREA**

Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Existing areas to low Runoff Area=0.312 ac 0.00% Impervious Runoff Depth=0.51"
Flow Length=252' Tc=10.2 min CN=35 Runoff=0.06 cfs 0.013 af

SubcatchmentDA1A: Existing areas to north Runoff Area=0.162 ac 0.00% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.003 af

SubcatchmentDA1B: Existing areas to east Runoff Area=0.757 ac 0.00% Impervious Runoff Depth=0.57"
Tc=5.0 min CN=36 Runoff=0.18 cfs 0.036 af

SubcatchmentDA2: SP2 Runoff Area=1.079 ac 0.00% Impervious Runoff Depth=0.32"
Flow Length=228' Tc=12.2 min CN=32 Runoff=0.08 cfs 0.029 af

SubcatchmentDA3: SP3 Runoff Area=0.529 ac 0.00% Impervious Runoff Depth=1.01"
Tc=5.0 min CN=42 Runoff=0.42 cfs 0.045 af

SubcatchmentDA4: SP4 Runoff Area=0.394 ac 0.00% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=30 Runoff=0.01 cfs 0.007 af

Reach SP1: Study Point 1 Inflow=0.18 cfs 0.047 af
Outflow=0.18 cfs 0.047 af

Pond 1P: Existing Low Area Peak Elev=57.51' Storage=124 cf Inflow=0.06 cfs 0.013 af
Discarded=0.00 cfs 0.005 af Primary=0.02 cfs 0.008 af Outflow=0.03 cfs 0.013 af

Total Runoff Area = 3.233 ac Runoff Volume = 0.133 af Average Runoff Depth = 0.49"
100.00% Pervious = 3.233 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA1: Existing areas to low point at road

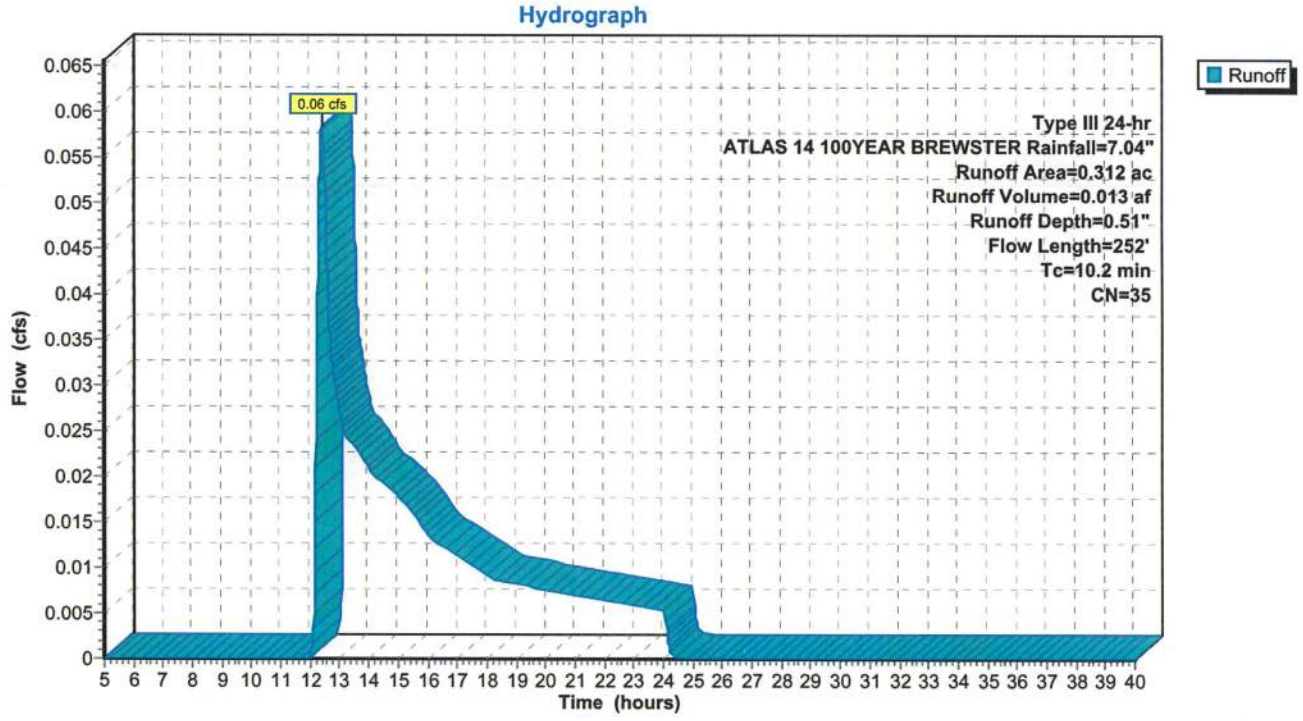
Runoff = 0.06 cfs @ 12.41 hrs, Volume= 0.013 af, Depth= 0.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.025	96	Gravel surface, HSG A
0.287	30	Woods, Good, HSG A
0.312	35	Weighted Average
0.312		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	61	0.0820	0.12		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	191	0.1047	1.62		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
10.2	252	Total			

Subcatchment DA1: Existing areas to low point at road



Summary for Subcatchment DA1A: Existing areas to north

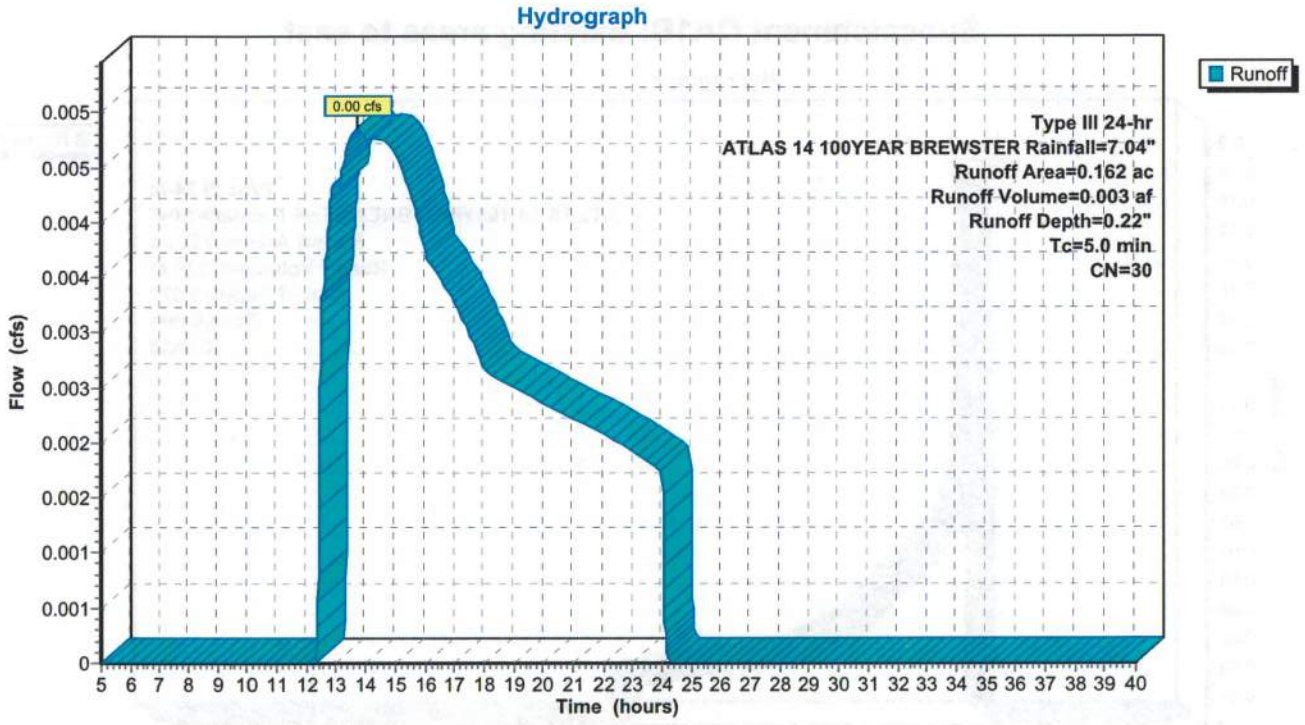
Runoff = 0.00 cfs @ 13.73 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.162	30	Woods, Good, HSG A
0.162		100.00% Pervious Area

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

Subcatchment DA1A: Existing areas to north



Summary for Subcatchment DA1B: Existing areas to east

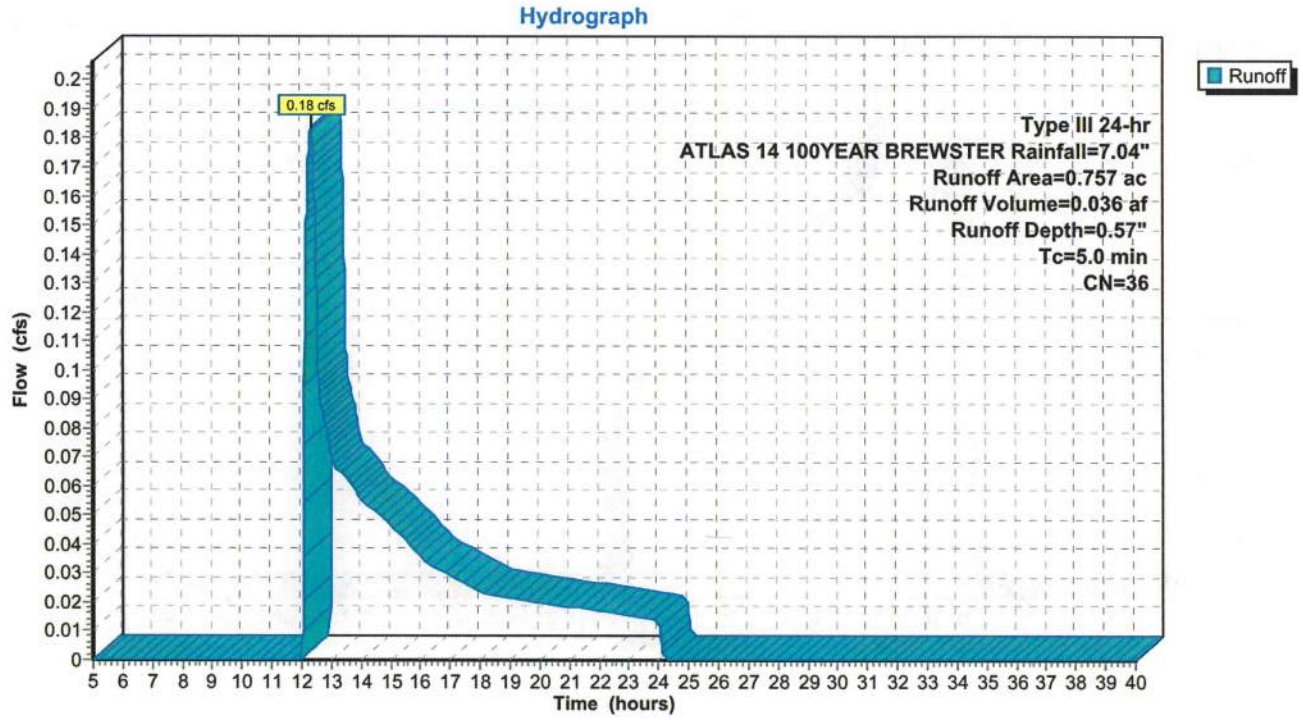
Runoff = 0.18 cfs @ 12.31 hrs, Volume= 0.036 af, Depth= 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.074	96	Gravel surface, HSG A
0.683	30	Woods, Good, HSG A
0.757	36	Weighted Average
0.757		100.00% Pervious Area

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

Subcatchment DA1B: Existing areas to east



Summary for Subcatchment DA2: SP2

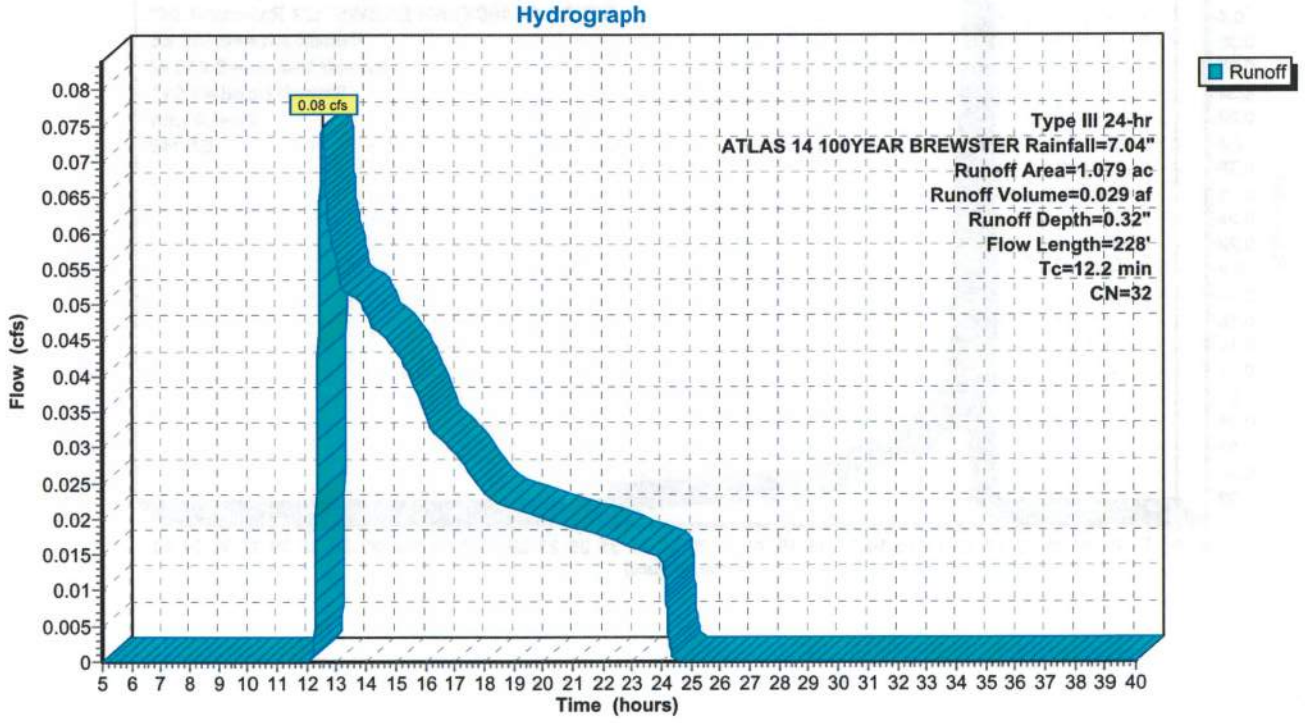
Runoff = 0.08 cfs @ 12.54 hrs, Volume= 0.029 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.035	96	Gravel surface, HSG A
1.044	30	Woods, Good, HSG A
1.079	32	Weighted Average
1.079		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	64	0.0468	0.10		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	164	0.1280	1.79		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
12.2	228	Total			

Subcatchment DA2: SP2



Summary for Subcatchment DA3: SP3

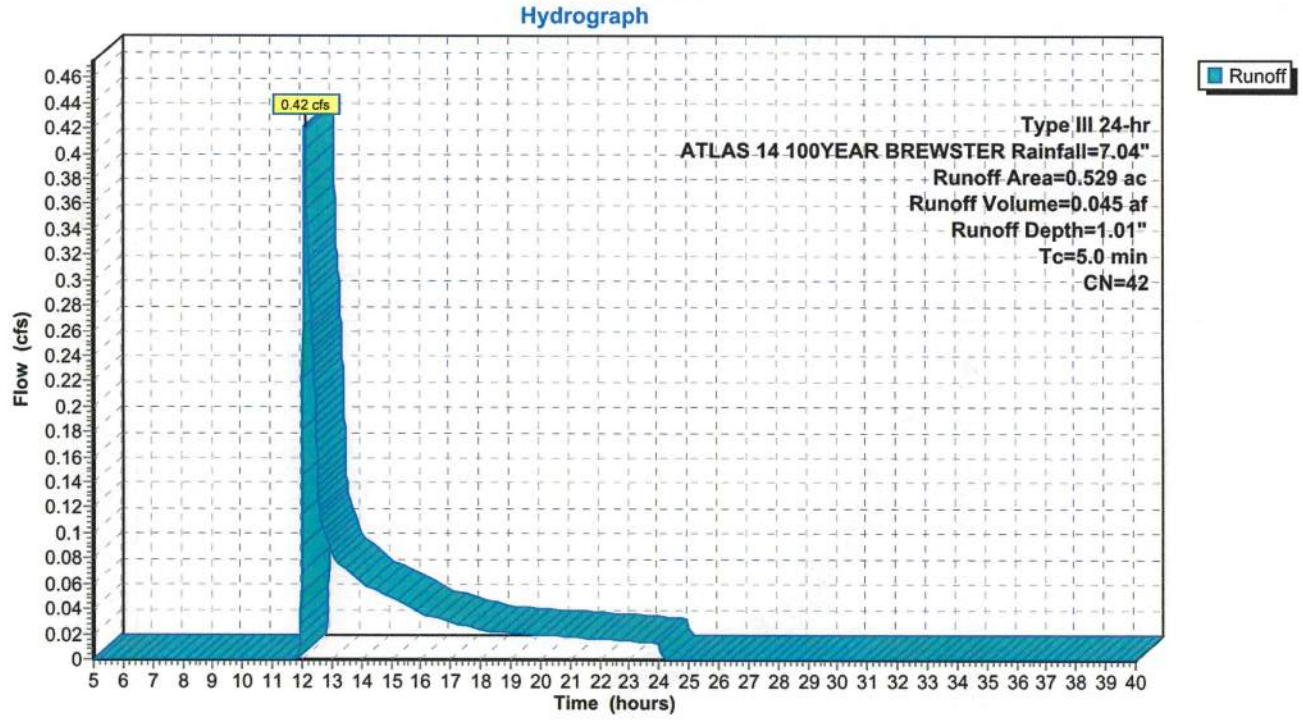
Runoff = 0.42 cfs @ 12.11 hrs, Volume= 0.045 af, Depth= 1.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.095	96	Gravel surface, HSG A
0.434	30	Woods, Good, HSG A
0.529	42	Weighted Average
0.529		100.00% Pervious Area

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

Subcatchment DA3: SP3



Summary for Subcatchment DA4: SP4

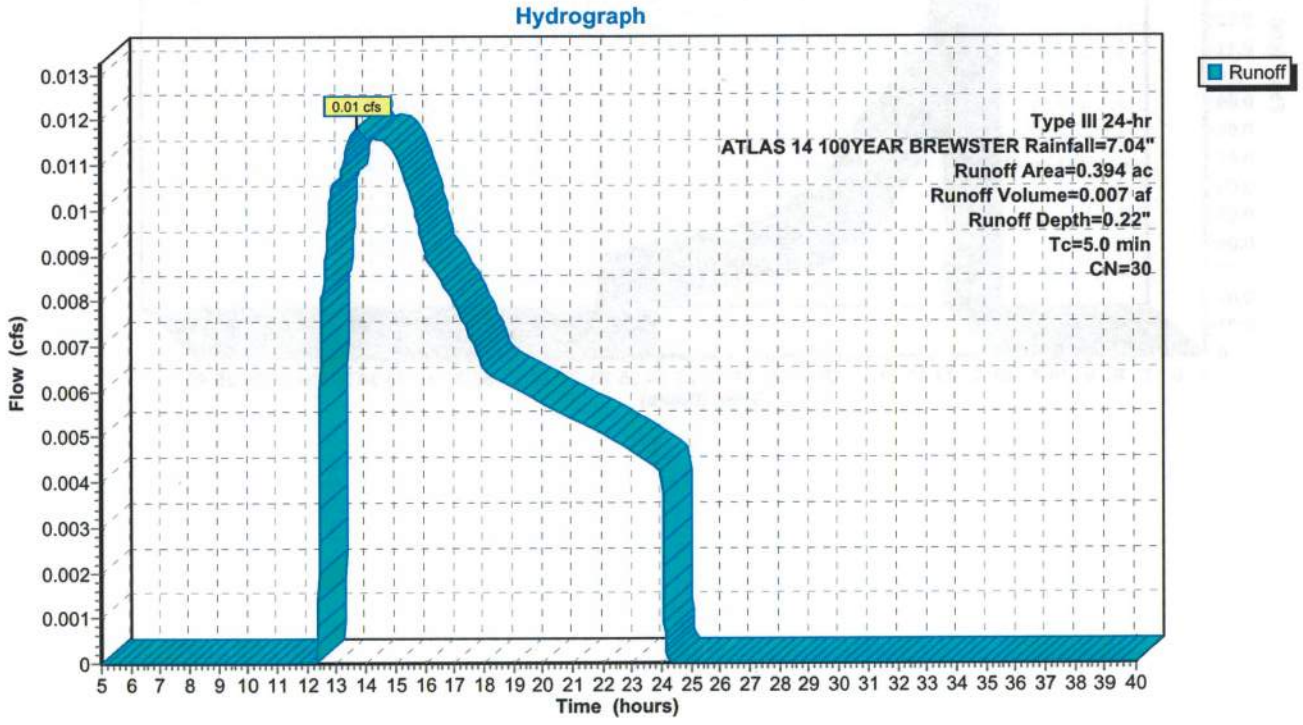
Runoff = 0.01 cfs @ 13.73 hrs, Volume= 0.007 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.393	30	Woods, Good, HSG A
0.394	30	Weighted Average
0.394		100.00% Pervious Area

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

Subcatchment DA4: SP4

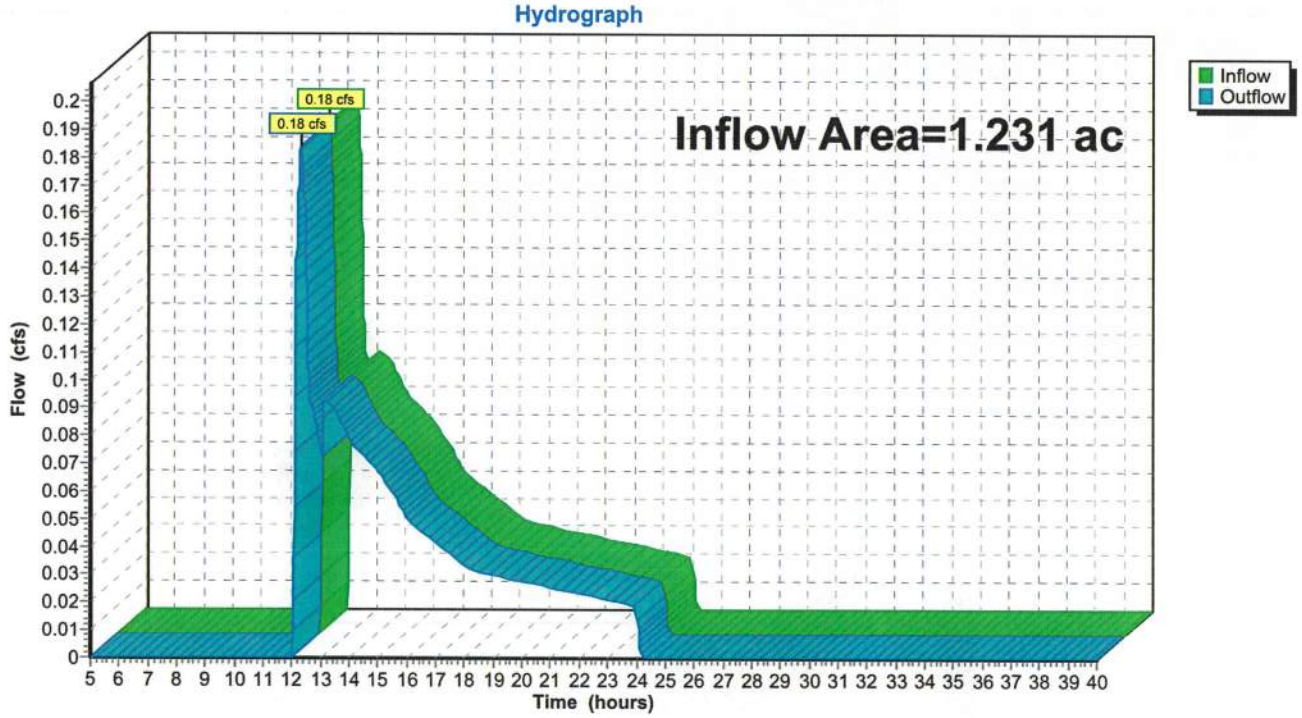


Summary for Reach SP1: Study Point 1

Inflow Area = 1.231 ac, 0.00% Impervious, Inflow Depth = 0.46" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.18 cfs @ 12.31 hrs, Volume= 0.047 af
Outflow = 0.18 cfs @ 12.31 hrs, Volume= 0.047 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Existing Low Area

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 0.51" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.06 cfs @ 12.41 hrs, Volume= 0.013 af
Outflow = 0.03 cfs @ 13.11 hrs, Volume= 0.013 af, Atten= 57%, Lag= 41.9 min
Discarded = 0.00 cfs @ 13.08 hrs, Volume= 0.005 af
Primary = 0.02 cfs @ 13.11 hrs, Volume= 0.008 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 57.51' @ 13.11 hrs Surf.Area= 92 sf Storage= 124 cf

Plug-Flow detention time= 242.8 min calculated for 0.013 af (97% of inflow)
Center-of-Mass det. time= 231.0 min (1,197.1 - 966.1)

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	171 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

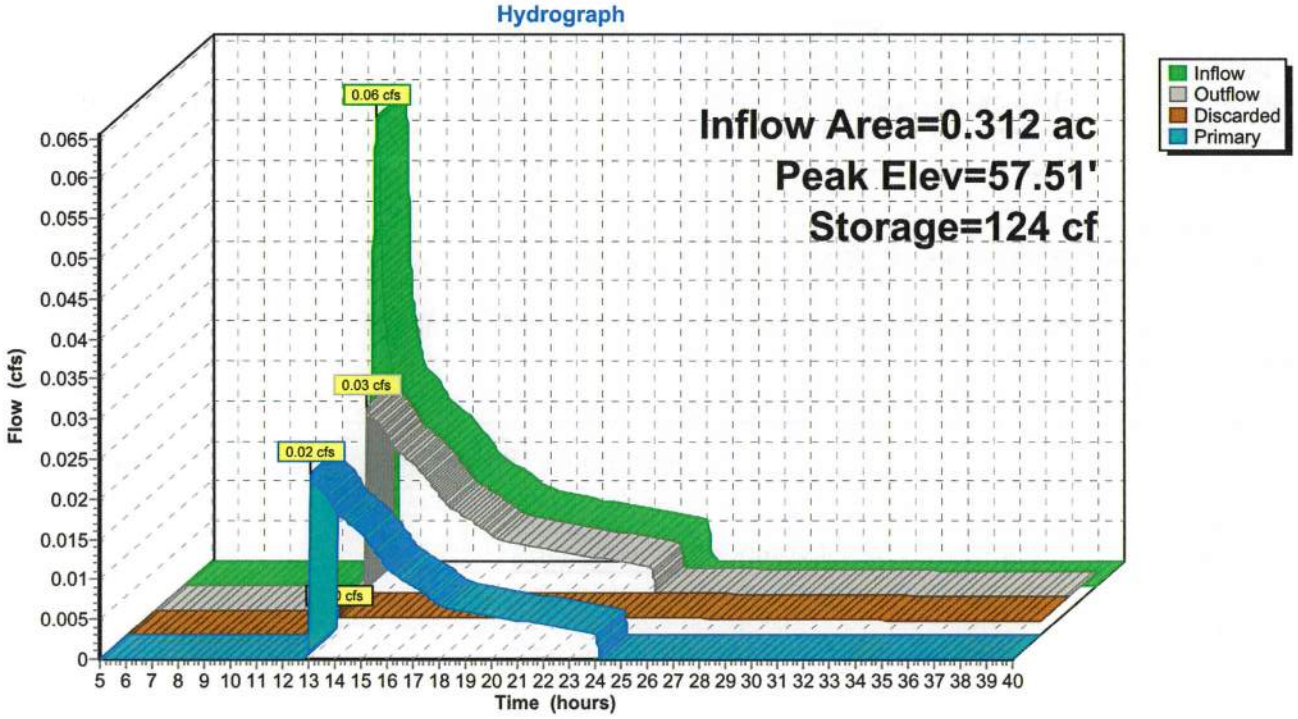
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	1	0	0
56.00	68	3	3
58.00	100	168	171

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**1.020 in/hr Exfiltration over Surface area from 55.80' - 57.50'** Excluded Surface area = 0 sf
#2	Primary	57.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 13.08 hrs HW=57.50' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.02 cfs @ 13.11 hrs HW=57.51' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 0.02 cfs @ 0.21 fps)

Pond 1P: Existing Low Area



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Existing areas to low Runoff Area=0.312 ac 0.00% Impervious Runoff Depth=0.05"
Flow Length=252' Tc=10.2 min CN=35 Runoff=0.00 cfs 0.001 af

SubcatchmentDA1A: Existing areas to north Runoff Area=0.162 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1B: Existing areas to east Runoff Area=0.757 ac 0.00% Impervious Runoff Depth=0.07"
Tc=5.0 min CN=36 Runoff=0.01 cfs 0.005 af

SubcatchmentDA2: SP2 Runoff Area=1.079 ac 0.00% Impervious Runoff Depth=0.01"
Flow Length=228' Tc=12.2 min CN=32 Runoff=0.00 cfs 0.001 af

SubcatchmentDA3: SP3 Runoff Area=0.529 ac 0.00% Impervious Runoff Depth=0.24"
Tc=5.0 min CN=42 Runoff=0.04 cfs 0.011 af

SubcatchmentDA4: SP4 Runoff Area=0.394 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

Reach SP1: Study Point 1 Inflow=0.01 cfs 0.005 af
Outflow=0.01 cfs 0.005 af

Pond 1P: Existing Low Area Peak Elev=56.03' Storage=5 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.001 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.001 af

Total Runoff Area = 3.233 ac Runoff Volume = 0.017 af Average Runoff Depth = 0.06"
100.00% Pervious = 3.233 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA1: Existing areas to low point at road

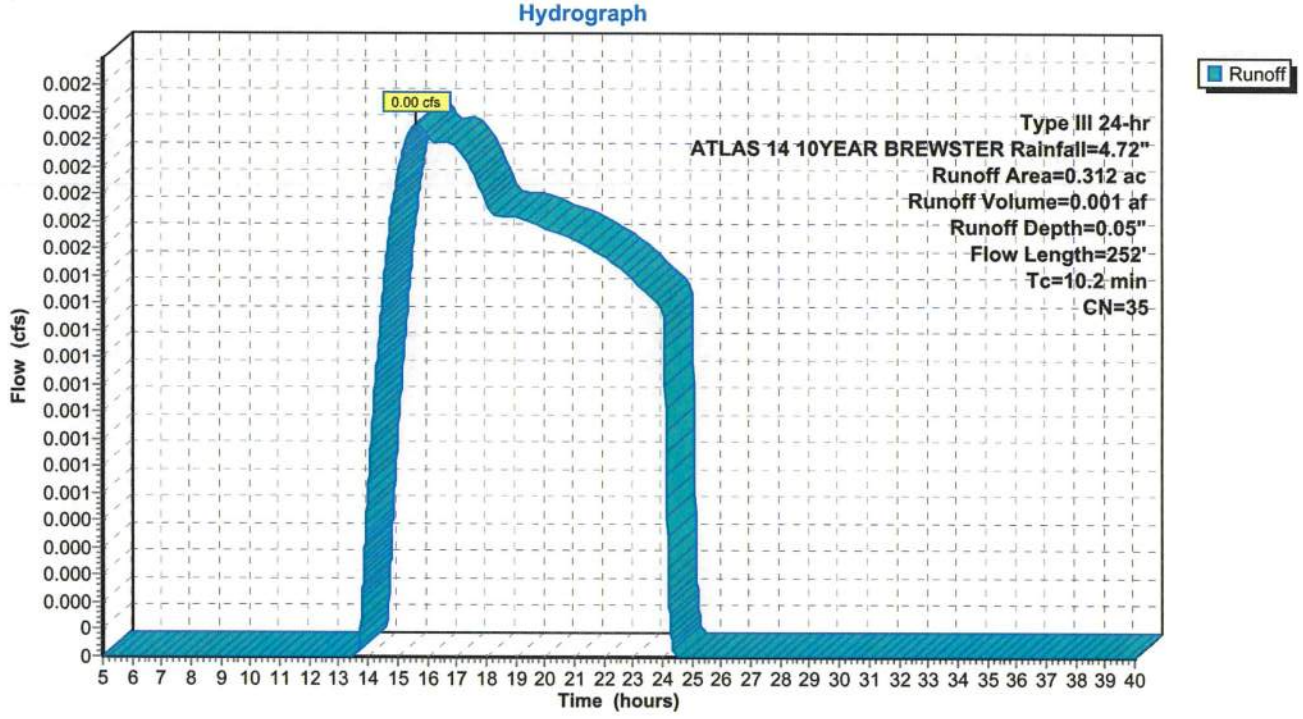
Runoff = 0.00 cfs @ 15.65 hrs, Volume= 0.001 af, Depth= 0.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.025	96	Gravel surface, HSG A
0.287	30	Woods, Good, HSG A
0.312	35	Weighted Average
0.312		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	61	0.0820	0.12		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	191	0.1047	1.62		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
10.2	252	Total			

Subcatchment DA1: Existing areas to low point at road



Summary for Subcatchment DA1A: Existing areas to north

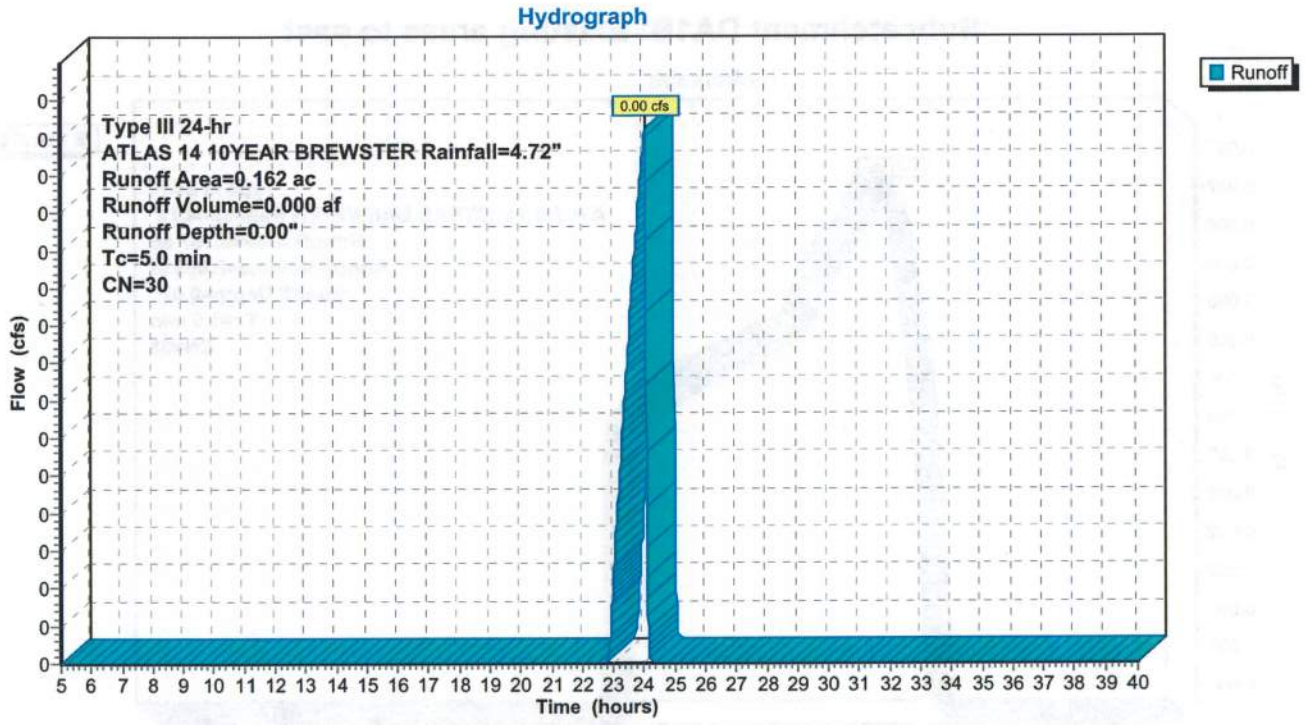
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.162	30	Woods, Good, HSG A
0.162		100.00% Pervious Area

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

Subcatchment DA1A: Existing areas to north



Summary for Subcatchment DA1B: Existing areas to east

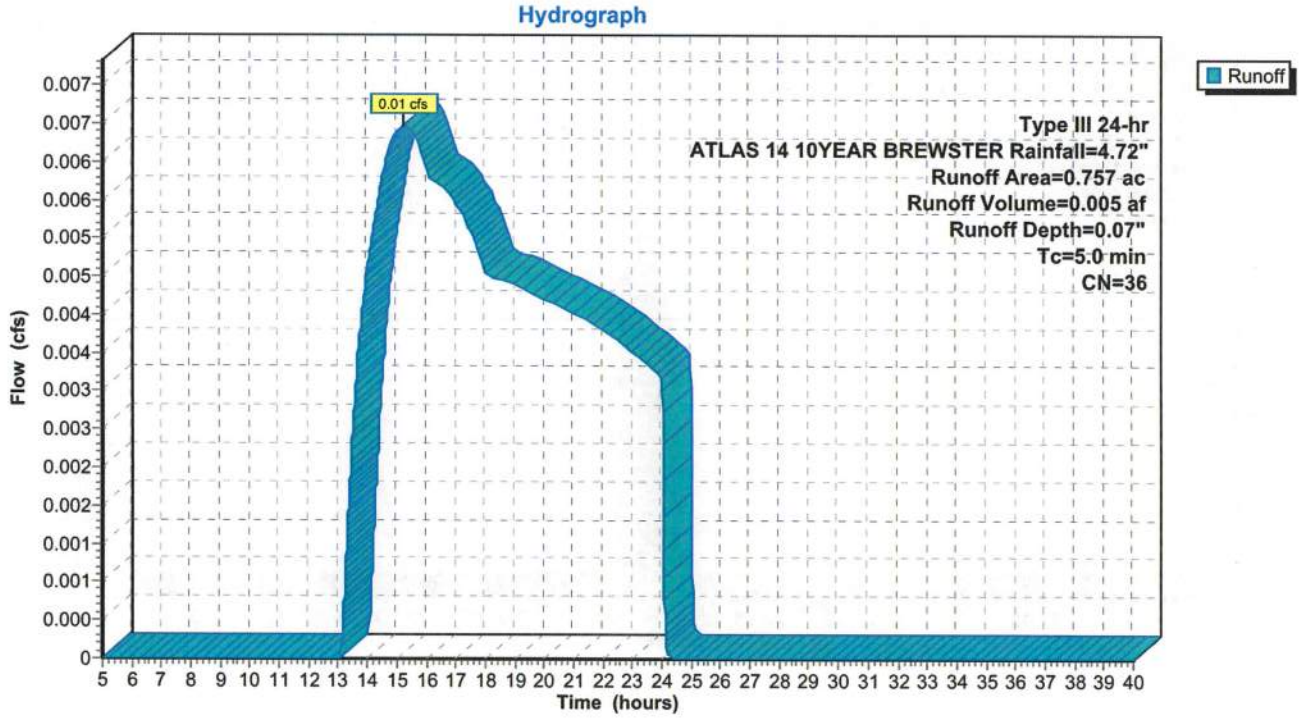
Runoff = 0.01 cfs @ 15.24 hrs, Volume= 0.005 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.074	96	Gravel surface, HSG A
0.683	30	Woods, Good, HSG A
0.757	36	Weighted Average
0.757		100.00% Pervious Area

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

Subcatchment DA1B: Existing areas to east



Summary for Subcatchment DA2: SP2

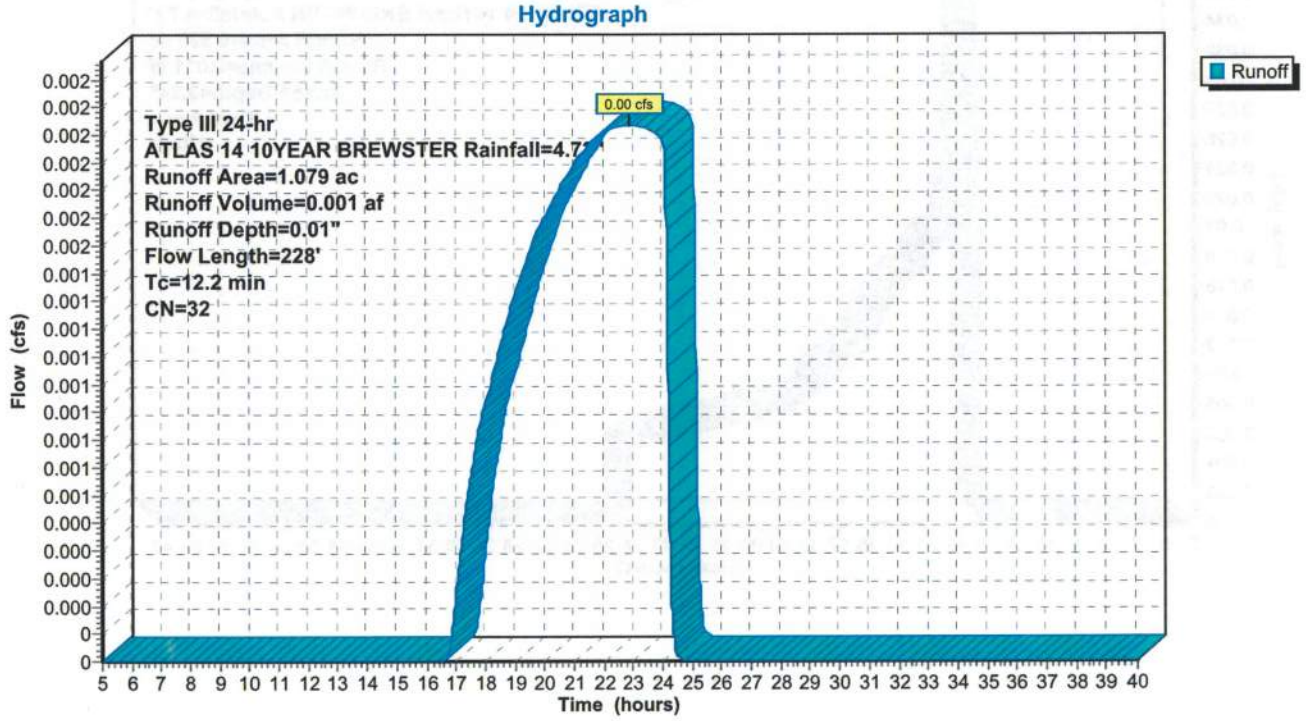
Runoff = 0.00 cfs @ 22.84 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.035	96	Gravel surface, HSG A
1.044	30	Woods, Good, HSG A
1.079	32	Weighted Average
1.079		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	64	0.0468	0.10		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	164	0.1280	1.79		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
12.2	228	Total			

Subcatchment DA2: SP2



Summary for Subcatchment DA3: SP3

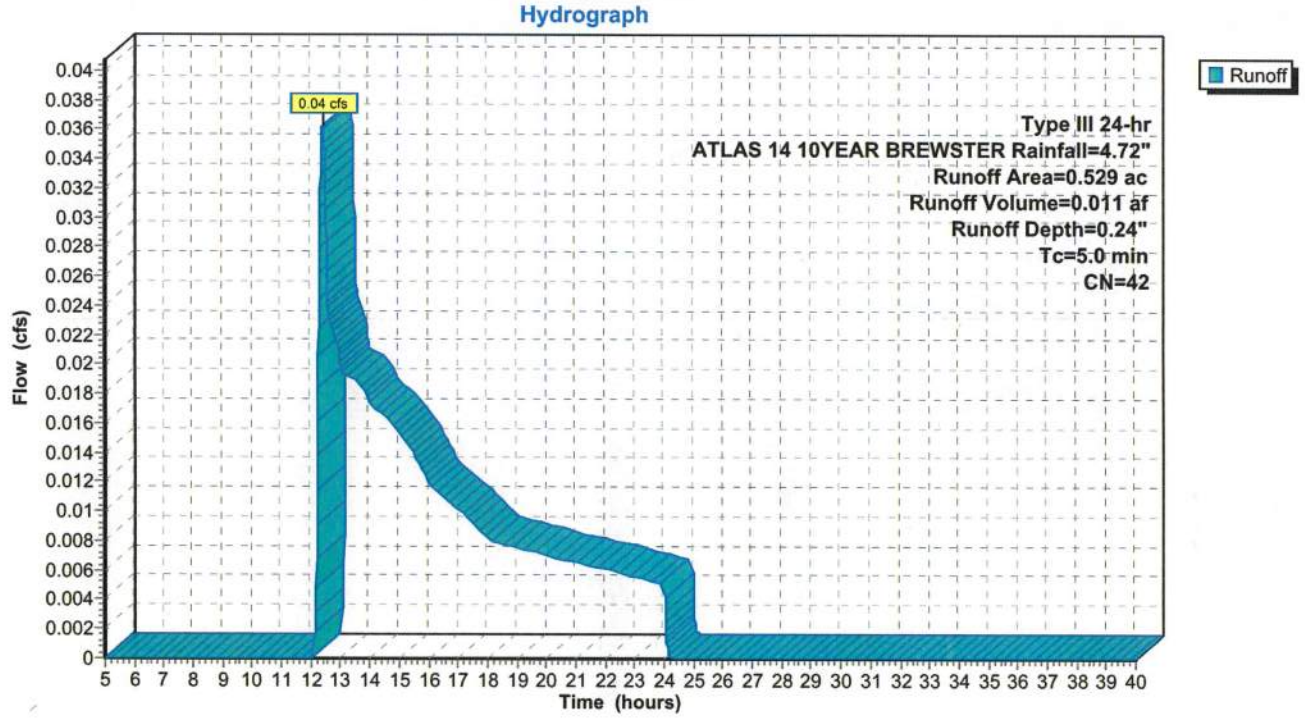
Runoff = 0.04 cfs @ 12.40 hrs, Volume= 0.011 af, Depth= 0.24"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.095	96	Gravel surface, HSG A
0.434	30	Woods, Good, HSG A
0.529	42	Weighted Average
0.529		100.00% Pervious Area

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

Subcatchment DA3: SP3



Summary for Subcatchment DA4: SP4

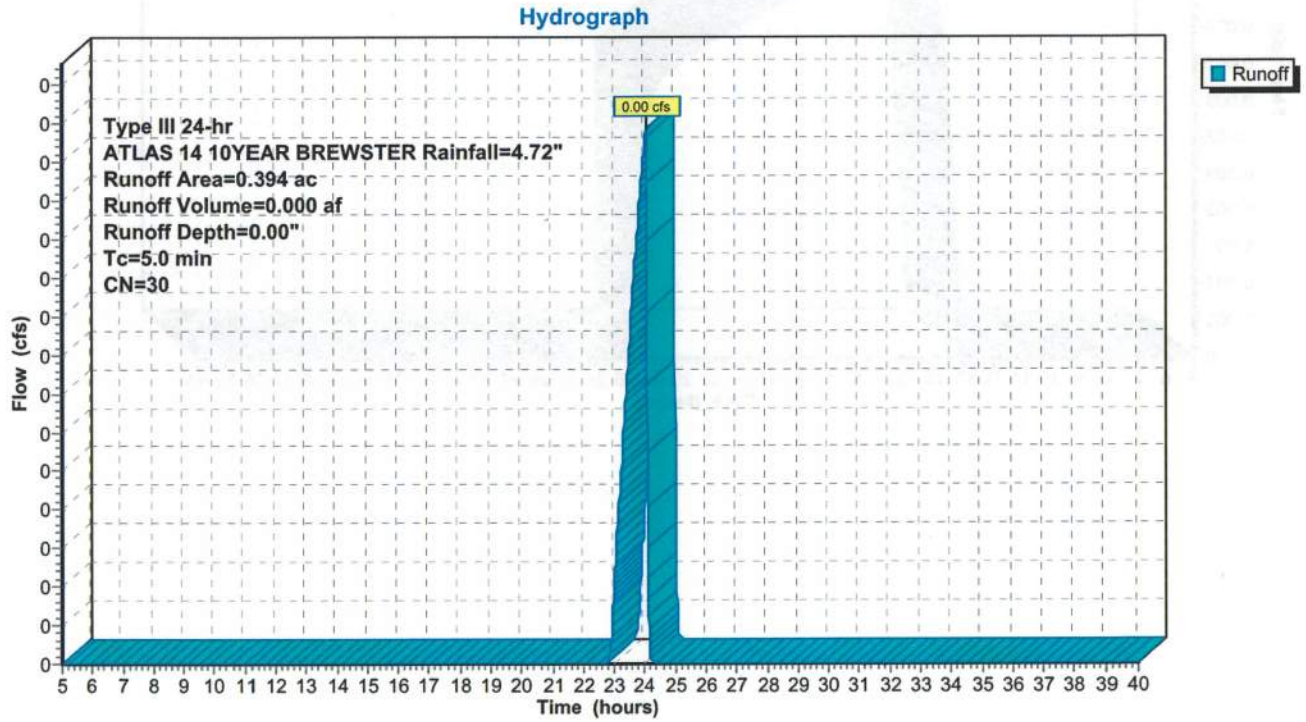
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.393	30	Woods, Good, HSG A
0.394	30	Weighted Average
0.394		100.00% Pervious Area

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

Subcatchment DA4: SP4

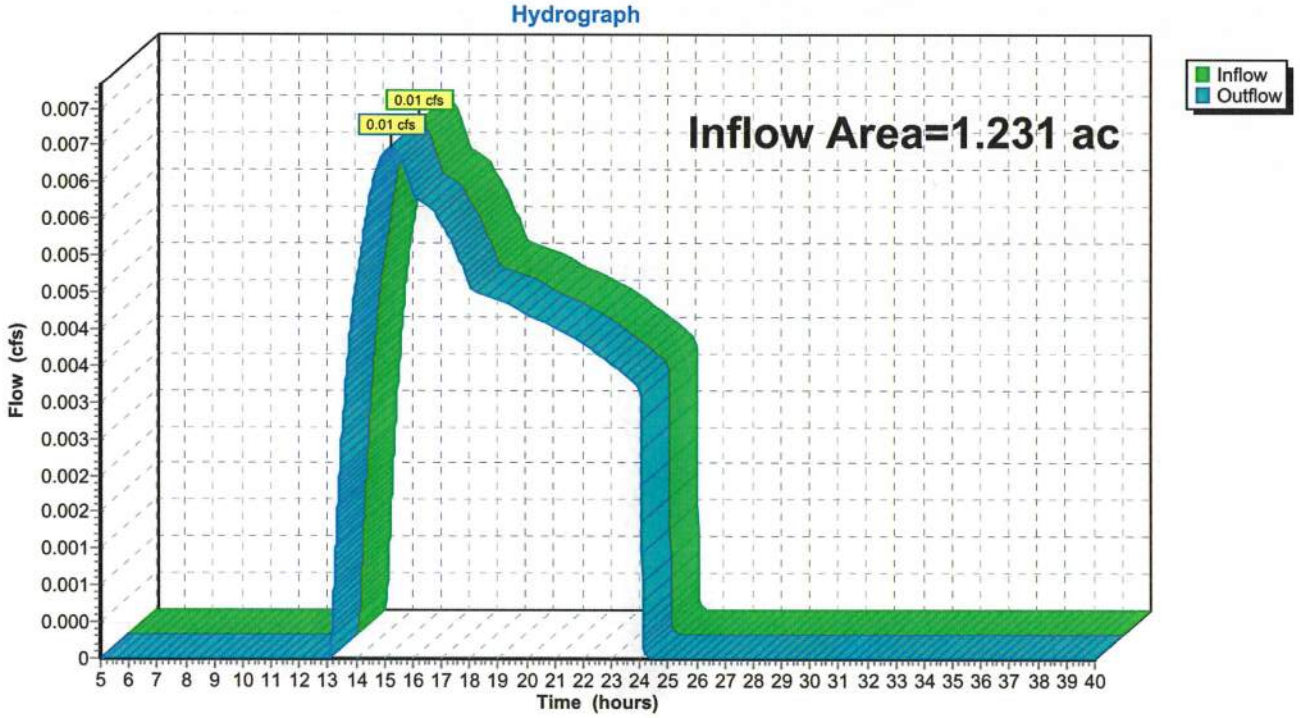


Summary for Reach SP1: Study Point 1

Inflow Area = 1.231 ac, 0.00% Impervious, Inflow Depth = 0.04" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.01 cfs @ 15.24 hrs, Volume= 0.005 af
Outflow = 0.01 cfs @ 15.24 hrs, Volume= 0.005 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Existing Low Area

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 0.05" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.00 cfs @ 15.65 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 19.08 hrs, Volume= 0.001 af, Atten= 18%, Lag= 205.9 min
Discarded = 0.00 cfs @ 19.08 hrs, Volume= 0.001 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 56.03' @ 19.08 hrs Surf.Area= 68 sf Storage= 5 cf

Plug-Flow detention time= 44.1 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 44.1 min (1,175.8 - 1,131.7)

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	171 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

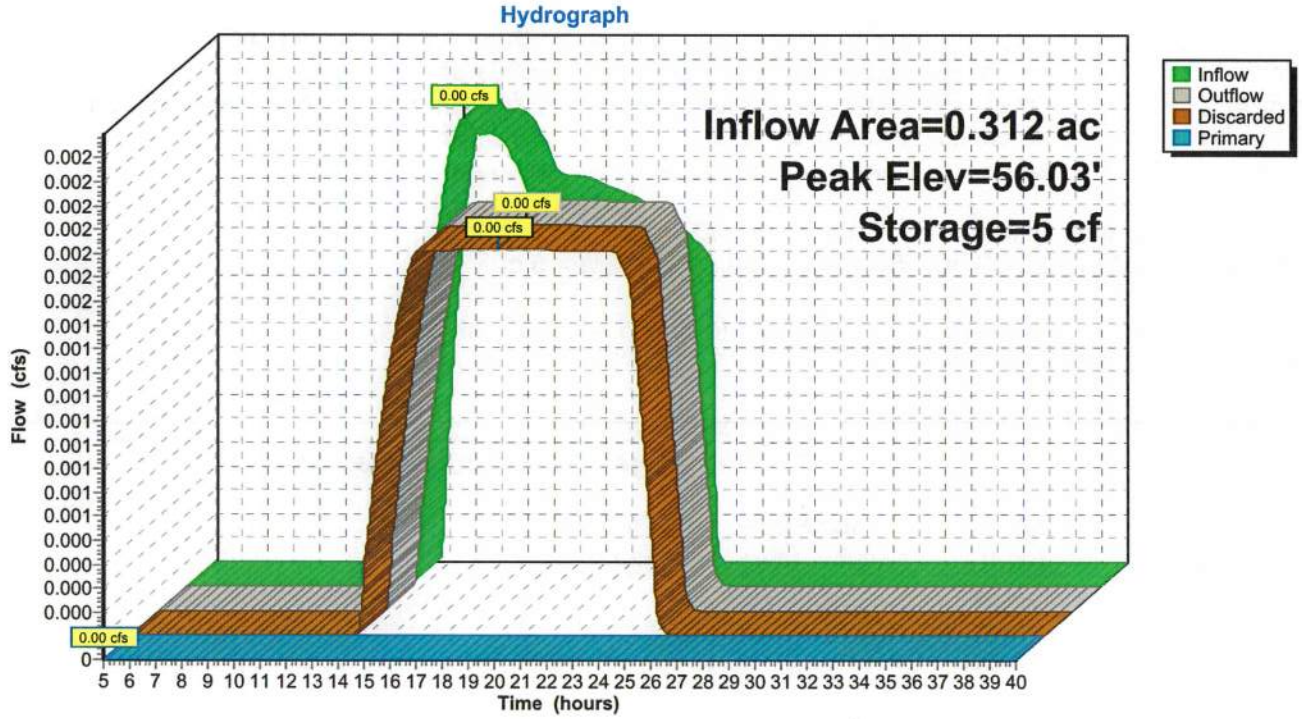
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	1	0	0
56.00	68	3	3
58.00	100	168	171

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**1.020 in/hr Exfiltration over Surface area from 55.80' - 57.50'** Excluded Surface area = 0 sf
#2	Primary	57.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 19.08 hrs HW=56.03' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=55.90' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Existing Low Area



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Existing areas to low Runoff Area=0.312 ac 0.00% Impervious Runoff Depth=0.18"
Flow Length=252' Tc=10.2 min CN=35 Runoff=0.01 cfs 0.005 af

SubcatchmentDA1A: Existing areas to north Runoff Area=0.162 ac 0.00% Impervious Runoff Depth=0.04"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.001 af

SubcatchmentDA1B: Existing areas to east Runoff Area=0.757 ac 0.00% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=36 Runoff=0.03 cfs 0.014 af

SubcatchmentDA2: SP2 Runoff Area=1.079 ac 0.00% Impervious Runoff Depth=0.08"
Flow Length=228' Tc=12.2 min CN=32 Runoff=0.01 cfs 0.008 af

SubcatchmentDA3: SP3 Runoff Area=0.529 ac 0.00% Impervious Runoff Depth=0.49"
Tc=5.0 min CN=42 Runoff=0.12 cfs 0.022 af

SubcatchmentDA4: SP4 Runoff Area=0.394 ac 0.00% Impervious Runoff Depth=0.04"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.001 af

Reach SP1: Study Point 1 Inflow=0.03 cfs 0.014 af
Outflow=0.03 cfs 0.014 af

Pond 1P: Existing Low Area Peak Elev=57.46' Storage=120 cf Inflow=0.01 cfs 0.005 af
Discarded=0.00 cfs 0.004 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.004 af

Total Runoff Area = 3.233 ac Runoff Volume = 0.049 af Average Runoff Depth = 0.18"
100.00% Pervious = 3.233 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA1: Existing areas to low point at road

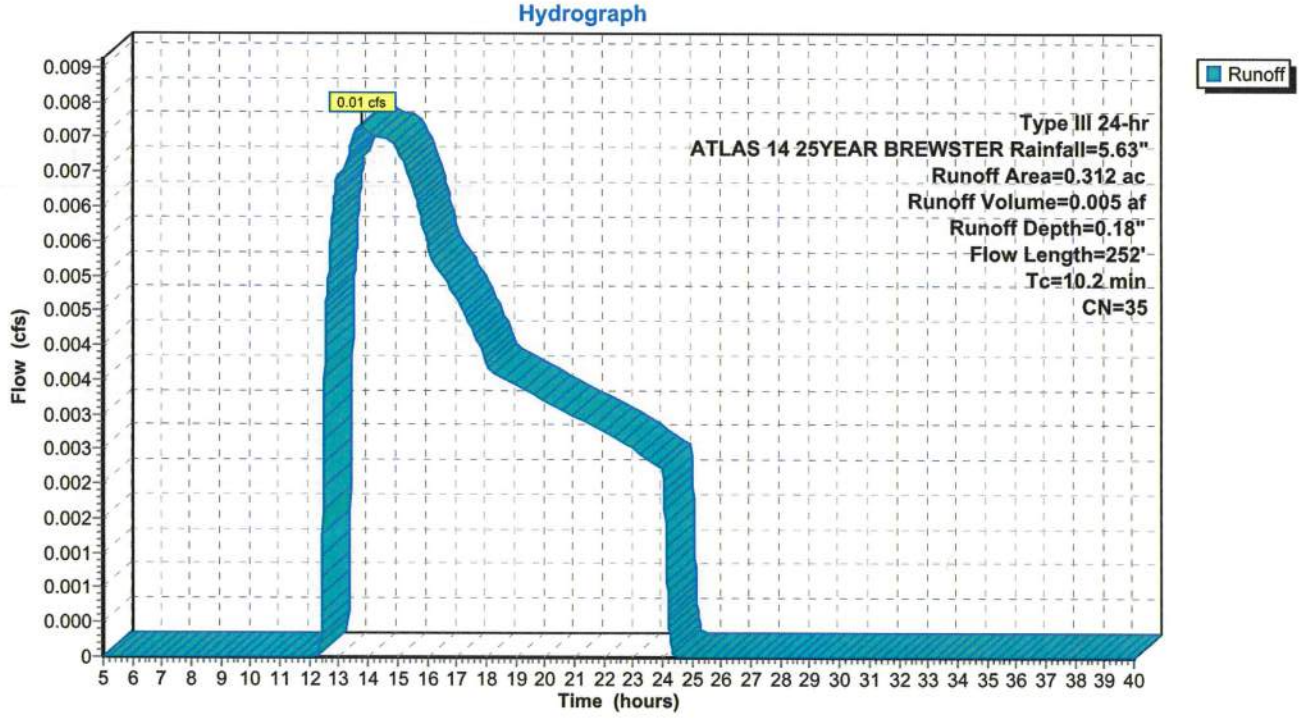
Runoff = 0.01 cfs @ 13.79 hrs, Volume= 0.005 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.025	96	Gravel surface, HSG A
0.287	30	Woods, Good, HSG A
0.312	35	Weighted Average
0.312		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	61	0.0820	0.12		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	191	0.1047	1.62		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
10.2	252	Total			

Subcatchment DA1: Existing areas to low point at road



Summary for Subcatchment DA1A: Existing areas to north

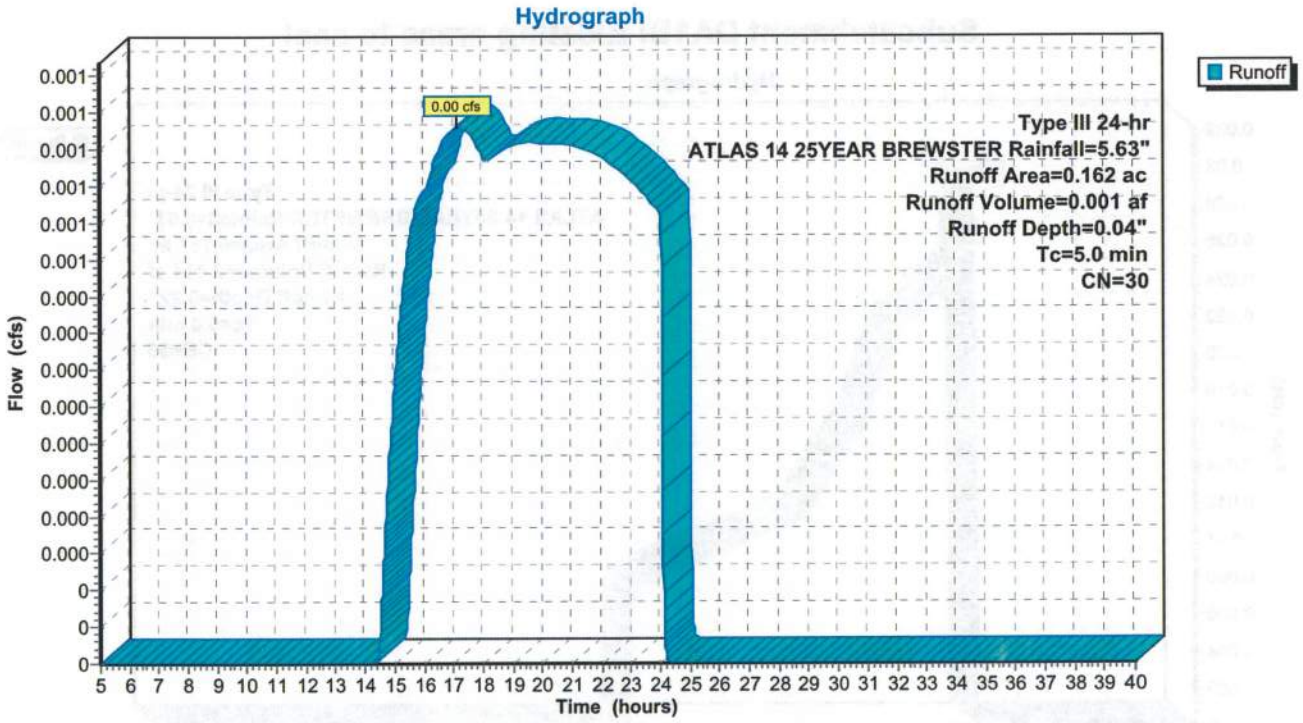
Runoff = 0.00 cfs @ 17.15 hrs, Volume= 0.001 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.162	30	Woods, Good, HSG A
0.162		100.00% Pervious Area

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

Subcatchment DA1A: Existing areas to north



Summary for Subcatchment DA1B: Existing areas to east

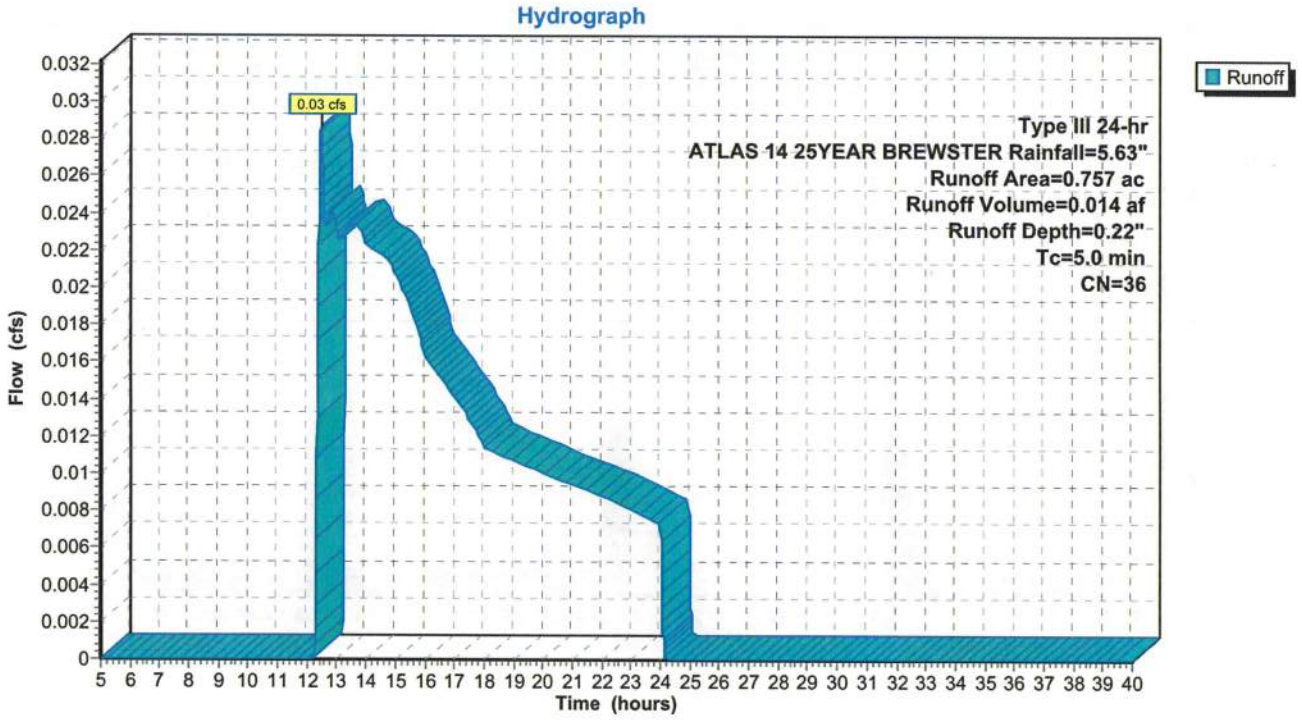
Runoff = 0.03 cfs @ 12.47 hrs, Volume= 0.014 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.074	96	Gravel surface, HSG A
0.683	30	Woods, Good, HSG A
0.757	36	Weighted Average
0.757		100.00% Pervious Area

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

Subcatchment DA1B: Existing areas to east



Summary for Subcatchment DA2: SP2

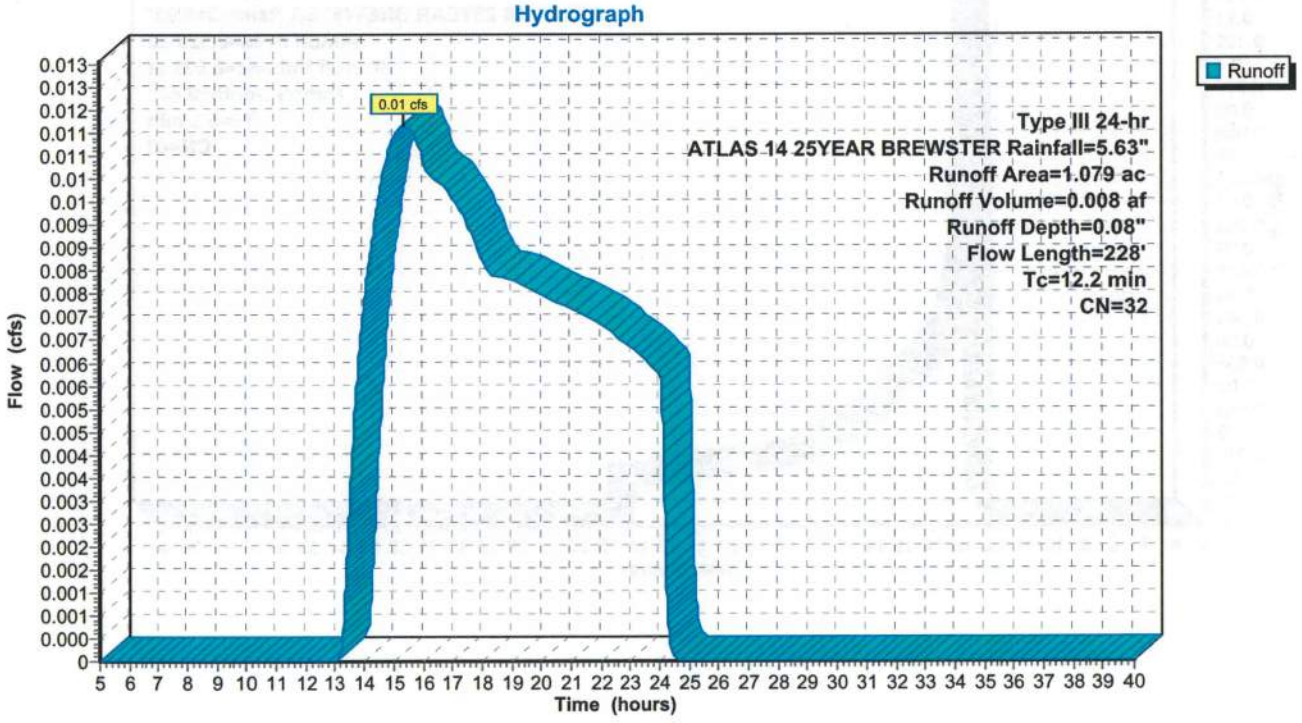
Runoff = 0.01 cfs @ 15.36 hrs, Volume= 0.008 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.035	96	Gravel surface, HSG A
1.044	30	Woods, Good, HSG A
1.079	32	Weighted Average
1.079		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	64	0.0468	0.10		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	164	0.1280	1.79		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
12.2	228	Total			

Subcatchment DA2: SP2



Summary for Subcatchment DA3: SP3

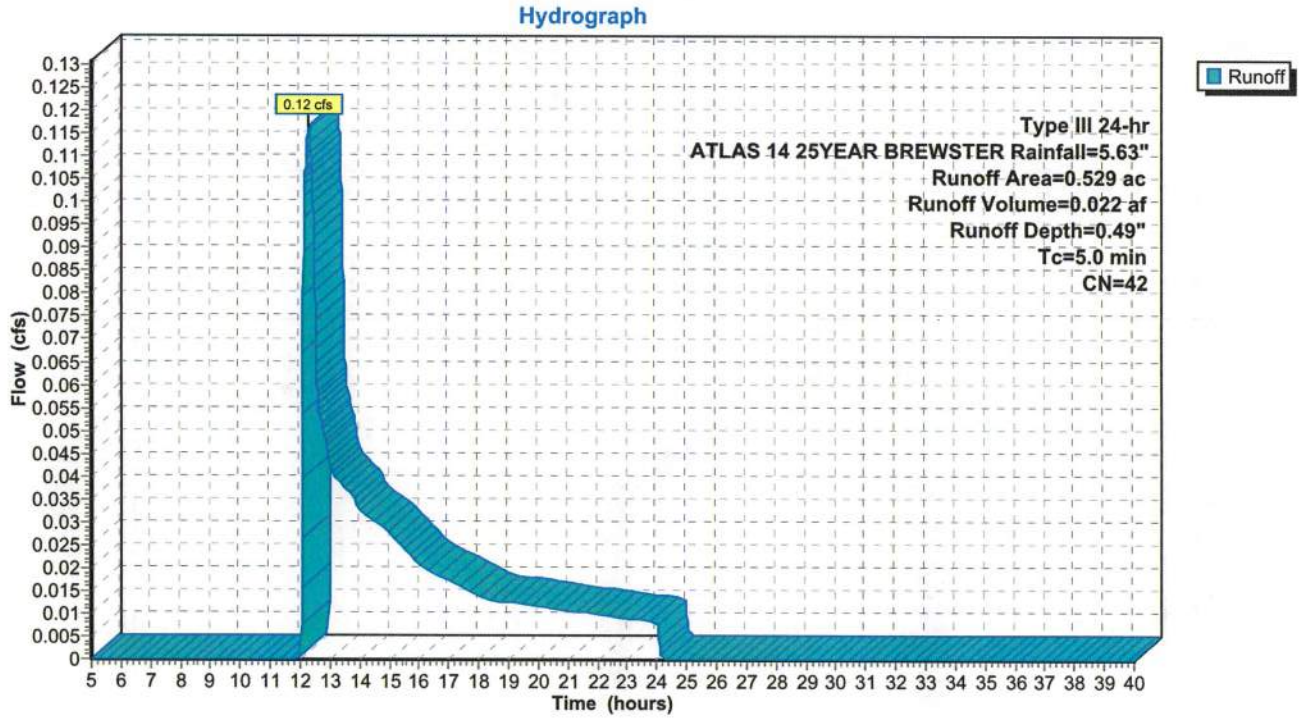
Runoff = 0.12 cfs @ 12.29 hrs, Volume= 0.022 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.095	96	Gravel surface, HSG A
0.434	30	Woods, Good, HSG A
0.529	42	Weighted Average
0.529		100.00% Pervious Area

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

Subcatchment DA3: SP3



Summary for Subcatchment DA4: SP4

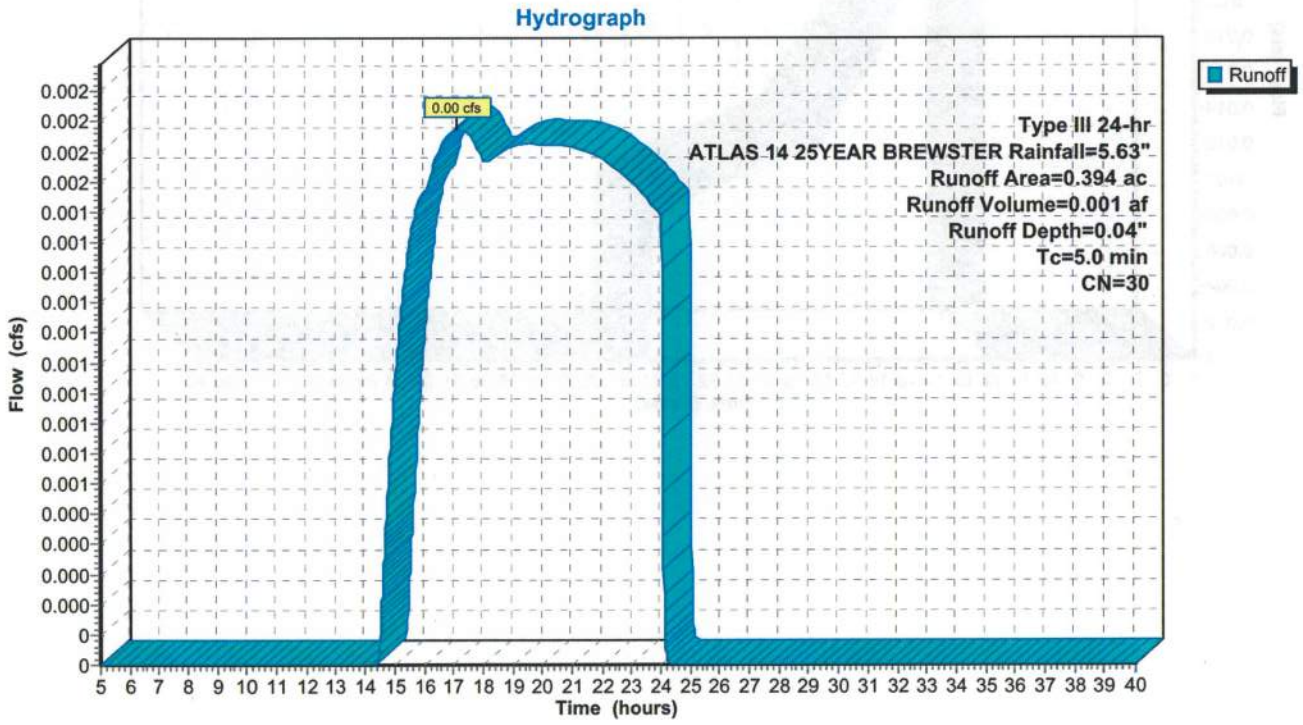
Runoff = 0.00 cfs @ 17.15 hrs, Volume= 0.001 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.393	30	Woods, Good, HSG A
0.394	30	Weighted Average
0.394		100.00% Pervious Area

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

Subcatchment DA4: SP4

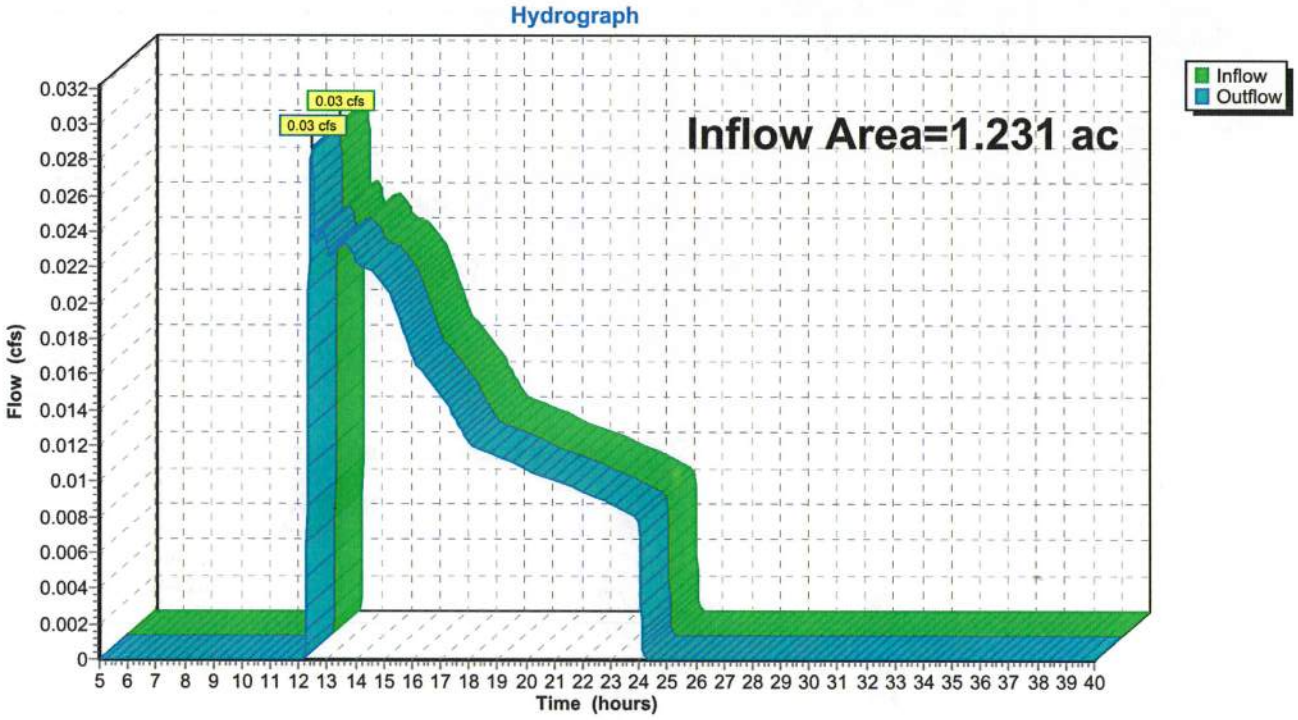


Summary for Reach SP1: Study Point 1

Inflow Area = 1.231 ac, 0.00% Impervious, Inflow Depth = 0.14" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.03 cfs @ 12.47 hrs, Volume= 0.014 af
Outflow = 0.03 cfs @ 12.47 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Existing Low Area

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 0.18" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.01 cfs @ 13.79 hrs, Volume= 0.005 af
Outflow = 0.00 cfs @ 24.10 hrs, Volume= 0.004 af, Atten= 72%, Lag= 618.5 min
Discarded = 0.00 cfs @ 24.10 hrs, Volume= 0.004 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 57.46' @ 24.10 hrs Surf.Area= 91 sf Storage= 120 cf

Plug-Flow detention time= 550.4 min calculated for 0.004 af (94% of inflow)
Center-of-Mass det. time= 528.0 min (1,562.4 - 1,034.4)

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	171 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

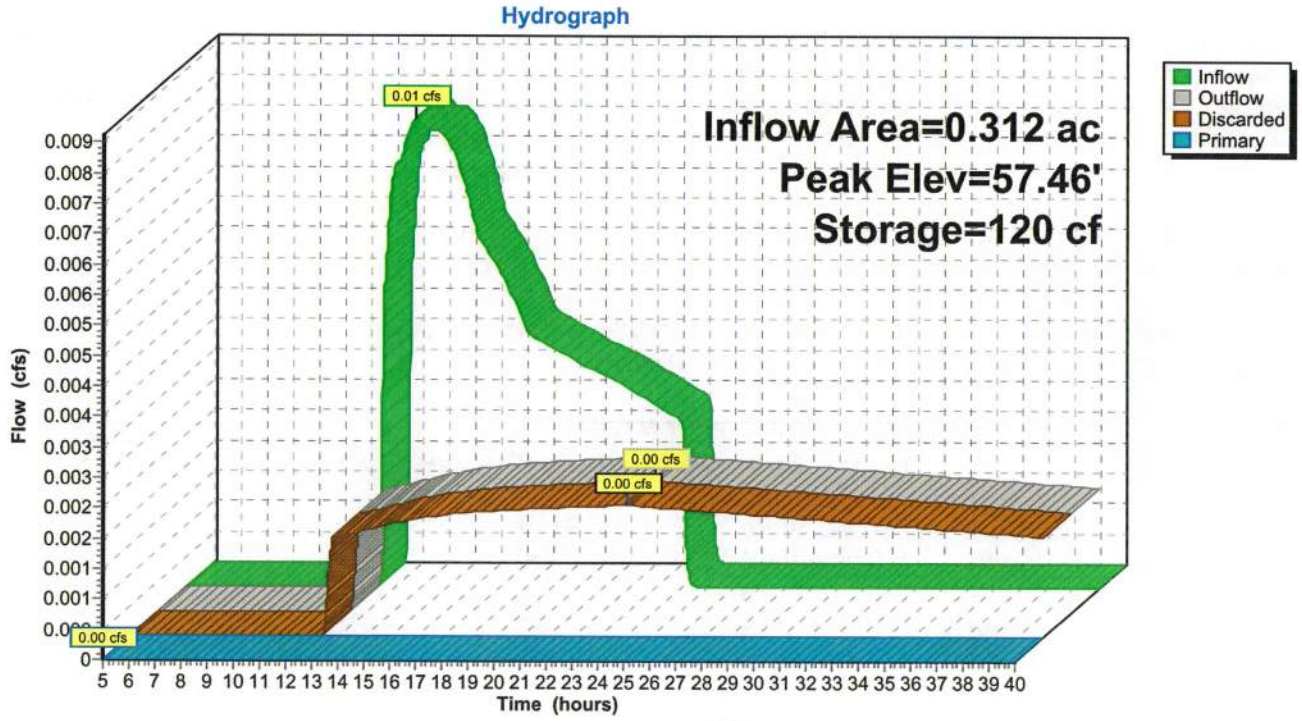
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	1	0	0
56.00	68	3	3
58.00	100	168	171

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**1.020 in/hr Exfiltration over Surface area from 55.80' - 57.50'** Excluded Surface area = 0 sf
#2	Primary	57.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 24.10 hrs HW=57.46' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=55.90' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Existing Low Area



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Existing areas to low Runoff Area=0.312 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=252' Tc=10.2 min CN=35 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1A: Existing areas to north Runoff Area=0.162 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1B: Existing areas to east Runoff Area=0.757 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=36 Runoff=0.00 cfs 0.000 af

SubcatchmentDA2: SP2 Runoff Area=1.079 ac 0.00% Impervious Runoff Depth=0.00"
Flow Length=228' Tc=12.2 min CN=32 Runoff=0.00 cfs 0.000 af

SubcatchmentDA3: SP3 Runoff Area=0.529 ac 0.00% Impervious Runoff Depth=0.02"
Tc=5.0 min CN=42 Runoff=0.00 cfs 0.001 af

SubcatchmentDA4: SP4 Runoff Area=0.394 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

Reach SP1: Study Point 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Existing Low Area Peak Elev=55.90' Storage=0 cf Inflow=0.00 cfs 0.000 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Total Runoff Area = 3.233 ac Runoff Volume = 0.001 af Average Runoff Depth = 0.00"
100.00% Pervious = 3.233 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment DA1: Existing areas to low point at road

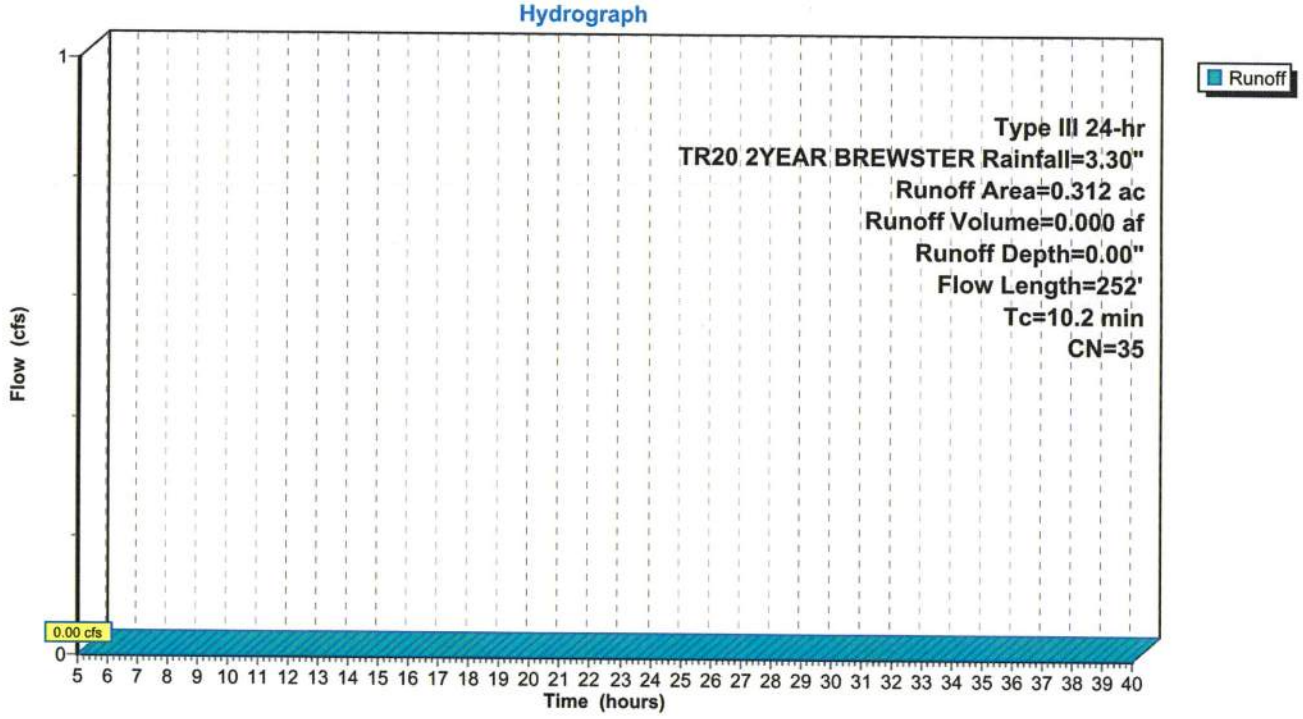
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.025	96	Gravel surface, HSG A
0.287	30	Woods, Good, HSG A
0.312	35	Weighted Average
0.312		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	61	0.0820	0.12		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
2.0	191	0.1047	1.62		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
10.2	252	Total			

Subcatchment DA1: Existing areas to low point at road



Summary for Subcatchment DA1A: Existing areas to north

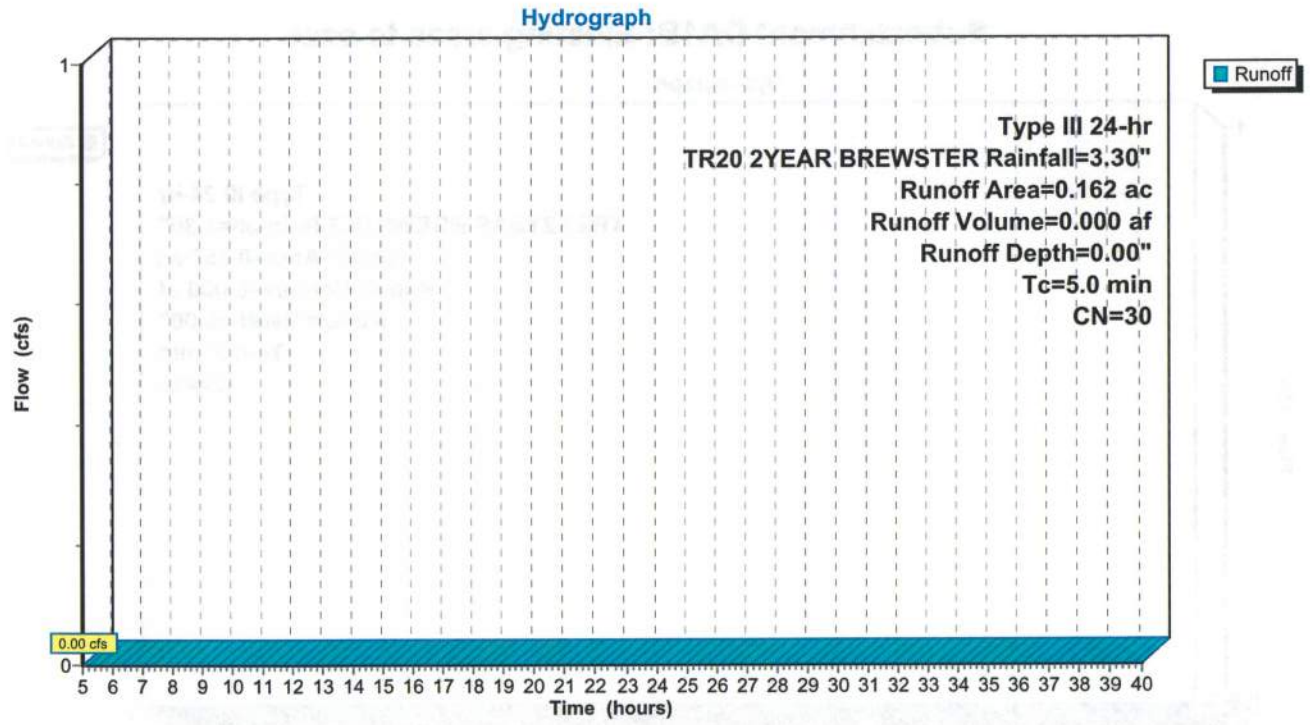
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.162	30	Woods, Good, HSG A
0.162		100.00% Pervious Area

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

Subcatchment DA1A: Existing areas to north



Summary for Subcatchment DA1B: Existing areas to east

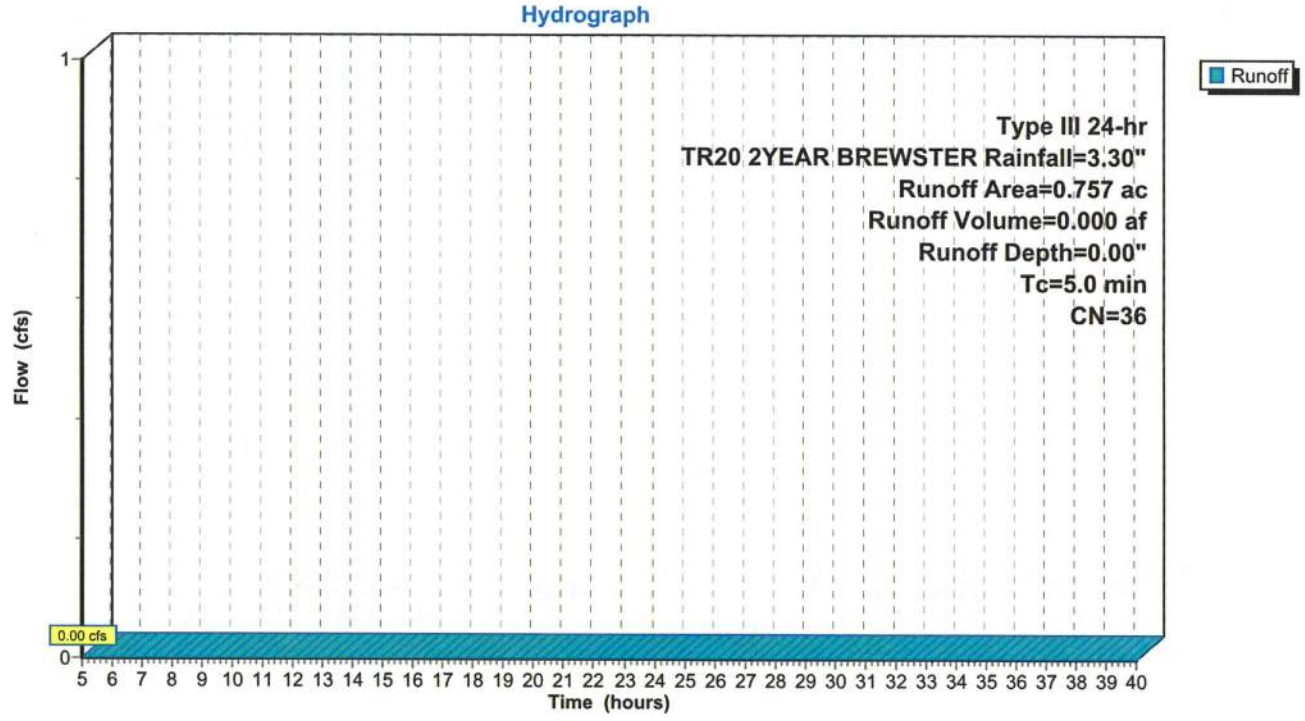
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.074	96	Gravel surface, HSG A
0.683	30	Woods, Good, HSG A
0.757	36	Weighted Average
0.757		100.00% Pervious Area

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

Subcatchment DA1B: Existing areas to east



Summary for Subcatchment DA2: SP2

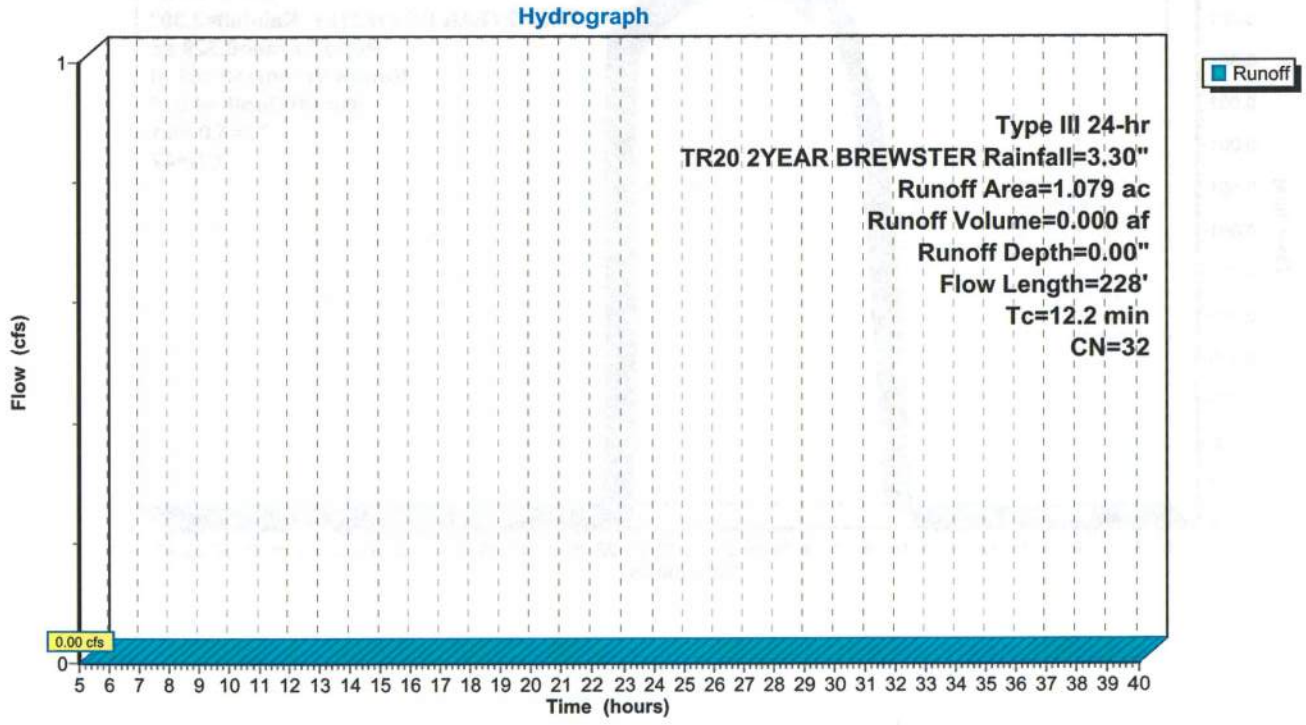
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.035	96	Gravel surface, HSG A
1.044	30	Woods, Good, HSG A
1.079	32	Weighted Average
1.079		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	64	0.0468	0.10		**Sheet Flow, A** Woods: Light underbrush n= 0.400 P2= 3.20"
1.5	164	0.1280	1.79		**Shallow Concentrated Flow, B** Woodland Kv= 5.0 fps
12.2	228	Total			

Subcatchment DA2: SP2



Summary for Subcatchment DA3: SP3

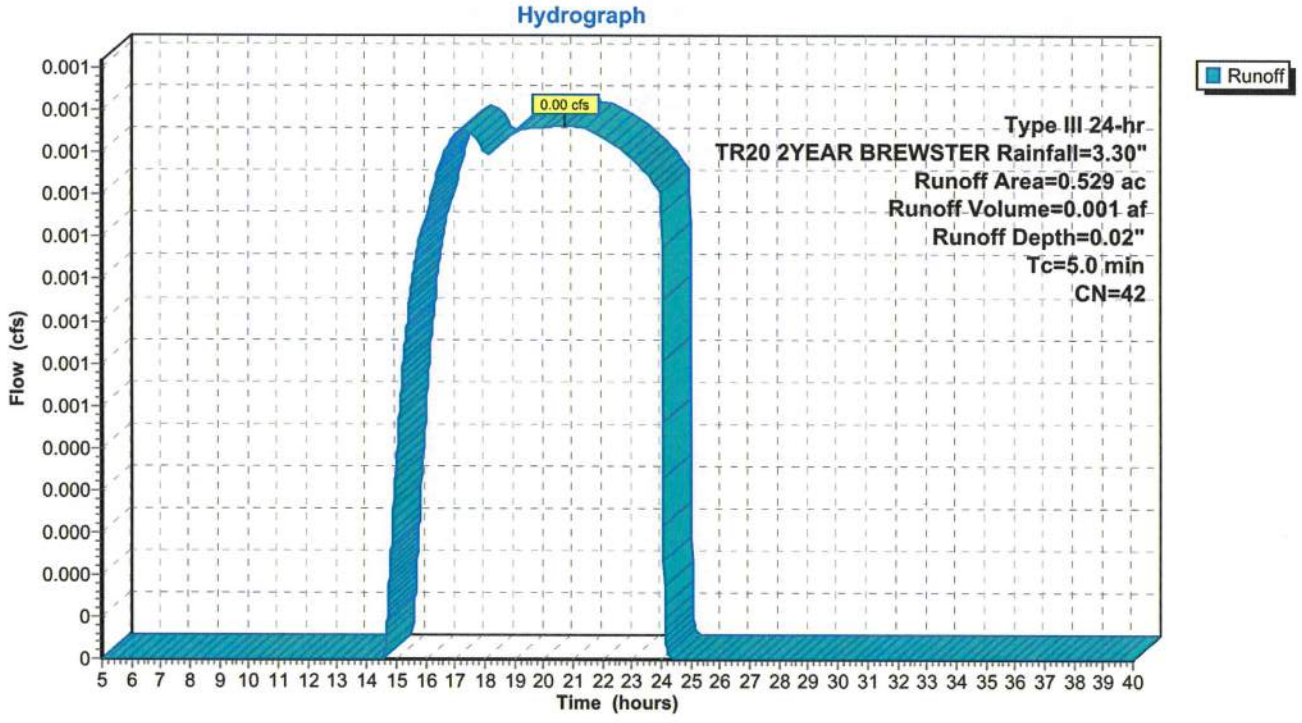
Runoff = 0.00 cfs @ 20.75 hrs, Volume= 0.001 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.095	96	Gravel surface, HSG A
0.434	30	Woods, Good, HSG A
0.529	42	Weighted Average
0.529		100.00% Pervious Area

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

Subcatchment DA3: SP3



Summary for Subcatchment DA4: SP4

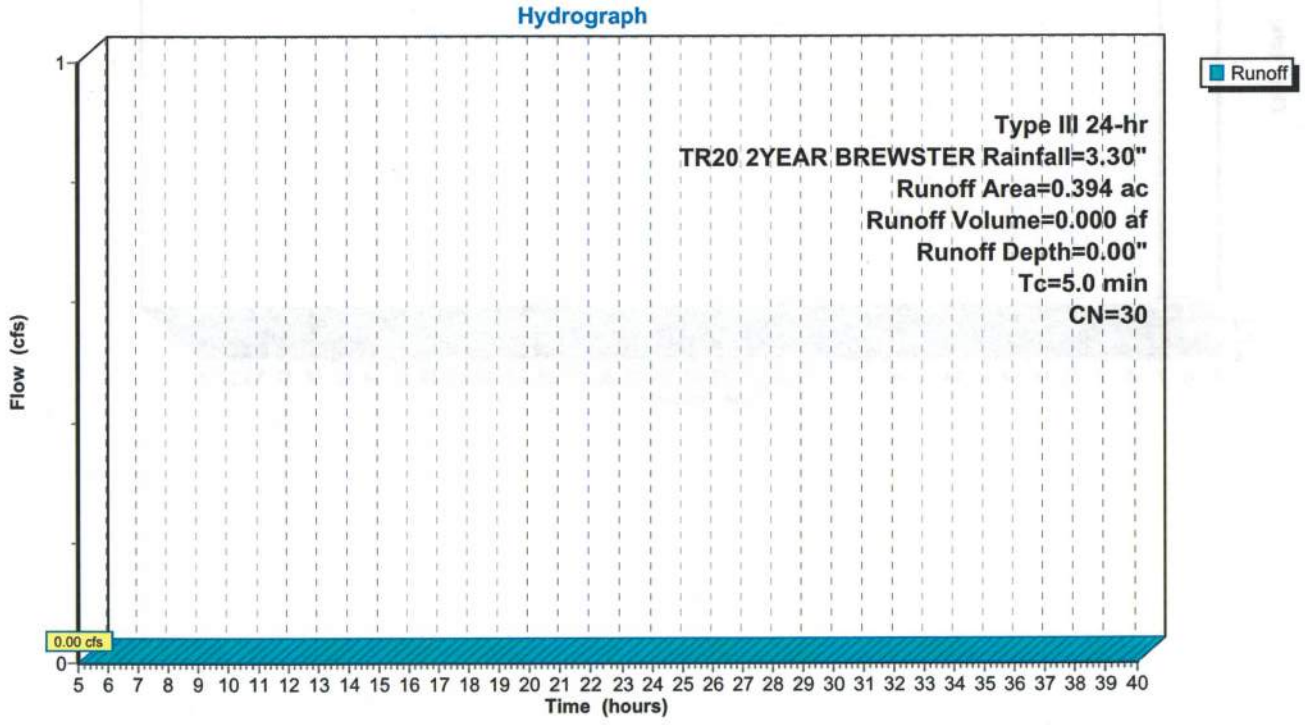
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.001	96	Gravel surface, HSG A
0.393	30	Woods, Good, HSG A
0.394	30	Weighted Average
0.394		100.00% Pervious Area

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

Subcatchment DA4: SP4

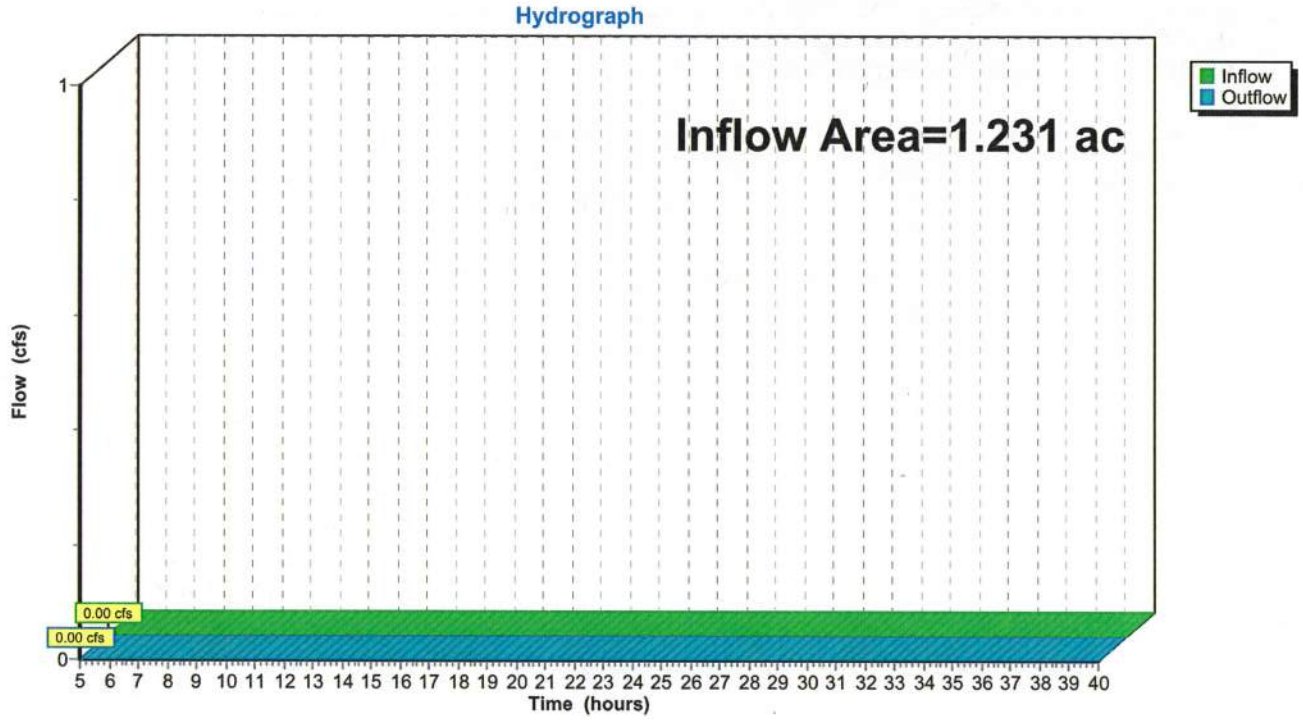


Summary for Reach SP1: Study Point 1

Inflow Area = 1.231 ac, 0.00% Impervious, Inflow Depth = 0.00" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Existing Low Area

Inflow Area = 0.312 ac, 0.00% Impervious, Inflow Depth = 0.00" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 55.90' @ 5.00 hrs Surf.Area= 1 sf Storage= 0 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	55.90'	171 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

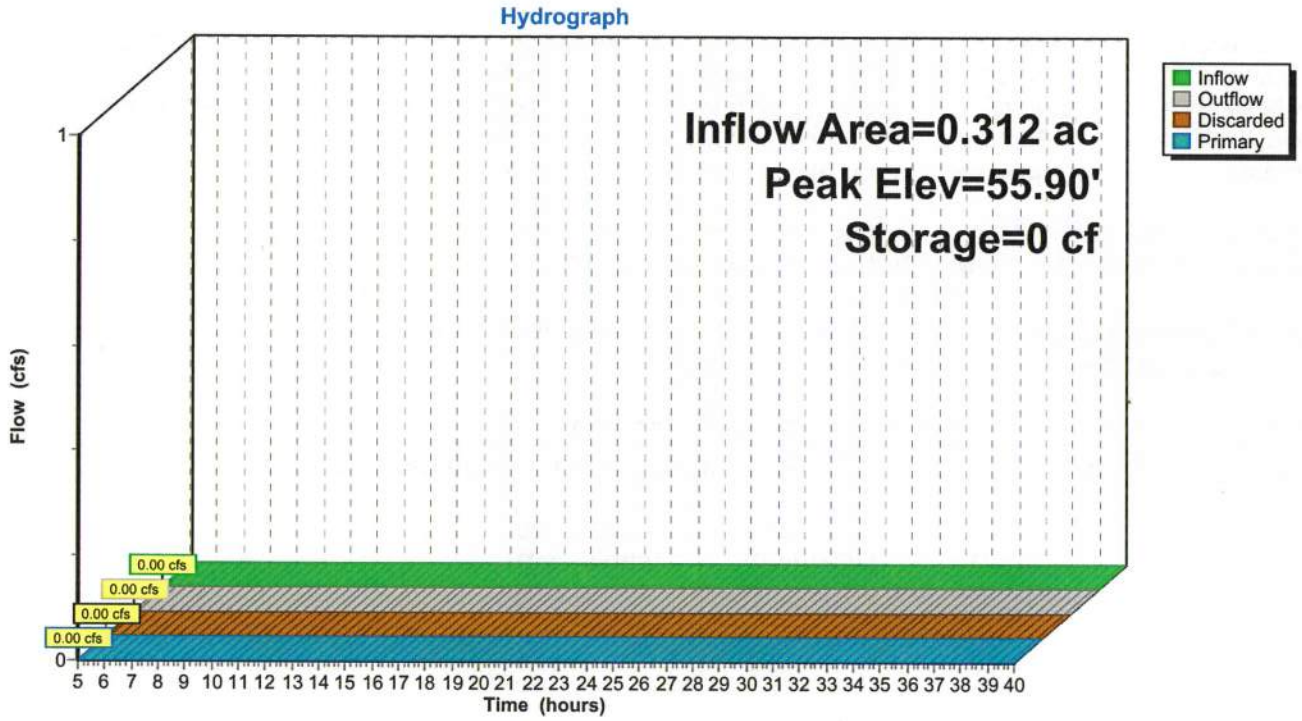
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
55.90	1	0	0
56.00	68	3	3
58.00	100	168	171

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**1.020 in/hr Exfiltration over Surface area from 55.80' - 57.50'** Excluded Surface area = 0 sf
#2	Primary	57.50'	**10.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=55.90' (Free Discharge)
↑—**1=Exfiltration** (Passes 0.00 cfs of 0.00 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=55.90' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Existing Low Area

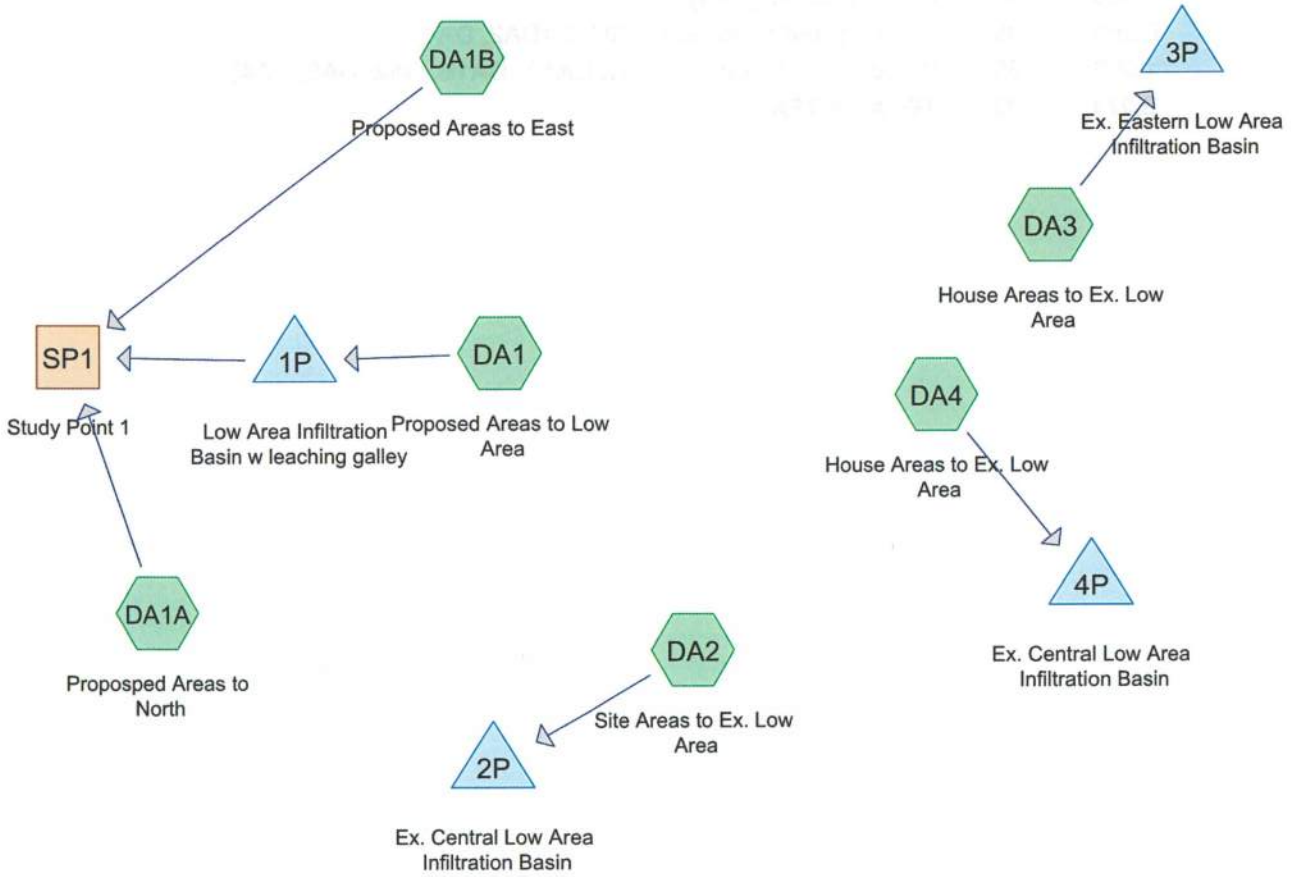


APPENDIX C

POST- DEVELOPMENT WATERSHED RUNOFF & ROUTING

(2, 10, 25 and 100-year Storms)

BAXTER NYE ENGINEERING & SURVEYING
1597 Falmouth Road,, Suite 1 ■ *Centerville, MA 02632*
Tel: 508-771-7502 ■ Fax: 508-771-7622 ■ www.baxter-nye.com



Subcat Reach Pond Link

Routing Diagram for 2023-108 PROPOSED
Prepared by Baxter Nye Engineering & Surveying, Printed 7/14/2023

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.808	39	>75% Grass cover, Good, HSG A (DA1, DA1B, DA2, DA3, DA4)
0.116	96	Gravel surface, HSG A (DA1, DA2)
0.086	98	Roofs, HSG A (DA4)
0.265	98	Unconnected pavement, HSG A (DA2, DA4)
1.996	30	Woods, Good, HSG A (DA1, DA1A, DA1B, DA2, DA3, DA4)
3.271	**42**	**TOTAL AREA**

Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Proposed Areas to Low Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=1.17"
Tc=5.0 min CN=44 Runoff=0.39 cfs 0.037 af

SubcatchmentDA1A: Proposped Areas to Runoff Area=0.153 ac 0.00% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.003 af

SubcatchmentDA1B: Proposed Areas to Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.38"
Tc=5.0 min CN=33 Runoff=0.06 cfs 0.017 af

SubcatchmentDA2: Site Areas to Ex. Low Runoff Area=1.168 ac 14.13% Impervious Runoff Depth=0.86"
Flow Length=181' Tc=5.6 min UI Adjusted CN=40 Runoff=0.65 cfs 0.083 af

SubcatchmentDA3: House Areas to Ex. Low Runoff Area=0.365 ac 0.00% Impervious Runoff Depth=0.44"
Tc=5.0 min CN=34 Runoff=0.06 cfs 0.013 af

SubcatchmentDA4: House Areas to Ex. Runoff Area=0.670 ac 27.76% Impervious Runoff Depth=1.34"
Tc=5.0 min UI Adjusted CN=46 Runoff=0.86 cfs 0.075 af

Reach SP1: Study Point 1 Inflow=0.10 cfs 0.027 af
Outflow=0.10 cfs 0.027 af

Pond 1P: Low Area Infiltration Basin w Peak Elev=58.02' Storage=500 cf Inflow=0.39 cfs 0.037 af
Discarded=0.02 cfs 0.028 af Primary=0.06 cfs 0.007 af Outflow=0.08 cfs 0.036 af

Pond 2P: Ex. Central Low Area Infiltration Peak Elev=70.30' Storage=1,172 cf Inflow=0.65 cfs 0.083 af
Outflow=0.10 cfs 0.083 af

Pond 3P: Ex. Eastern Low Area Infiltration Peak Elev=91.73' Storage=114 cf Inflow=0.06 cfs 0.013 af
Outflow=0.02 cfs 0.013 af

Pond 4P: Ex. Central Low Area Infiltration Peak Elev=89.04' Storage=1,191 cf Inflow=0.86 cfs 0.075 af
Outflow=0.09 cfs 0.075 af

Total Runoff Area = 3.271 ac Runoff Volume = 0.228 af Average Runoff Depth = 0.84"
89.27% Pervious = 2.920 ac 10.73% Impervious = 0.351 ac

Summary for Subcatchment DA1: Proposed Areas to Low Area

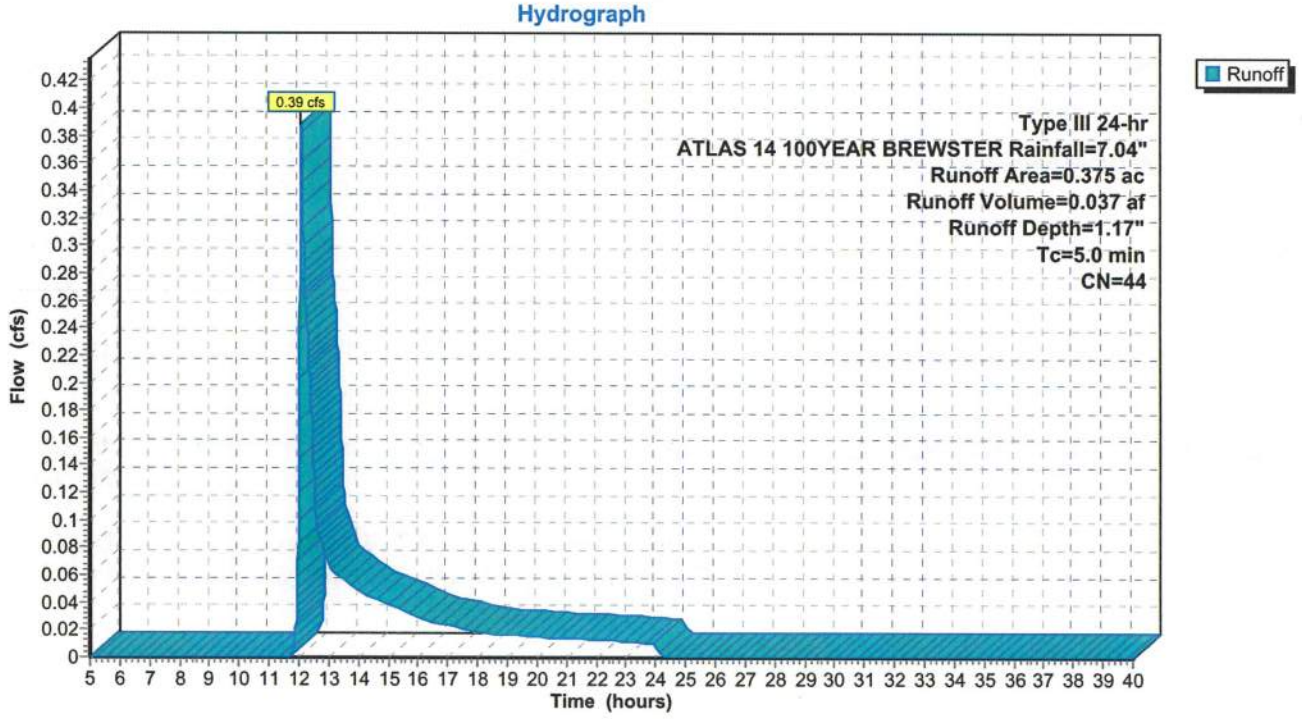
Runoff = 0.39 cfs @ 12.10 hrs, Volume= 0.037 af, Depth= 1.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.076	96	Gravel surface, HSG A
0.289	30	Woods, Good, HSG A
0.010	39	>75% Grass cover, Good, HSG A
0.375	44	Weighted Average
0.375		100.00% Pervious Area

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

Subcatchment DA1: Proposed Areas to Low Area



Summary for Subcatchment DA1A: Proposed Areas to North

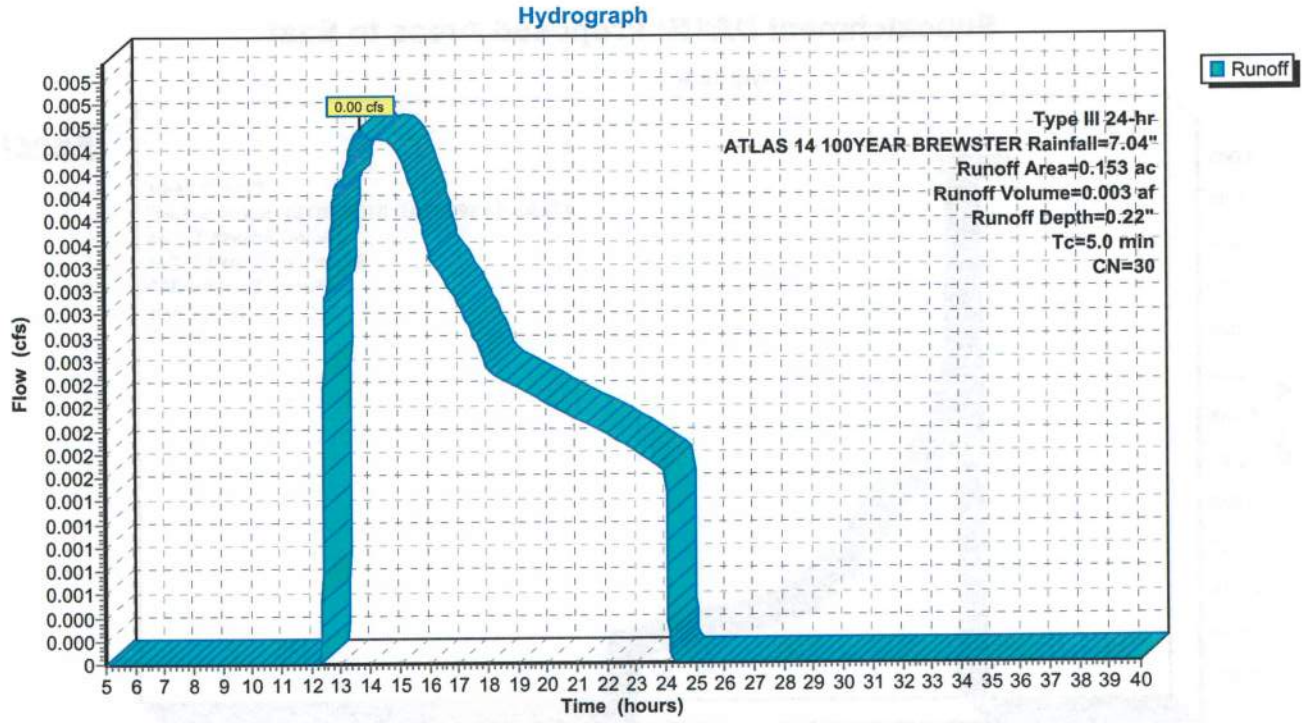
Runoff = 0.00 cfs @ 13.73 hrs, Volume= 0.003 af, Depth= 0.22"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.153	30	Woods, Good, HSG A
0.153		100.00% Pervious Area

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

Subcatchment DA1A: Proposed Areas to North



Summary for Subcatchment DA1B: Proposed Areas to East

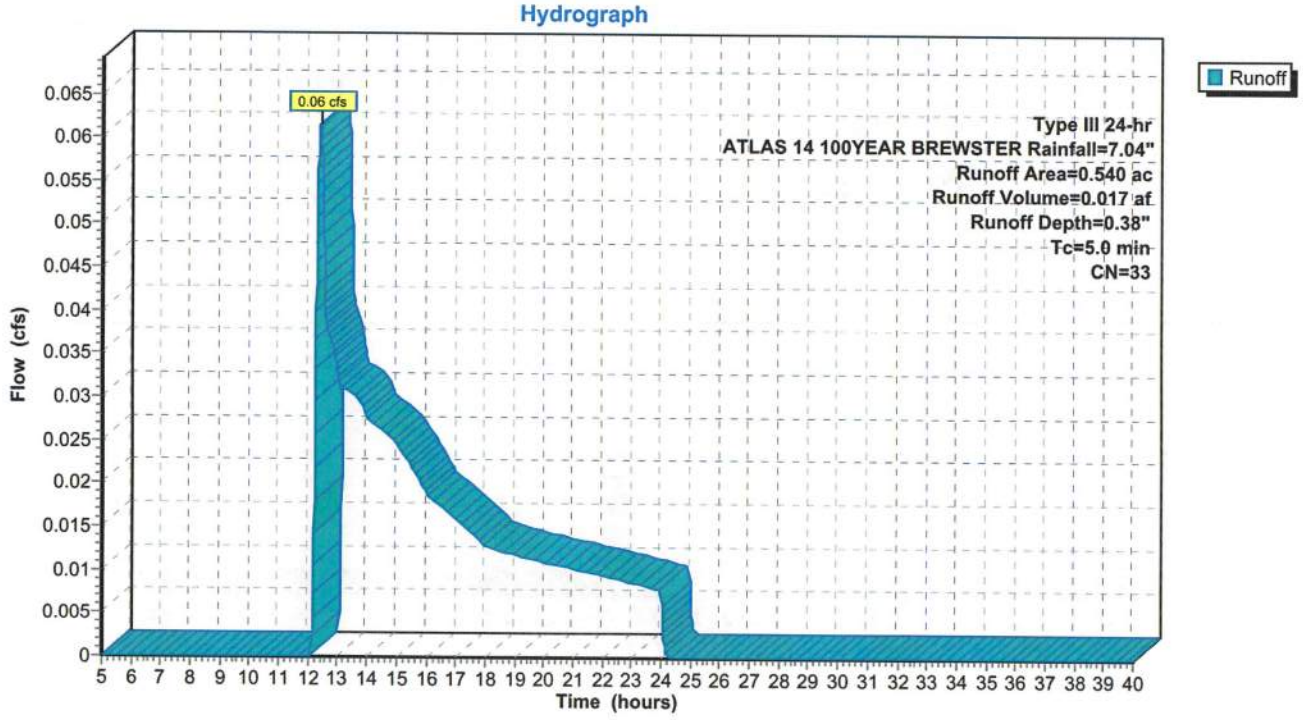
Runoff = 0.06 cfs @ 12.39 hrs, Volume= 0.017 af, Depth= 0.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.340	30	Woods, Good, HSG A
0.200	39	>75% Grass cover, Good, HSG A
0.540	33	Weighted Average
0.540		100.00% Pervious Area

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

Subcatchment DA1B: Proposed Areas to East



Summary for Subcatchment DA2: Site Areas to Ex. Low Area

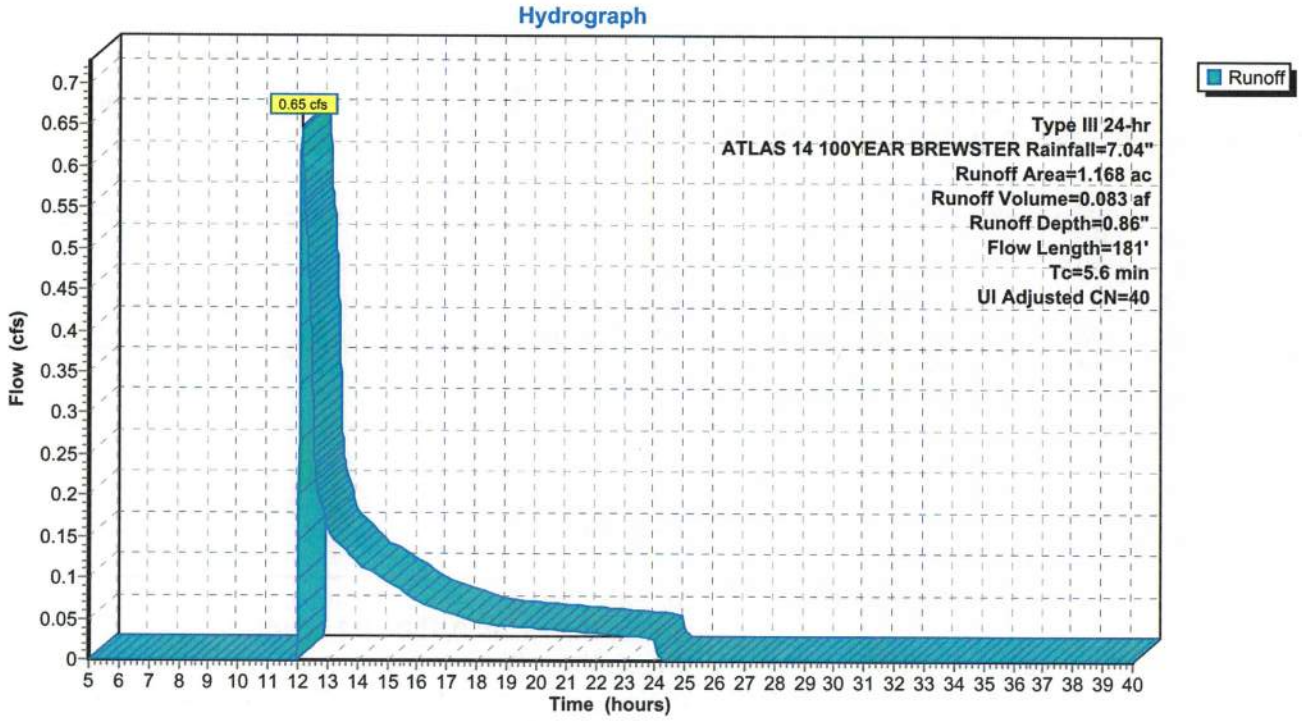
Runoff = 0.65 cfs @ 12.13 hrs, Volume= 0.083 af, Depth= 0.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Adj	Description
0.040	96		Gravel surface, HSG A
0.686	30		Woods, Good, HSG A
0.277	39		>75% Grass cover, Good, HSG A
0.165	98		Unconnected pavement, HSG A
1.168	44	40	Weighted Average, UI Adjusted
1.003			85.87% Pervious Area
0.165			14.13% Impervious Area
0.165			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	25	0.1800	0.31		**Sheet Flow, A** Grass: Short n= 0.150 P2= 3.20"
2.9	25	0.1800	0.14		**Sheet Flow, B** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	131	0.0990	1.57		**Shallow Concentrated Flow, C** Woodland Kv= 5.0 fps
5.6	181	Total			

Subcatchment DA2: Site Areas to Ex. Low Area



Summary for Subcatchment DA3: House Areas to Ex. Low Area

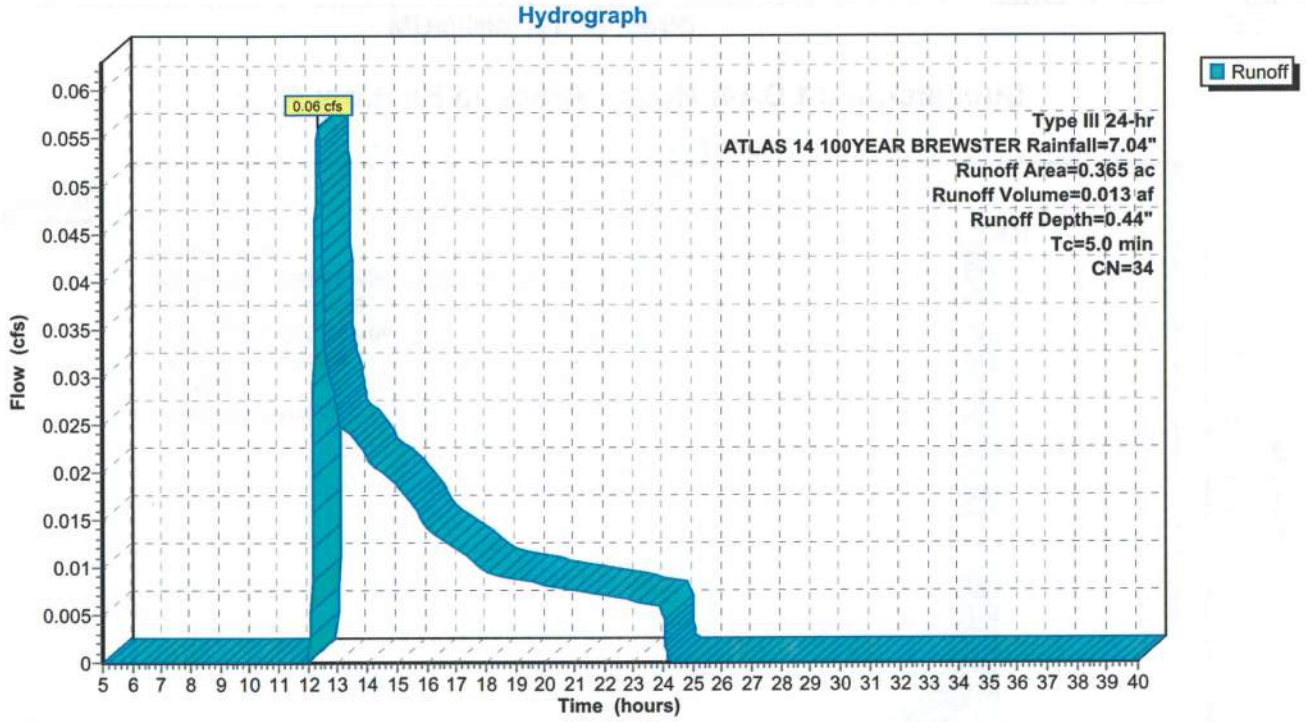
Runoff = 0.06 cfs @ 12.36 hrs, Volume= 0.013 af, Depth= 0.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Description
0.198	30	Woods, Good, HSG A
0.167	39	>75% Grass cover, Good, HSG A
0.365	34	Weighted Average
0.365		100.00% Pervious Area

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

Subcatchment DA3: House Areas to Ex. Low Area



Summary for Subcatchment DA4: House Areas to Ex. Low Area

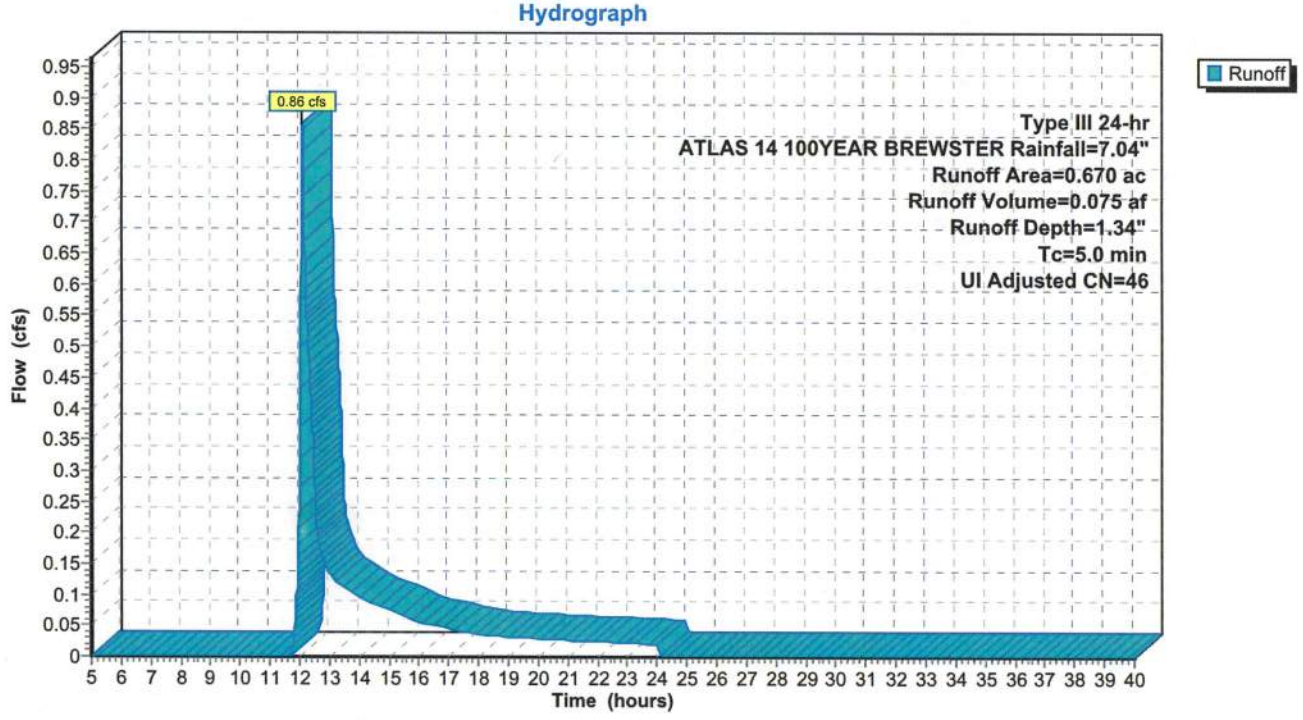
Runoff = 0.86 cfs @ 12.09 hrs, Volume= 0.075 af, Depth= 1.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 100YEAR BREWSTER Rainfall=7.04"

Area (ac)	CN	Adj	Description
0.330	30		Woods, Good, HSG A
0.154	39		>75% Grass cover, Good, HSG A
0.100	98		Unconnected pavement, HSG A
0.086	98		Roofs, HSG A
0.670	51	46	Weighted Average, UI Adjusted
0.484			72.24% Pervious Area
0.186			27.76% Impervious Area
0.100			53.76% Unconnected

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

Subcatchment DA4: House Areas to Ex. Low Area

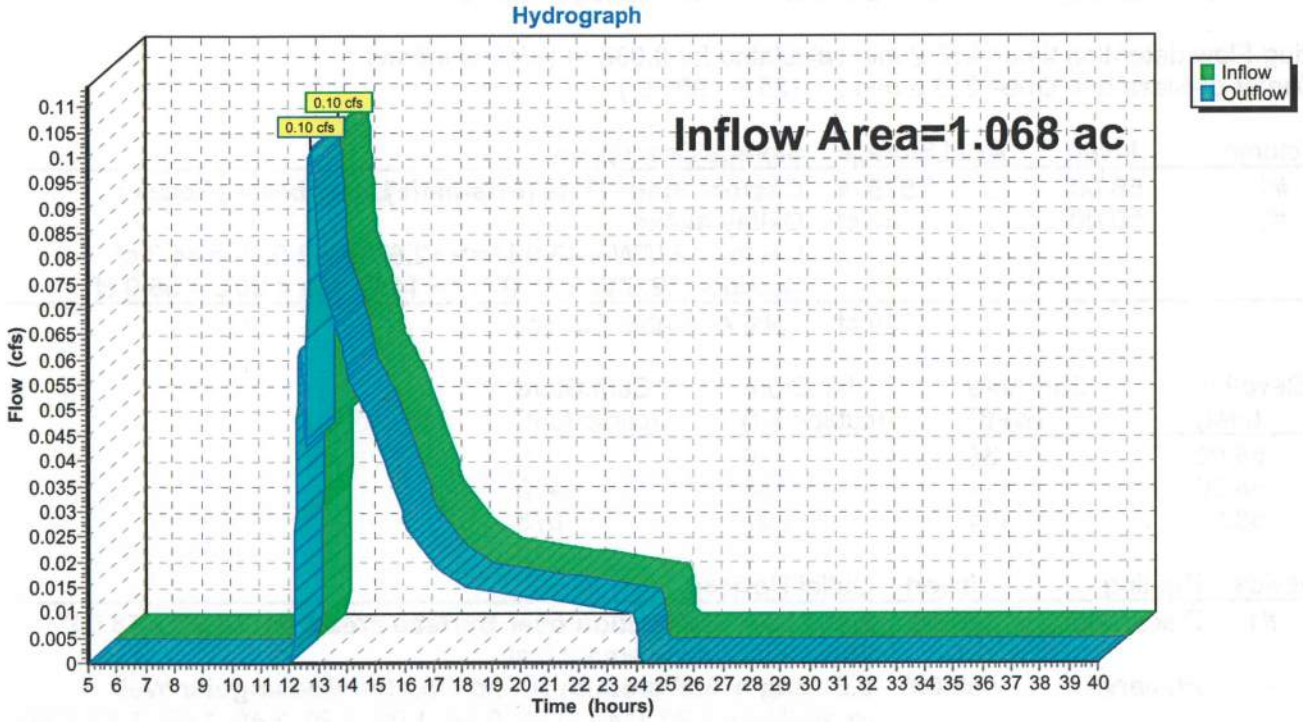


Summary for Reach SP1: Study Point 1

Inflow Area = 1.068 ac, 0.00% Impervious, Inflow Depth = 0.31" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.10 cfs @ 12.74 hrs, Volume= 0.027 af
Outflow = 0.10 cfs @ 12.74 hrs, Volume= 0.027 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Low Area Infiltration Basin w leaching galley

Inflow Area = 0.375 ac, 0.00% Impervious, Inflow Depth = 1.17" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.39 cfs @ 12.10 hrs, Volume= 0.037 af
Outflow = 0.08 cfs @ 12.74 hrs, Volume= 0.036 af, Atten= 78%, Lag= 38.4 min
Discarded = 0.02 cfs @ 12.62 hrs, Volume= 0.028 af
Primary = 0.06 cfs @ 12.74 hrs, Volume= 0.007 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 58.02' @ 12.74 hrs Surf.Area= 417 sf Storage= 500 cf

Plug-Flow detention time= 238.2 min calculated for 0.036 af (97% of inflow)
Center-of-Mass det. time= 223.8 min (1,125.7 - 901.9)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	675 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	50.00'	44 cf	**Galley 4x4x4** Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf
		719 cf	Total Available Storage

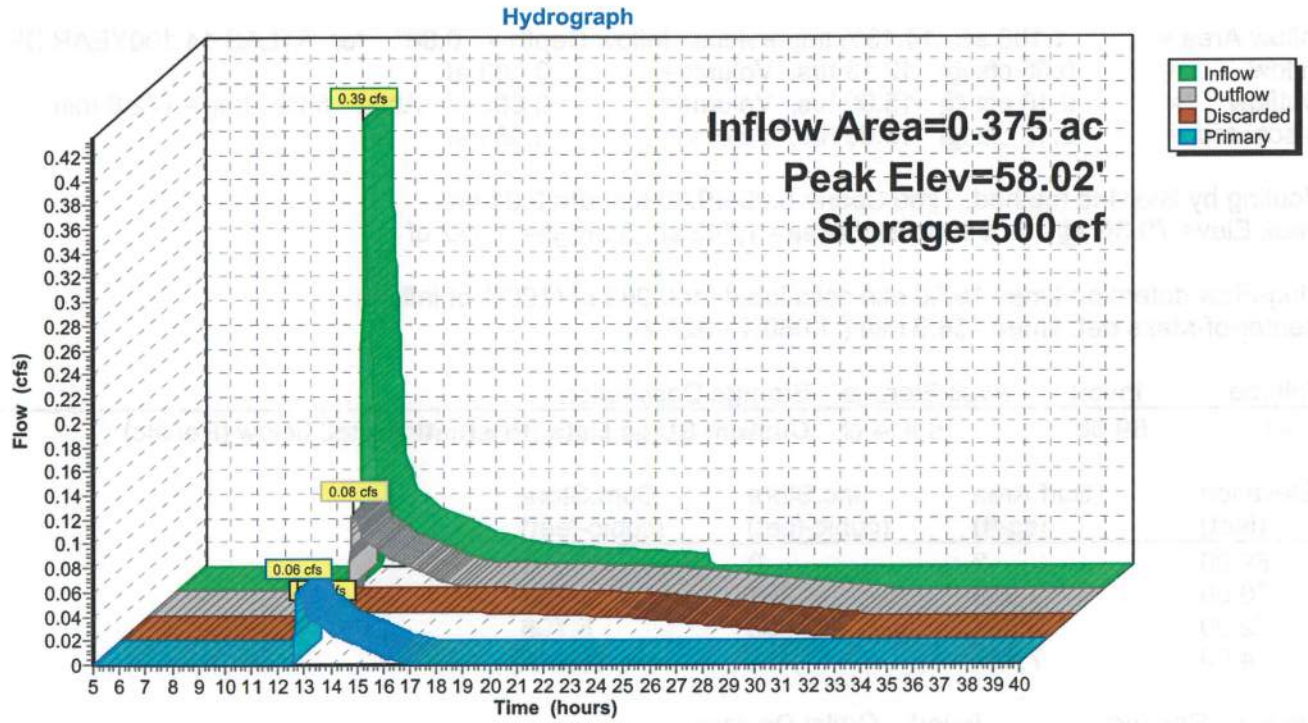
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.00	34	0	0
58.00	414	448	448
58.50	494	227	675

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**2.410 in/hr Exfiltration over Surface area from 55.90' - 58.00'** Excluded Surface area = 0 sf
#2	Primary	58.00'	**5.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.02 cfs @ 12.62 hrs HW=58.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.03 cfs @ 12.74 hrs HW=58.02' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.03 cfs @ 0.33 fps)

Pond 1P: Low Area Infiltration Basin w leaching galley



Summary for Pond 2P: Ex. Central Low Area Infiltration Basin

Inflow Area = 1.168 ac, 14.13% Impervious, Inflow Depth = 0.86" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.65 cfs @ 12.13 hrs, Volume= 0.083 af
Outflow = 0.10 cfs @ 15.00 hrs, Volume= 0.083 af, Atten= 85%, Lag= 172.6 min
Discarded = 0.10 cfs @ 15.00 hrs, Volume= 0.083 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 70.30' @ 15.00 hrs Surf.Area= 1,743 sf Storage= 1,172 cf

Plug-Flow detention time= 157.0 min calculated for 0.083 af (100% of inflow)
Center-of-Mass det. time= 156.9 min (1,080.1 - 923.2)

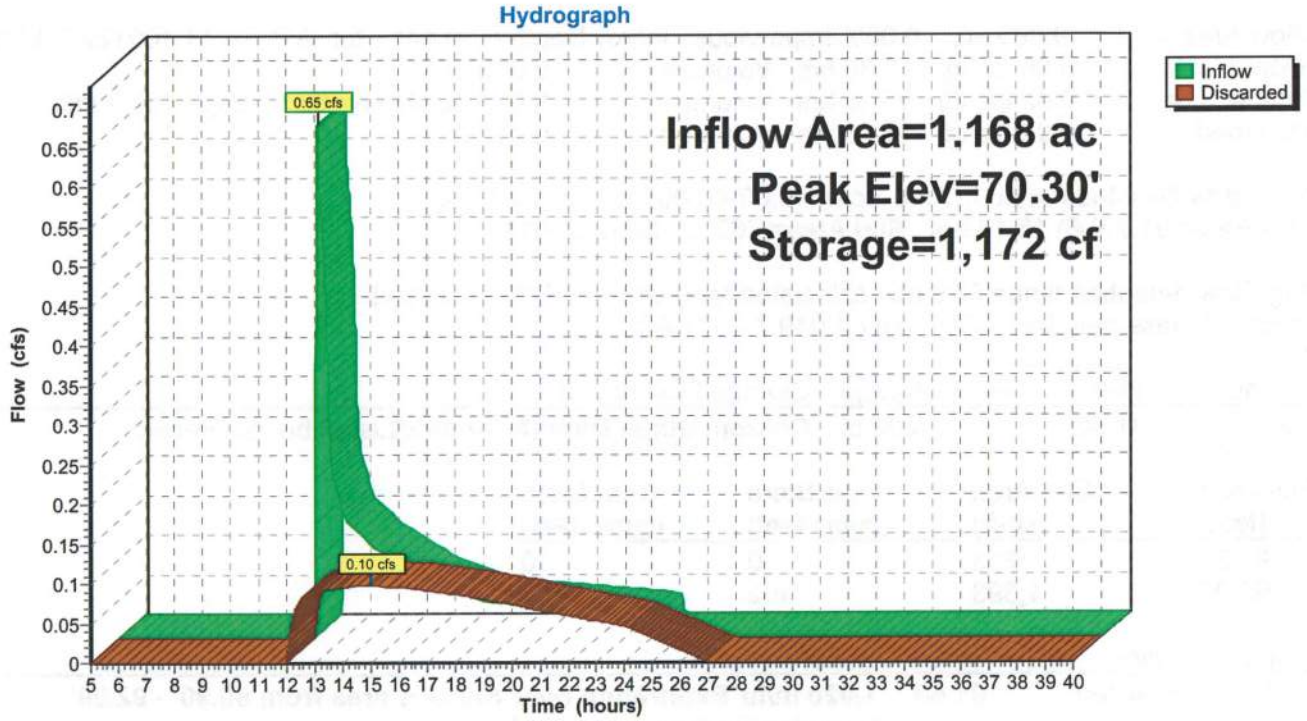
Volume	Invert	Avail.Storage	Storage Description
#1	69.00'	16,914 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.00	3	0	0
70.00	1,398	701	701
72.00	3,697	5,095	5,796
74.00	7,421	11,118	16,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	69.00'	**2.410 in/hr Exfiltration over Surface area from 67.90' - 74.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.10 cfs @ 15.00 hrs HW=70.30' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.10 cfs)

Pond 2P: Ex. Central Low Area Infiltration Basin



Summary for Pond 3P: Ex. Eastern Low Area Infiltration Basin

Inflow Area = 0.365 ac, 0.00% Impervious, Inflow Depth = 0.44" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.06 cfs @ 12.36 hrs, Volume= 0.013 af
Outflow = 0.02 cfs @ 15.15 hrs, Volume= 0.013 af, Atten= 68%, Lag= 167.4 min
Discarded = 0.02 cfs @ 15.15 hrs, Volume= 0.013 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 91.73' @ 15.15 hrs Surf.Area= 762 sf Storage= 114 cf

Plug-Flow detention time= 77.9 min calculated for 0.013 af (100% of inflow)
Center-of-Mass det. time= 77.9 min (1,049.7 - 971.8)

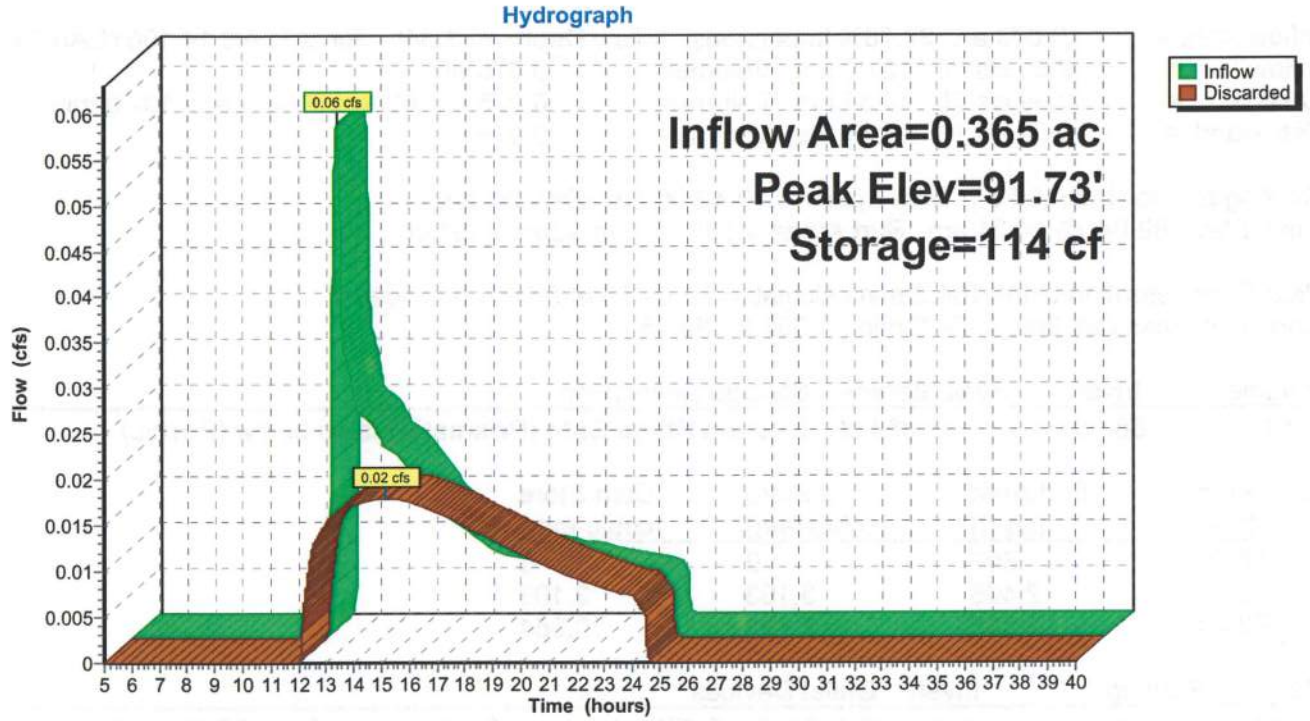
Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	402 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	213	0	0
92.00	1,393	402	402

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**1.020 in/hr Exfiltration over Surface area from 90.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.02 cfs @ 15.15 hrs HW=91.73' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Pond 3P: Ex. Eastern Low Area Infiltration Basin



Summary for Pond 4P: Ex. Central Low Area Infiltration Basin

Inflow Area = 0.670 ac, 27.76% Impervious, Inflow Depth = 1.34" for ATLAS 14 100YEAR BREWSTER e
Inflow = 0.86 cfs @ 12.09 hrs, Volume= 0.075 af
Outflow = 0.09 cfs @ 14.31 hrs, Volume= 0.075 af, Atten= 90%, Lag= 132.8 min
Discarded = 0.09 cfs @ 14.31 hrs, Volume= 0.075 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 89.04' @ 14.31 hrs Surf.Area= 1,588 sf Storage= 1,191 cf

Plug-Flow detention time= 164.3 min calculated for 0.075 af (100% of inflow)
Center-of-Mass det. time= 164.2 min (1,057.8 - 893.5)

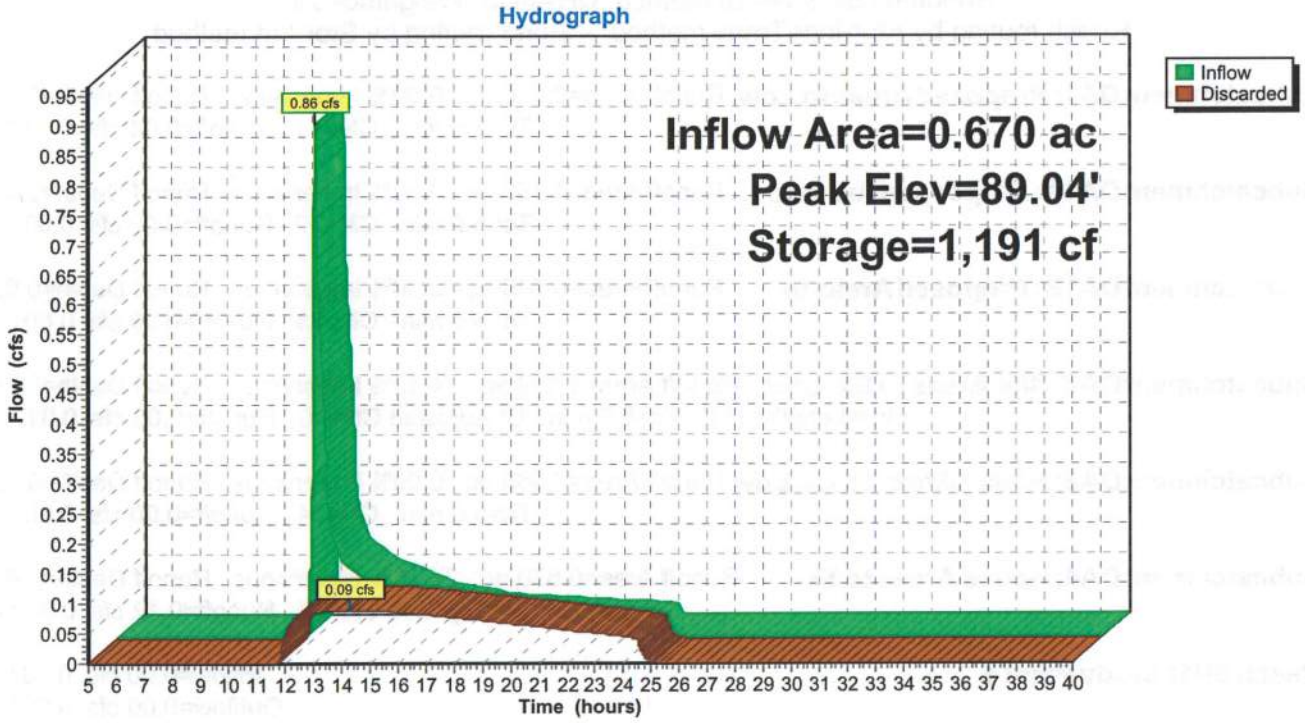
Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	10,864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	697	0	0
90.00	2,406	3,103	3,103
92.00	5,355	7,761	10,864

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	**2.410 in/hr Exfiltration over Surface area from 87.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.09 cfs @ 14.31 hrs HW=89.04' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Pond 4P: Ex. Central Low Area Infiltration Basin



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Proposed Areas to Low Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=0.32"
Tc=5.0 min CN=44 Runoff=0.04 cfs 0.010 af

SubcatchmentDA1A: Proposped Areas to Runoff Area=0.153 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1B: Proposed Areas to Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.02"
Tc=5.0 min CN=33 Runoff=0.00 cfs 0.001 af

SubcatchmentDA2: Site Areas to Ex. Low Runoff Area=1.168 ac 14.13% Impervious Runoff Depth=0.18"
Flow Length=181' Tc=5.6 min UI Adjusted CN=40 Runoff=0.03 cfs 0.017 af

SubcatchmentDA3: House Areas to Ex. Low Runoff Area=0.365 ac 0.00% Impervious Runoff Depth=0.03"
Tc=5.0 min CN=34 Runoff=0.00 cfs 0.001 af

SubcatchmentDA4: House Areas to Ex. Runoff Area=0.670 ac 27.76% Impervious Runoff Depth=0.40"
Tc=5.0 min UI Adjusted CN=46 Runoff=0.12 cfs 0.022 af

Reach SP1: Study Point 1 Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond 1P: Low Area Infiltration Basin w Peak Elev=56.82' Storage=137 cf Inflow=0.04 cfs 0.010 af
Discarded=0.01 cfs 0.009 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.009 af

Pond 2P: Ex. Central Low Area Infiltration Basin Peak Elev=69.33' Storage=75 cf Inflow=0.03 cfs 0.017 af
Outflow=0.03 cfs 0.017 af

Pond 3P: Ex. Eastern Low Area Infiltration Basin Peak Elev=91.50' Storage=0 cf Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond 4P: Ex. Central Low Area Infiltration Peak Elev=88.15' Storage=116 cf Inflow=0.12 cfs 0.022 af
Outflow=0.05 cfs 0.022 af

Total Runoff Area = 3.271 ac Runoff Volume = 0.051 af Average Runoff Depth = 0.19"
89.27% Pervious = 2.920 ac 10.73% Impervious = 0.351 ac

Summary for Subcatchment DA1: Proposed Areas to Low Area

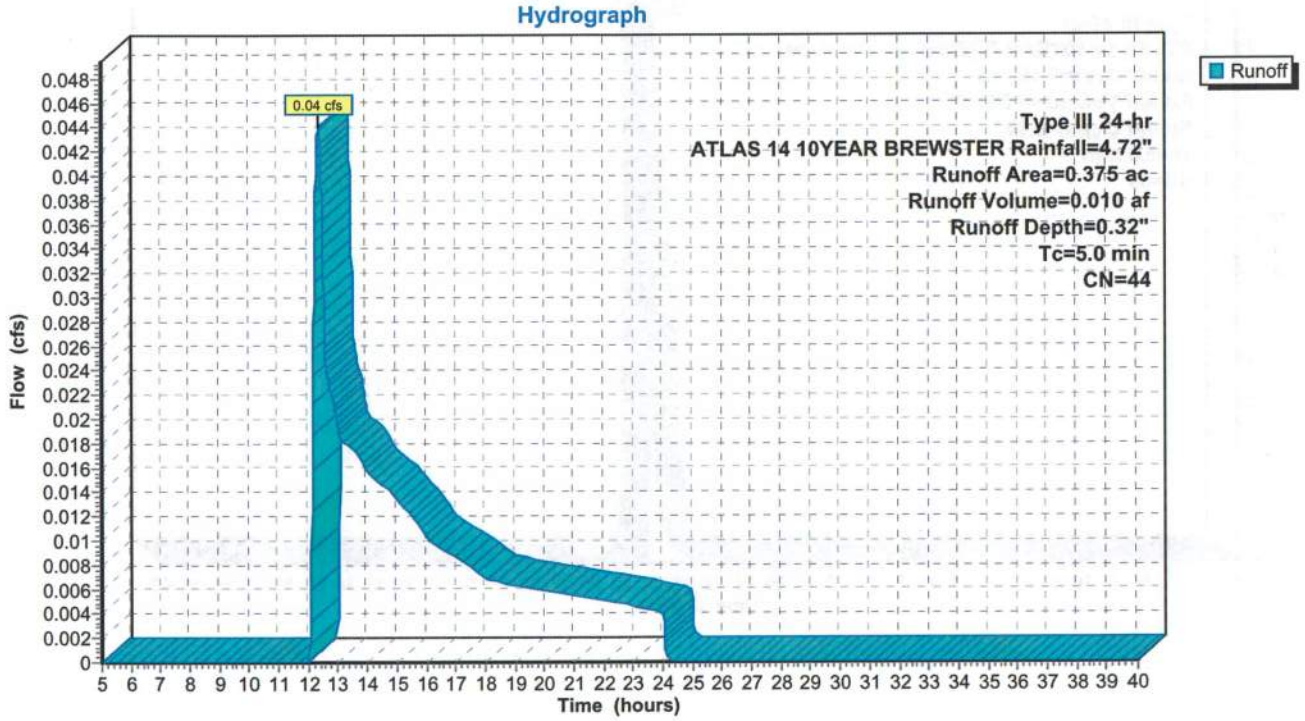
Runoff = 0.04 cfs @ 12.35 hrs, Volume= 0.010 af, Depth= 0.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.076	96	Gravel surface, HSG A
0.289	30	Woods, Good, HSG A
0.010	39	>75% Grass cover, Good, HSG A
0.375	44	Weighted Average
0.375		100.00% Pervious Area

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

Subcatchment DA1: Proposed Areas to Low Area



Summary for Subcatchment DA1A: Proposped Areas to North

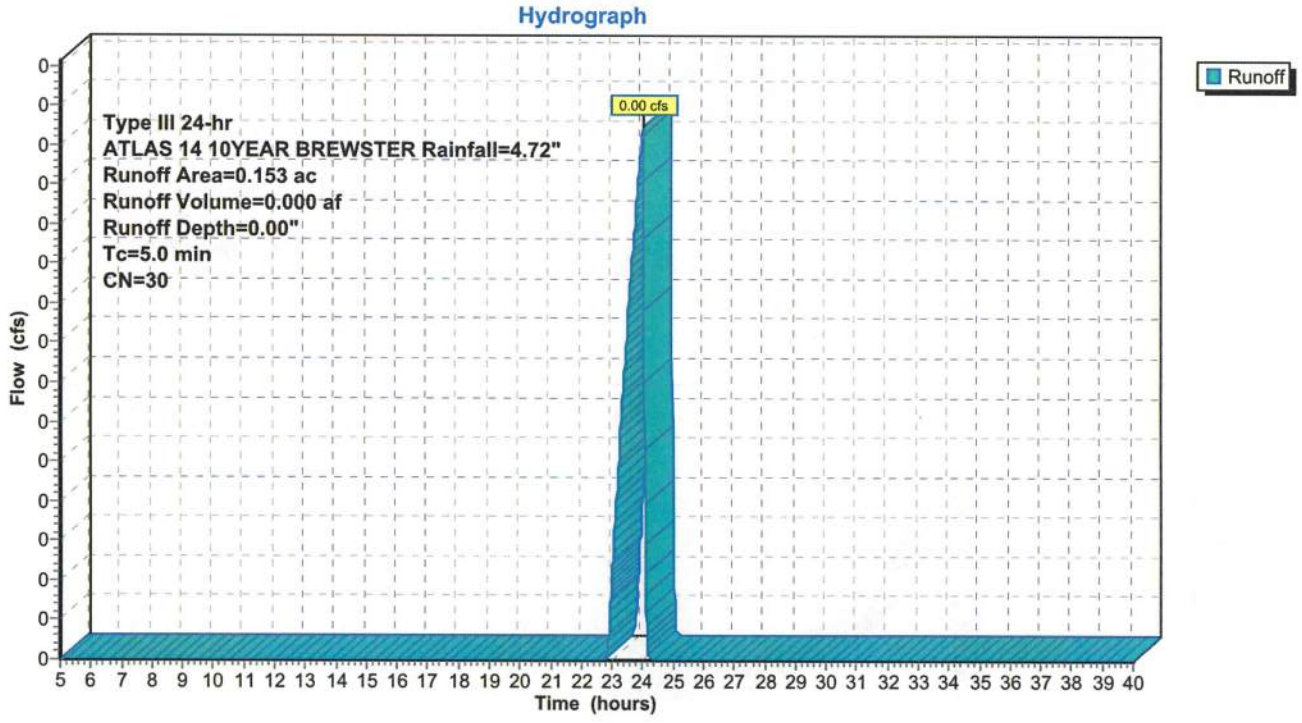
Runoff = 0.00 cfs @ 24.01 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.153	30	Woods, Good, HSG A
0.153		100.00% Pervious Area

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

Subcatchment DA1A: Proposped Areas to North



Summary for Subcatchment DA1B: Proposed Areas to East

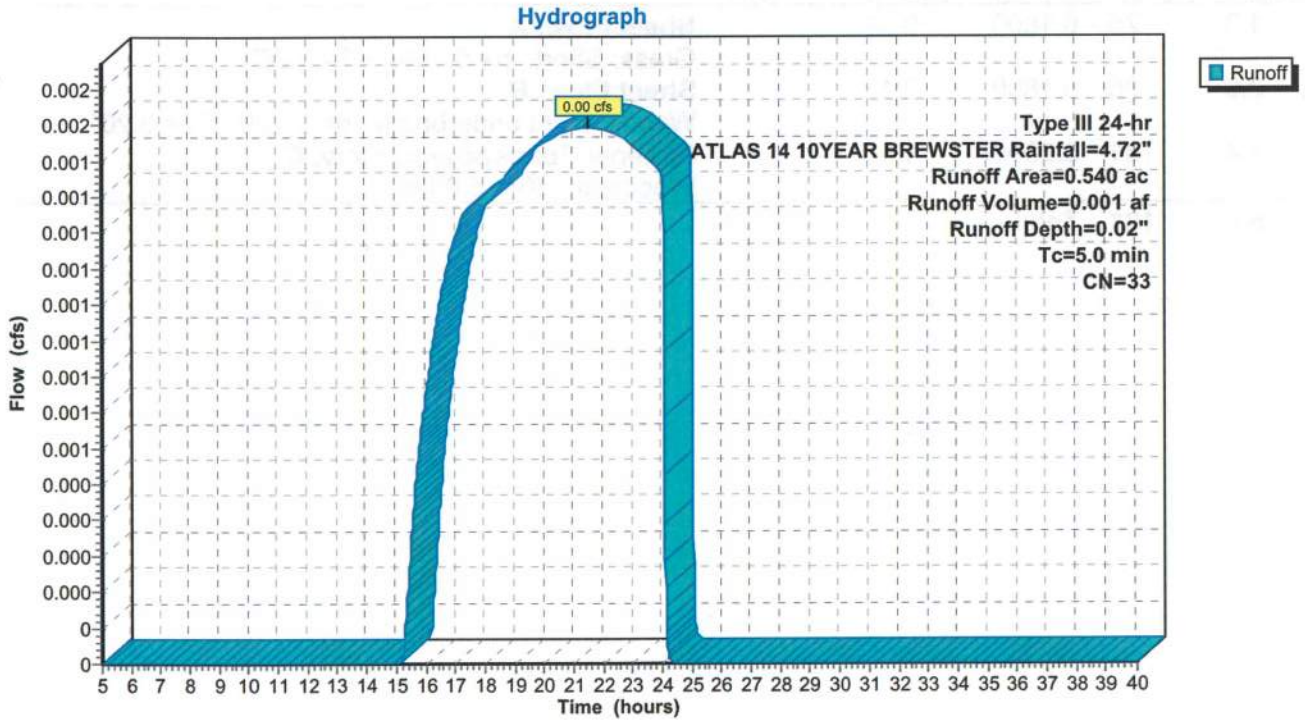
Runoff = 0.00 cfs @ 21.45 hrs, Volume= 0.001 af, Depth= 0.02"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.340	30	Woods, Good, HSG A
0.200	39	>75% Grass cover, Good, HSG A
0.540	33	Weighted Average
0.540		100.00% Pervious Area

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

Subcatchment DA1B: Proposed Areas to East



Summary for Subcatchment DA2: Site Areas to Ex. Low Area

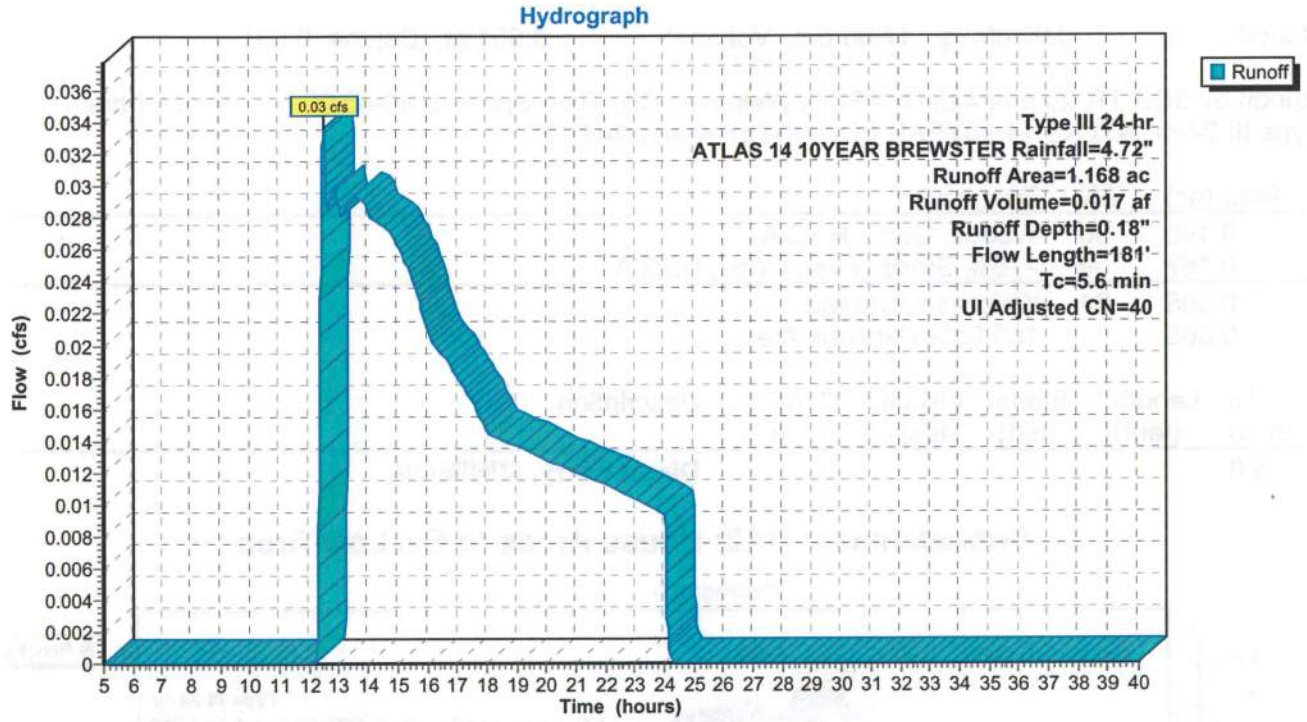
Runoff = 0.03 cfs @ 12.49 hrs, Volume= 0.017 af, Depth= 0.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Adj	Description
0.040	96		Gravel surface, HSG A
0.686	30		Woods, Good, HSG A
0.277	39		>75% Grass cover, Good, HSG A
0.165	98		Unconnected pavement, HSG A
1.168	44	40	Weighted Average, UI Adjusted
1.003			85.87% Pervious Area
0.165			14.13% Impervious Area
0.165			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	25	0.1800	0.31		**Sheet Flow, A** Grass: Short n= 0.150 P2= 3.20"
2.9	25	0.1800	0.14		**Sheet Flow, B** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	131	0.0990	1.57		**Shallow Concentrated Flow, C** Woodland Kv= 5.0 fps
5.6	181	Total			

Subcatchment DA2: Site Areas to Ex. Low Area



Summary for Subcatchment DA3: House Areas to Ex. Low Area

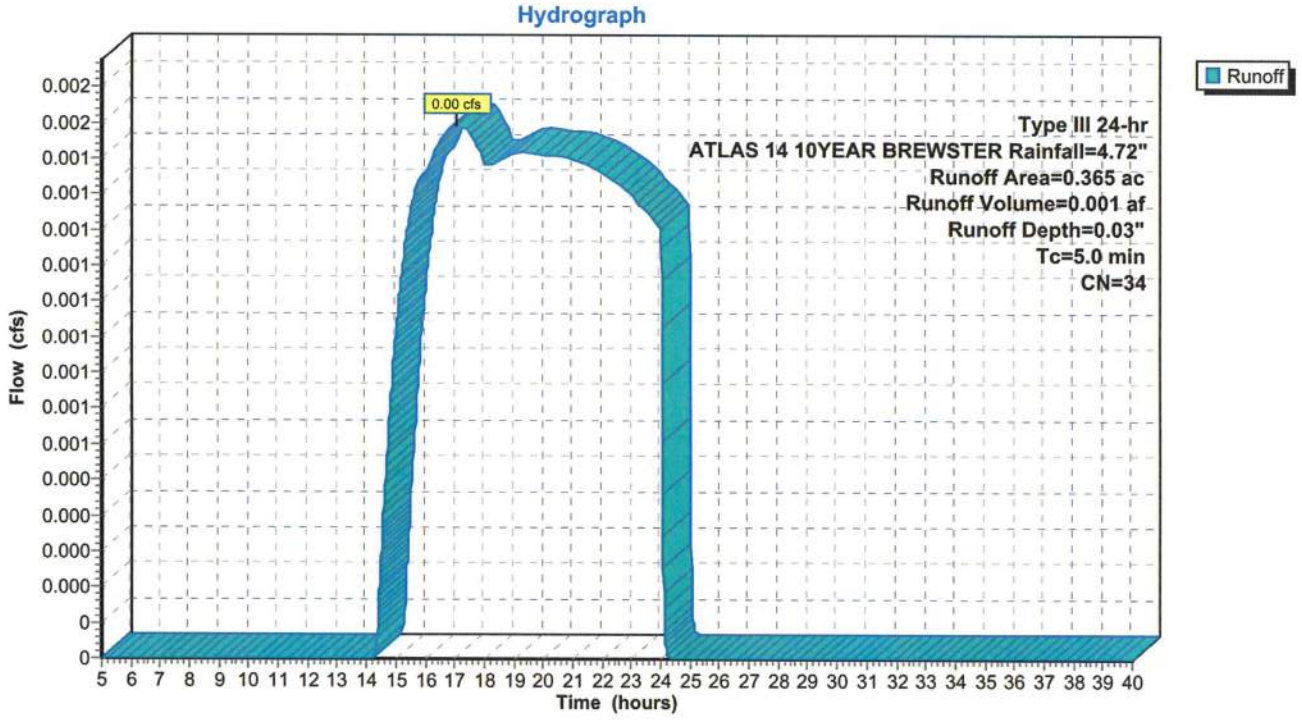
Runoff = 0.00 cfs @ 17.05 hrs, Volume= 0.001 af, Depth= 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Description
0.198	30	Woods, Good, HSG A
0.167	39	>75% Grass cover, Good, HSG A
0.365	34	Weighted Average
0.365		100.00% Pervious Area

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

Subcatchment DA3: House Areas to Ex. Low Area



Summary for Subcatchment DA4: House Areas to Ex. Low Area

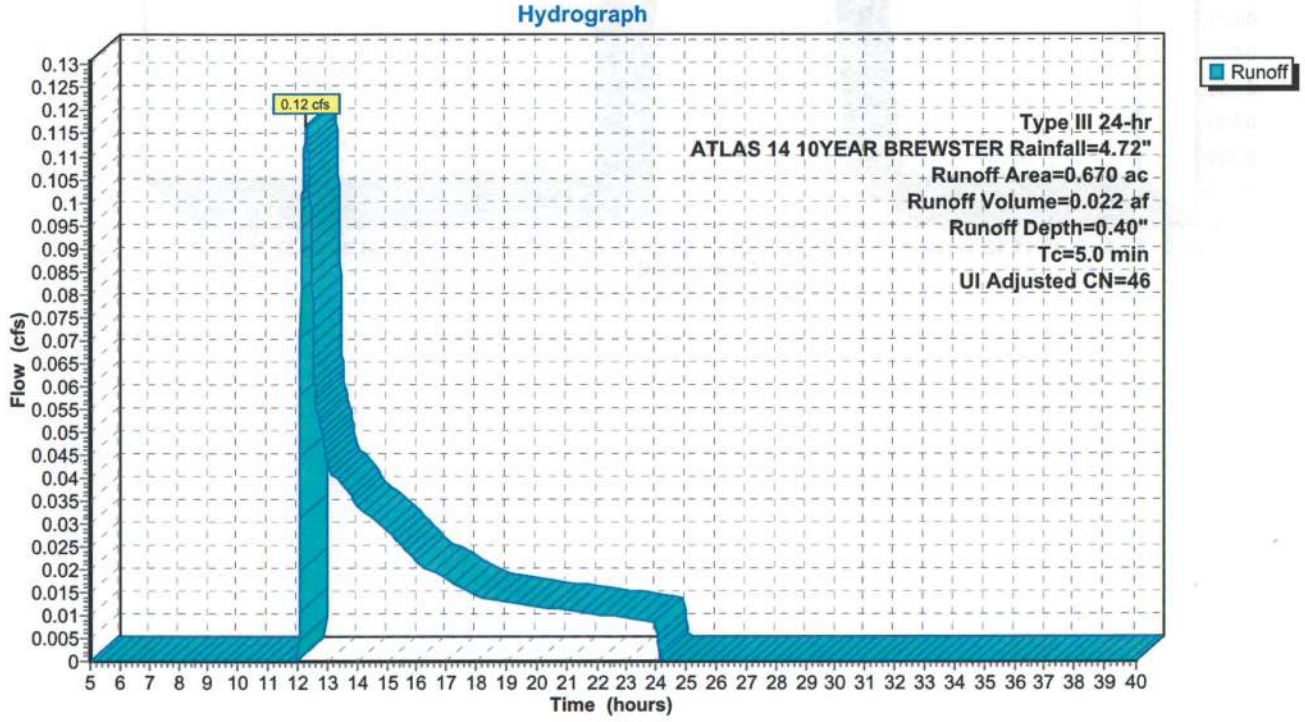
Runoff = 0.12 cfs @ 12.30 hrs, Volume= 0.022 af, Depth= 0.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 10YEAR BREWSTER Rainfall=4.72"

Area (ac)	CN	Adj	Description
0.330	30		Woods, Good, HSG A
0.154	39		>75% Grass cover, Good, HSG A
0.100	98		Unconnected pavement, HSG A
0.086	98		Roofs, HSG A
0.670	51	46	Weighted Average, UI Adjusted
0.484			72.24% Pervious Area
0.186			27.76% Impervious Area
0.100			53.76% Unconnected

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

Subcatchment DA4: House Areas to Ex. Low Area

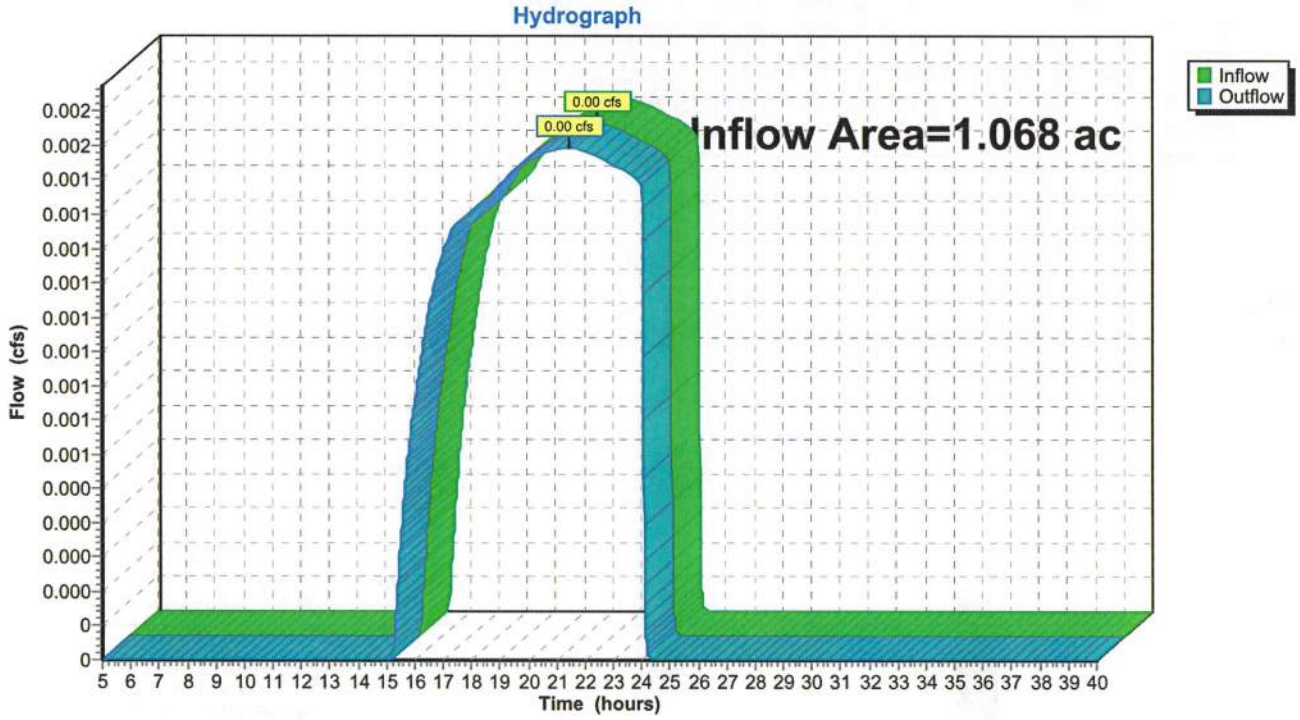


Summary for Reach SP1: Study Point 1

Inflow Area = 1.068 ac, 0.00% Impervious, Inflow Depth = 0.01" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.00 cfs @ 21.45 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 21.45 hrs, Volume= 0.001 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Low Area Infiltration Basin w leaching galley

Inflow Area = 0.375 ac, 0.00% Impervious, Inflow Depth = 0.32" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.04 cfs @ 12.35 hrs, Volume= 0.010 af
Outflow = 0.01 cfs @ 15.90 hrs, Volume= 0.009 af, Atten= 76%, Lag= 213.1 min
Discarded = 0.01 cfs @ 15.90 hrs, Volume= 0.009 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.82' @ 15.90 hrs Surf.Area= 191 sf Storage= 137 cf

Plug-Flow detention time= 186.6 min calculated for 0.009 af (90% of inflow)
Center-of-Mass det. time= 141.3 min (1,107.6 - 966.4)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	675 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	50.00'	44 cf	**Galley 4x4x4** Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf
		719 cf	Total Available Storage

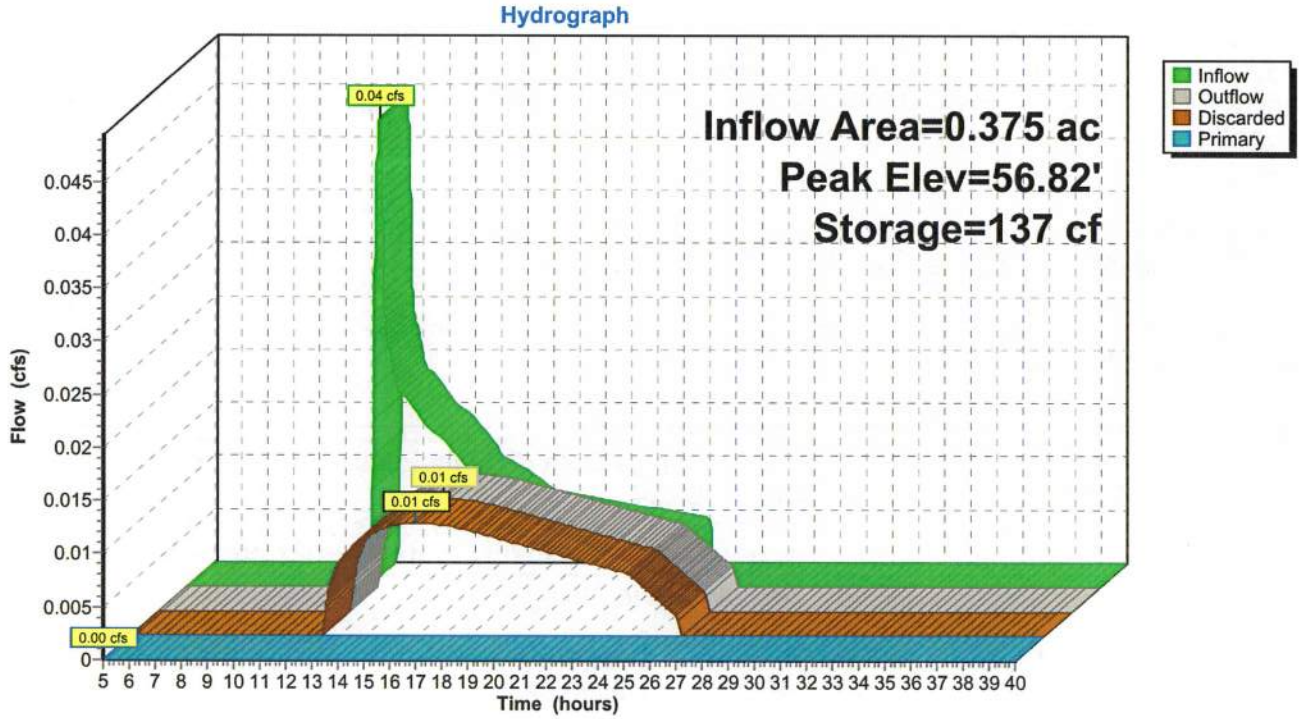
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.00	34	0	0
58.00	414	448	448
58.50	494	227	675

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**2.410 in/hr Exfiltration over Surface area from 55.90' - 58.00'** Excluded Surface area = 0 sf
#2	Primary	58.00'	**5.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.01 cfs @ 15.90 hrs HW=56.82' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=50.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P: Low Area Infiltration Basin w leaching galley



Summary for Pond 2P: Ex. Central Low Area Infiltration Basin

Inflow Area = 1.168 ac, 14.13% Impervious, Inflow Depth = 0.18" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.03 cfs @ 12.49 hrs, Volume= 0.017 af
Outflow = 0.03 cfs @ 15.20 hrs, Volume= 0.017 af, Atten= 24%, Lag= 162.8 min
Discarded = 0.03 cfs @ 15.20 hrs, Volume= 0.017 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 69.33' @ 15.20 hrs Surf.Area= 457 sf Storage= 75 cf

Plug-Flow detention time= 36.7 min calculated for 0.017 af (100% of inflow)
Center-of-Mass det. time= 36.6 min (1,052.3 - 1,015.6)

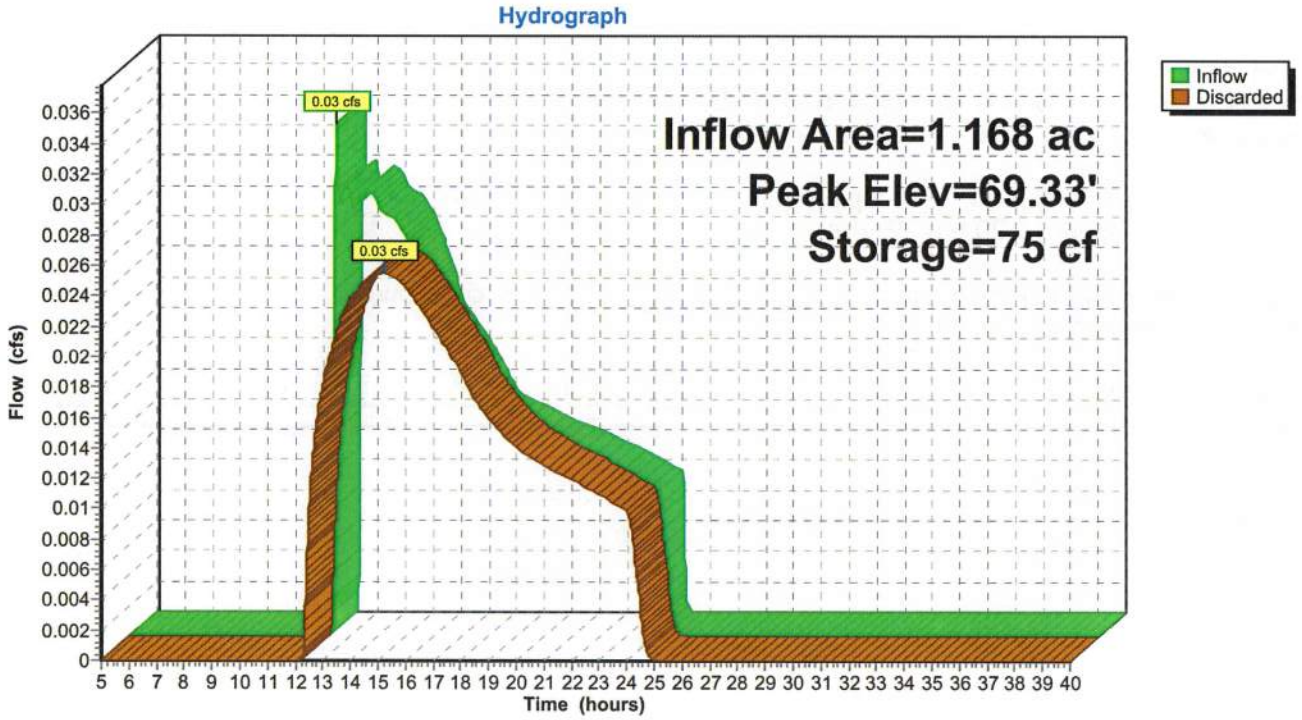
Volume	Invert	Avail.Storage	Storage Description
#1	69.00'	16,914 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.00	3	0	0
70.00	1,398	701	701
72.00	3,697	5,095	5,796
74.00	7,421	11,118	16,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	69.00'	**2.410 in/hr Exfiltration over Surface area from 67.90' - 74.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.03 cfs @ 15.20 hrs HW=69.33' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.03 cfs)

Pond 2P: Ex. Central Low Area Infiltration Basin



Summary for Pond 3P: Ex. Eastern Low Area Infiltration Basin

Inflow Area = 0.365 ac, 0.00% Impervious, Inflow Depth = 0.03" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.00 cfs @ 17.05 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 17.11 hrs, Volume= 0.001 af, Atten= 0%, Lag= 3.3 min
Discarded = 0.00 cfs @ 17.11 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 91.50' @ 17.11 hrs Surf.Area= 216 sf Storage= 0 cf

Plug-Flow detention time= 3.4 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 3.4 min (1,166.1 - 1,162.7)

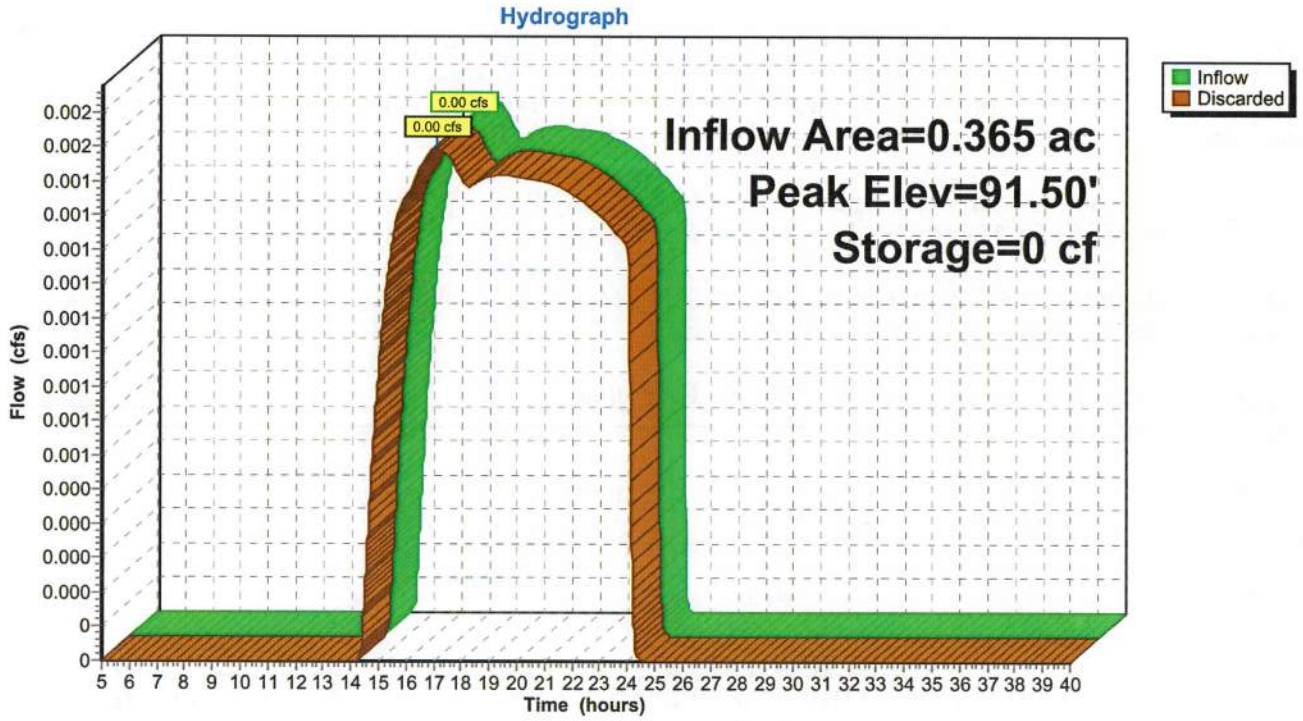
Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	402 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	213	0	0
92.00	1,393	402	402

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**1.020 in/hr Exfiltration over Surface area from 90.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.01 cfs @ 17.11 hrs HW=91.50' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3P: Ex. Eastern Low Area Infiltration Basin



Summary for Pond 4P: Ex. Central Low Area Infiltration Basin

Inflow Area = 0.670 ac, 27.76% Impervious, Inflow Depth = 0.40" for ATLAS 14 10YEAR BREWSTER ev
Inflow = 0.12 cfs @ 12.30 hrs, Volume= 0.022 af
Outflow = 0.05 cfs @ 12.94 hrs, Volume= 0.022 af, Atten= 61%, Lag= 38.6 min
Discarded = 0.05 cfs @ 12.94 hrs, Volume= 0.022 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 88.15' @ 12.94 hrs Surf.Area= 827 sf Storage= 116 cf

Plug-Flow detention time= 22.0 min calculated for 0.022 af (100% of inflow)
Center-of-Mass det. time= 21.9 min (970.8 - 948.8)

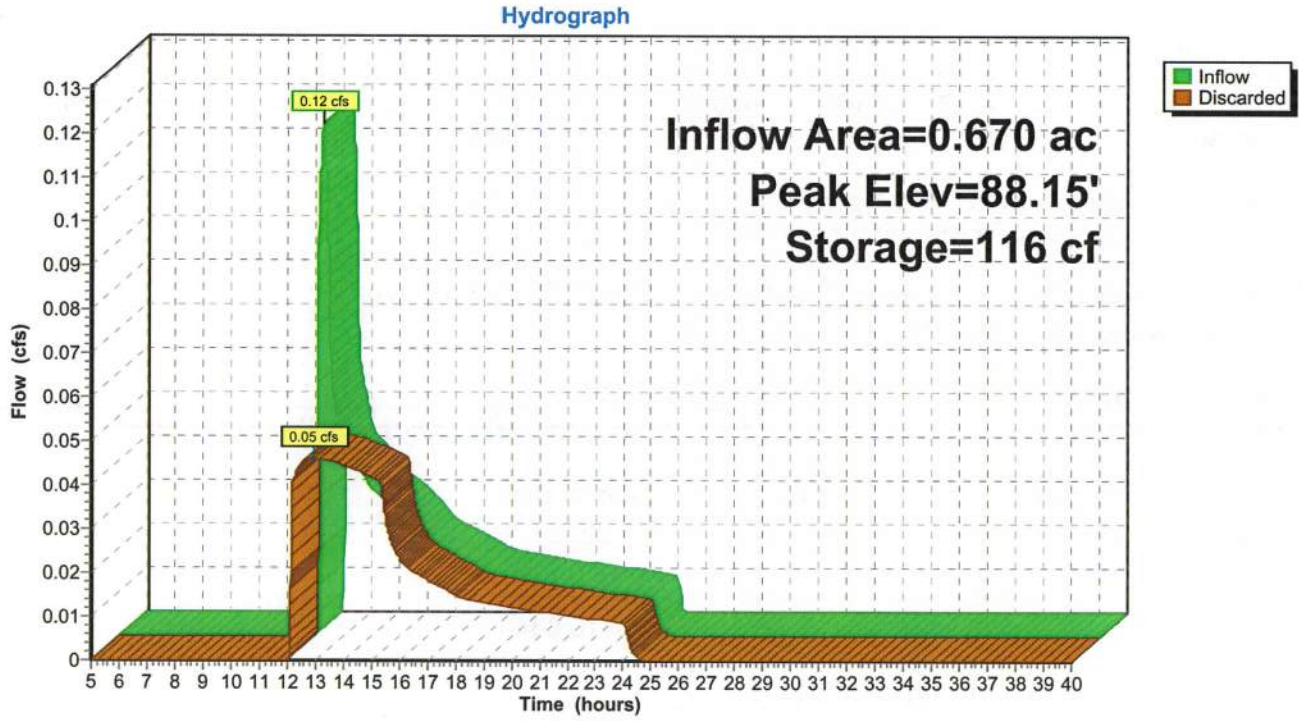
Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	10,864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	697	0	0
90.00	2,406	3,103	3,103
92.00	5,355	7,761	10,864

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	**2.410 in/hr Exfiltration over Surface area from 87.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.05 cfs @ 12.94 hrs HW=88.15' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Pond 4P: Ex. Central Low Area Infiltration Basin



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Proposed Areas to Low Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=0.60"
Tc=5.0 min CN=44 Runoff=0.13 cfs 0.019 af

SubcatchmentDA1A: Proposped Areas to Runoff Area=0.153 ac 0.00% Impervious Runoff Depth=0.04"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1B: Proposed Areas to Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.11"
Tc=5.0 min CN=33 Runoff=0.01 cfs 0.005 af

SubcatchmentDA2: Site Areas to Ex. Low Runoff Area=1.168 ac 14.13% Impervious Runoff Depth=0.39"
Flow Length=181' Tc=5.6 min UI Adjusted CN=40 Runoff=0.17 cfs 0.038 af

SubcatchmentDA3: House Areas to Ex. Low Runoff Area=0.365 ac 0.00% Impervious Runoff Depth=0.14"
Tc=5.0 min CN=34 Runoff=0.01 cfs 0.004 af

SubcatchmentDA4: House Areas to Ex. Runoff Area=0.670 ac 27.76% Impervious Runoff Depth=0.72"
Tc=5.0 min UI Adjusted CN=46 Runoff=0.34 cfs 0.040 af

Reach SP1: Study Point 1 Inflow=0.01 cfs 0.006 af
Outflow=0.01 cfs 0.006 af

Pond 1P: Low Area Infiltration Basin w Peak Elev=57.51' Storage=313 cf Inflow=0.13 cfs 0.019 af
Discarded=0.02 cfs 0.018 af Primary=0.00 cfs 0.000 af Outflow=0.02 cfs 0.018 af

Pond 2P: Ex. Central Low Area Infiltration Peak Elev=69.68' Storage=326 cf Inflow=0.17 cfs 0.038 af
Outflow=0.05 cfs 0.038 af

Pond 3P: Ex. Eastern Low Area Infiltration Basin Peak Elev=91.53' Storage=7 cf Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Pond 4P: Ex. Central Low Area Infiltration Peak Elev=88.48' Storage=430 cf Inflow=0.34 cfs 0.040 af
Outflow=0.06 cfs 0.040 af

Total Runoff Area = 3.271 ac Runoff Volume = 0.107 af Average Runoff Depth = 0.39"
89.27% Pervious = 2.920 ac 10.73% Impervious = 0.351 ac

Summary for Subcatchment DA1: Proposed Areas to Low Area

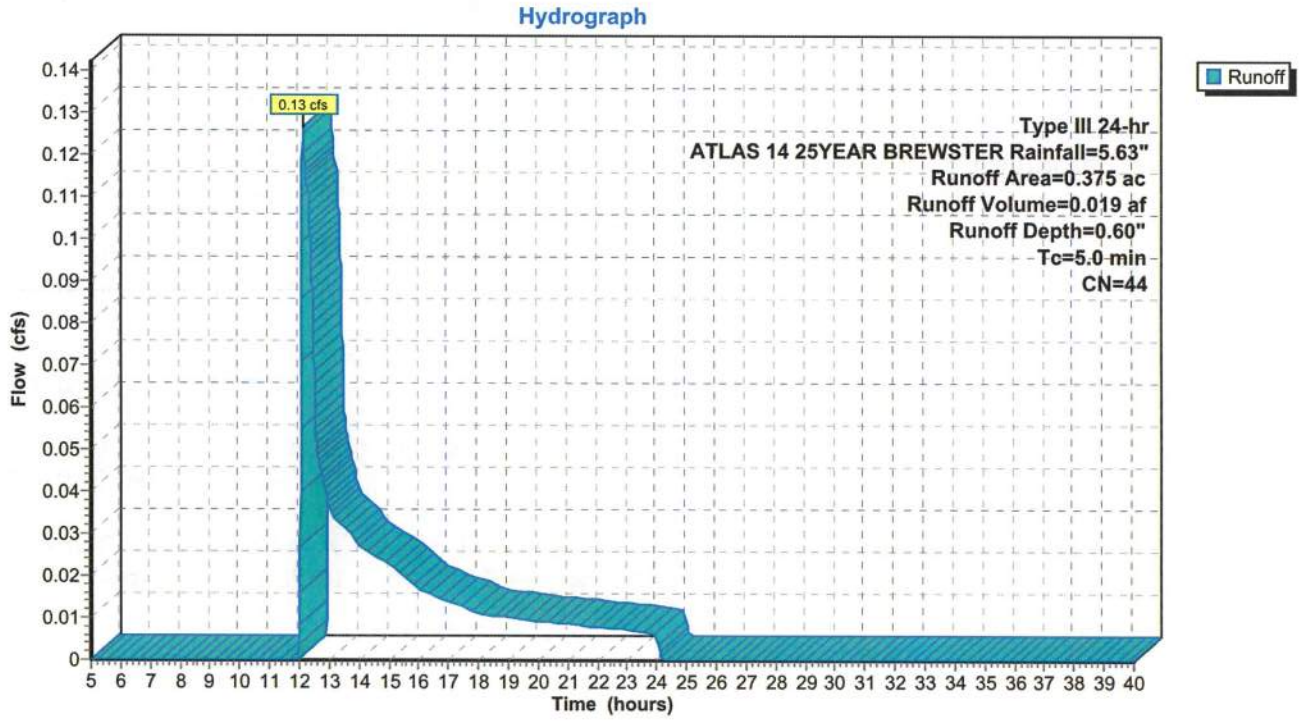
Runoff = 0.13 cfs @ 12.13 hrs, Volume= 0.019 af, Depth= 0.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.076	96	Gravel surface, HSG A
0.289	30	Woods, Good, HSG A
0.010	39	>75% Grass cover, Good, HSG A
0.375	44	Weighted Average
0.375		100.00% Pervious Area

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

Subcatchment DA1: Proposed Areas to Low Area



Summary for Subcatchment DA1A: Proposped Areas to North

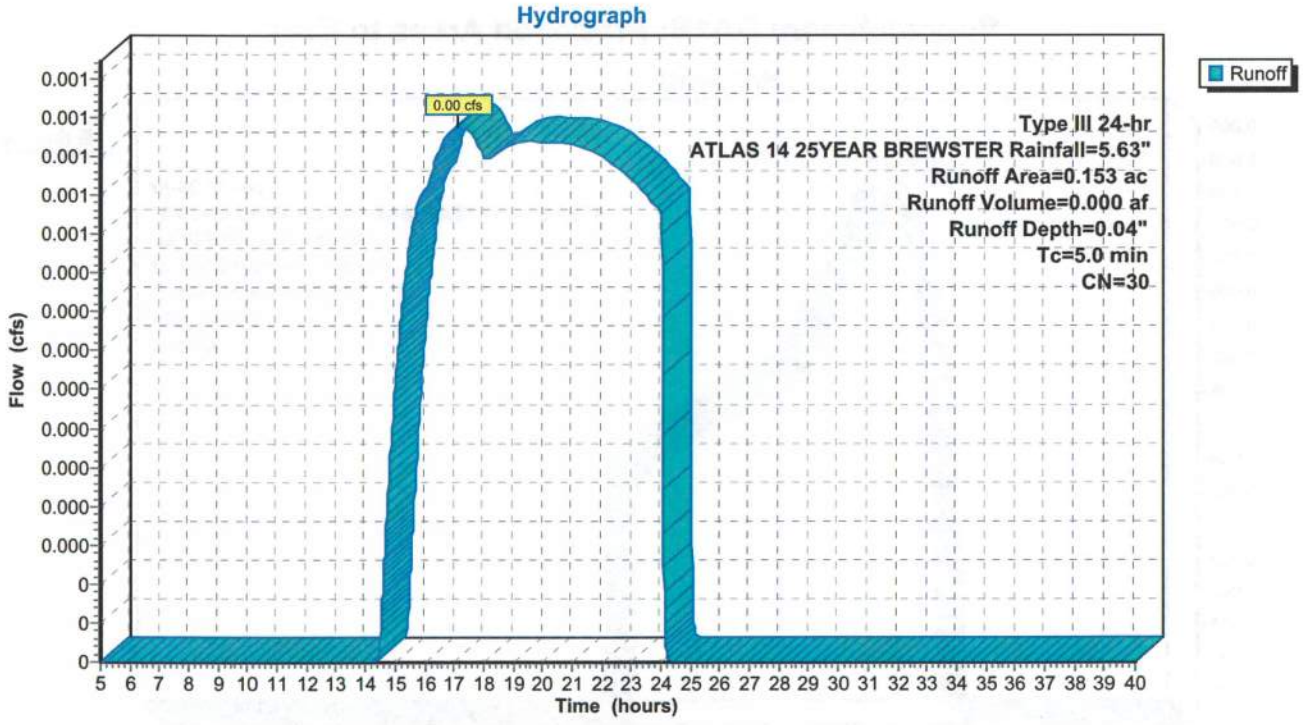
Runoff = 0.00 cfs @ 17.15 hrs, Volume= 0.000 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.153	30	Woods, Good, HSG A
0.153		100.00% Pervious Area

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

Subcatchment DA1A: Proposped Areas to North



Summary for Subcatchment DA1B: Proposed Areas to East

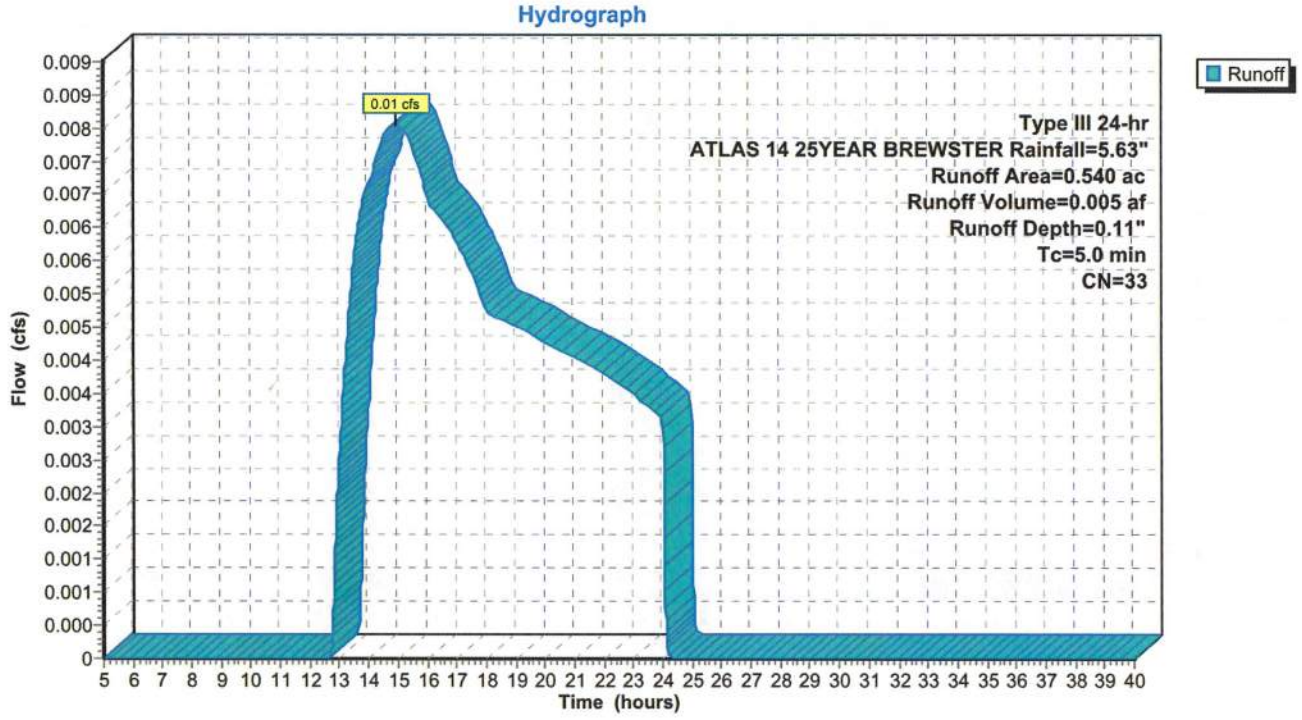
Runoff = 0.01 cfs @ 14.94 hrs, Volume= 0.005 af, Depth= 0.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.340	30	Woods, Good, HSG A
0.200	39	>75% Grass cover, Good, HSG A
0.540	33	Weighted Average
0.540		100.00% Pervious Area

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

Subcatchment DA1B: Proposed Areas to East



Summary for Subcatchment DA2: Site Areas to Ex. Low Area

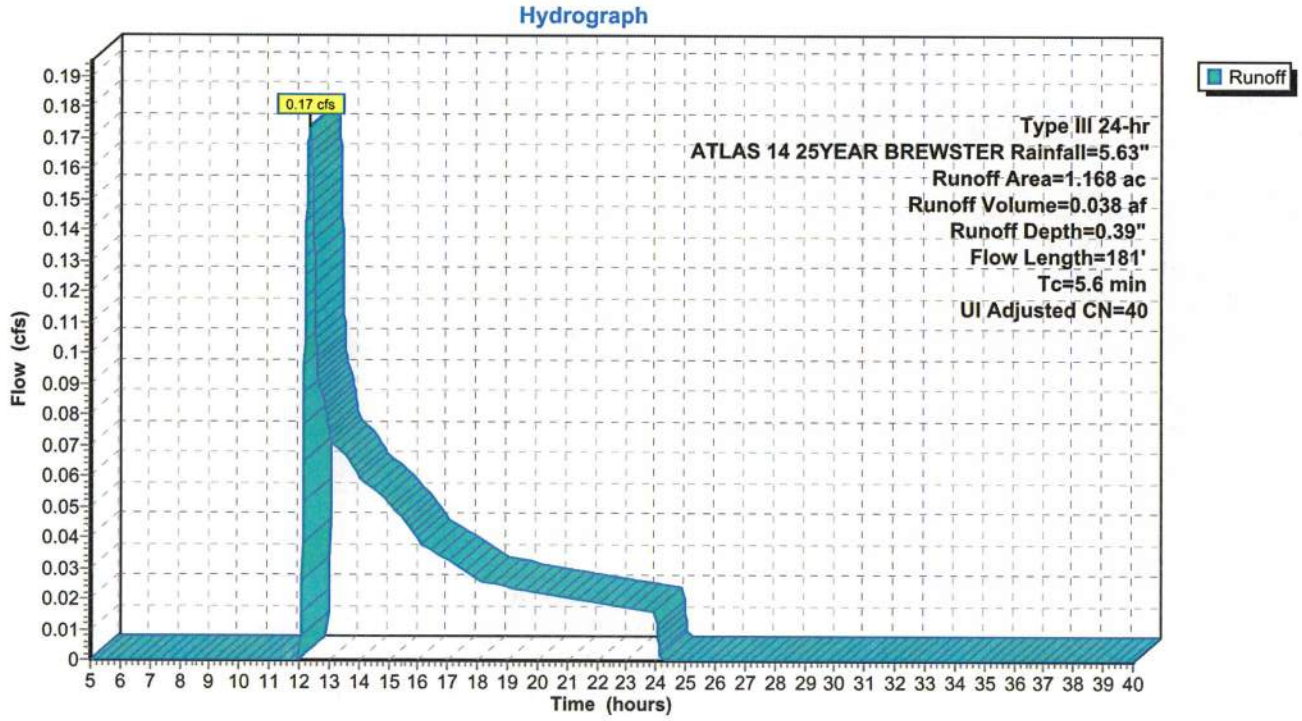
Runoff = 0.17 cfs @ 12.35 hrs, Volume= 0.038 af, Depth= 0.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Adj	Description
0.040	96		Gravel surface, HSG A
0.686	30		Woods, Good, HSG A
0.277	39		>75% Grass cover, Good, HSG A
0.165	98		Unconnected pavement, HSG A
1.168	44	40	Weighted Average, UI Adjusted
1.003			85.87% Pervious Area
0.165			14.13% Impervious Area
0.165			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	25	0.1800	0.31		**Sheet Flow, A** Grass: Short n= 0.150 P2= 3.20"
2.9	25	0.1800	0.14		**Sheet Flow, B** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	131	0.0990	1.57		**Shallow Concentrated Flow, C** Woodland Kv= 5.0 fps
5.6	181	Total			

Subcatchment DA2: Site Areas to Ex. Low Area



Summary for Subcatchment DA3: House Areas to Ex. Low Area

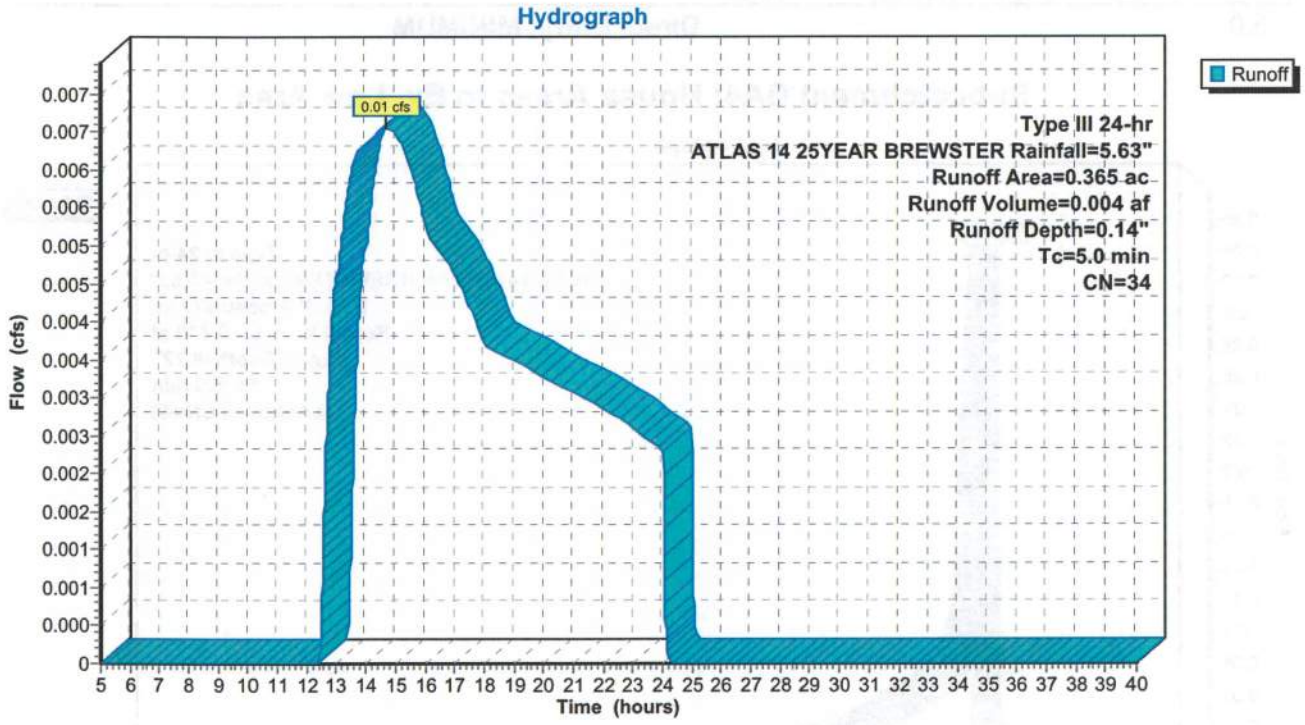
Runoff = 0.01 cfs @ 14.65 hrs, Volume= 0.004 af, Depth= 0.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Description
0.198	30	Woods, Good, HSG A
0.167	39	>75% Grass cover, Good, HSG A
0.365	34	Weighted Average
0.365		100.00% Pervious Area

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

Subcatchment DA3: House Areas to Ex. Low Area



Summary for Subcatchment DA4: House Areas to Ex. Low Area

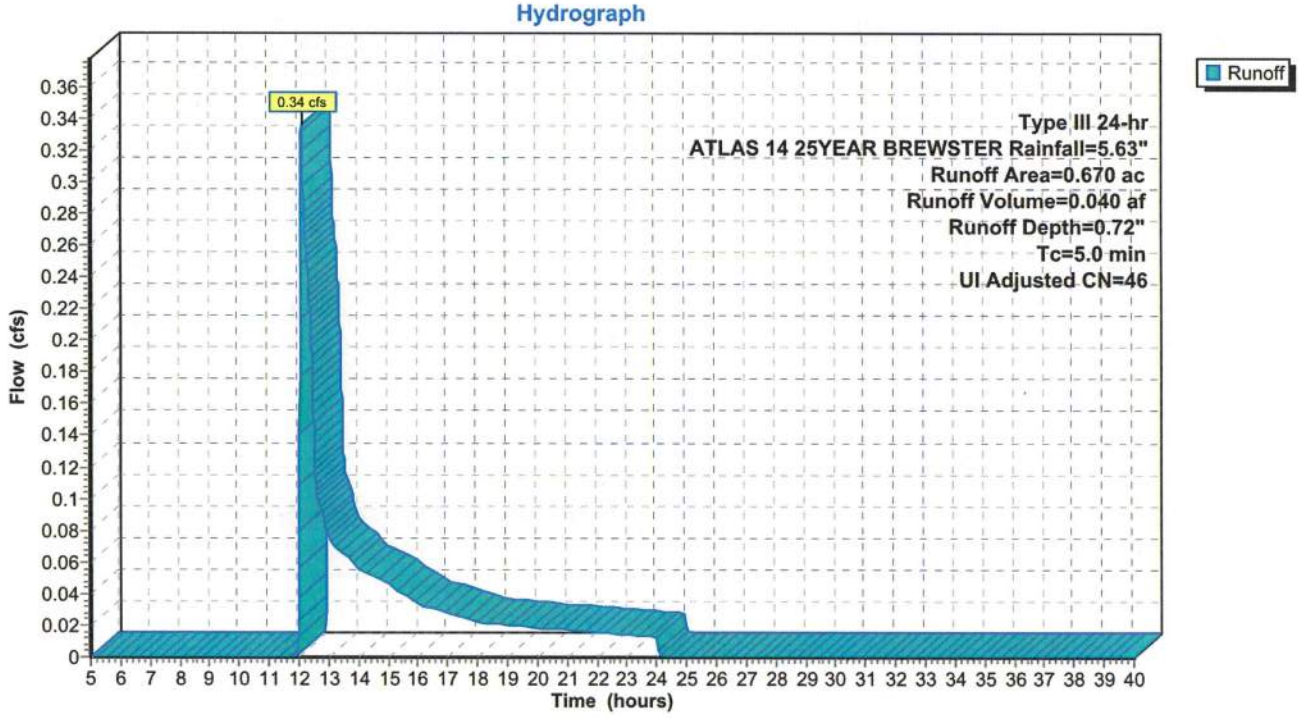
Runoff = 0.34 cfs @ 12.11 hrs, Volume= 0.040 af, Depth= 0.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr ATLAS 14 25YEAR BREWSTER Rainfall=5.63"

Area (ac)	CN	Adj	Description
0.330	30		Woods, Good, HSG A
0.154	39		>75% Grass cover, Good, HSG A
0.100	98		Unconnected pavement, HSG A
0.086	98		Roofs, HSG A
0.670	51	46	Weighted Average, UI Adjusted
0.484			72.24% Pervious Area
0.186			27.76% Impervious Area
0.100			53.76% Unconnected

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

Subcatchment DA4: House Areas to Ex. Low Area

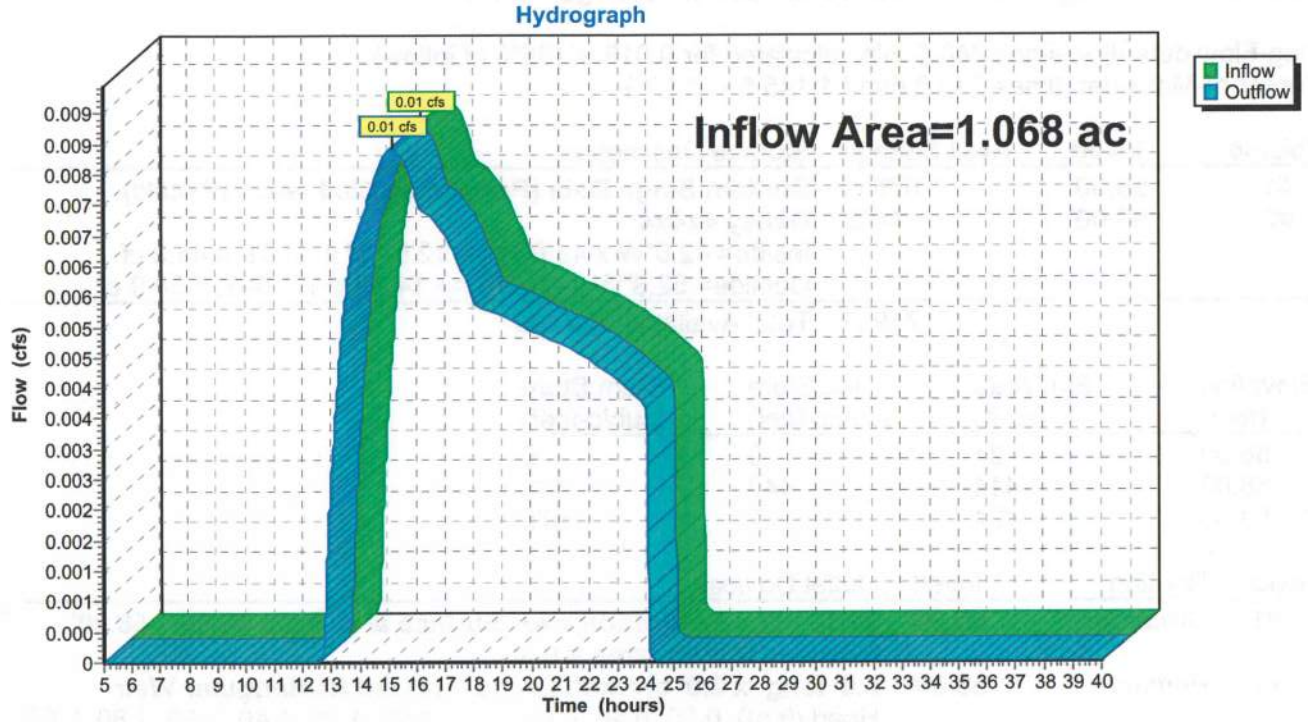


Summary for Reach SP1: Study Point 1

Inflow Area = 1.068 ac, 0.00% Impervious, Inflow Depth = 0.06" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.01 cfs @ 15.14 hrs, Volume= 0.006 af
Outflow = 0.01 cfs @ 15.14 hrs, Volume= 0.006 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Low Area Infiltration Basin w leaching galley

Inflow Area = 0.375 ac, 0.00% Impervious, Inflow Depth = 0.60" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.13 cfs @ 12.13 hrs, Volume= 0.019 af
Outflow = 0.02 cfs @ 15.84 hrs, Volume= 0.018 af, Atten= 86%, Lag= 222.6 min
Discarded = 0.02 cfs @ 15.84 hrs, Volume= 0.018 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 57.51' @ 15.84 hrs Surf.Area= 321 sf Storage= 313 cf

Plug-Flow detention time= 240.0 min calculated for 0.018 af (95% of inflow)
Center-of-Mass det. time= 213.8 min (1,145.5 - 931.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	675 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	50.00'	44 cf	**Galley 4x4x4** Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf
		719 cf	Total Available Storage

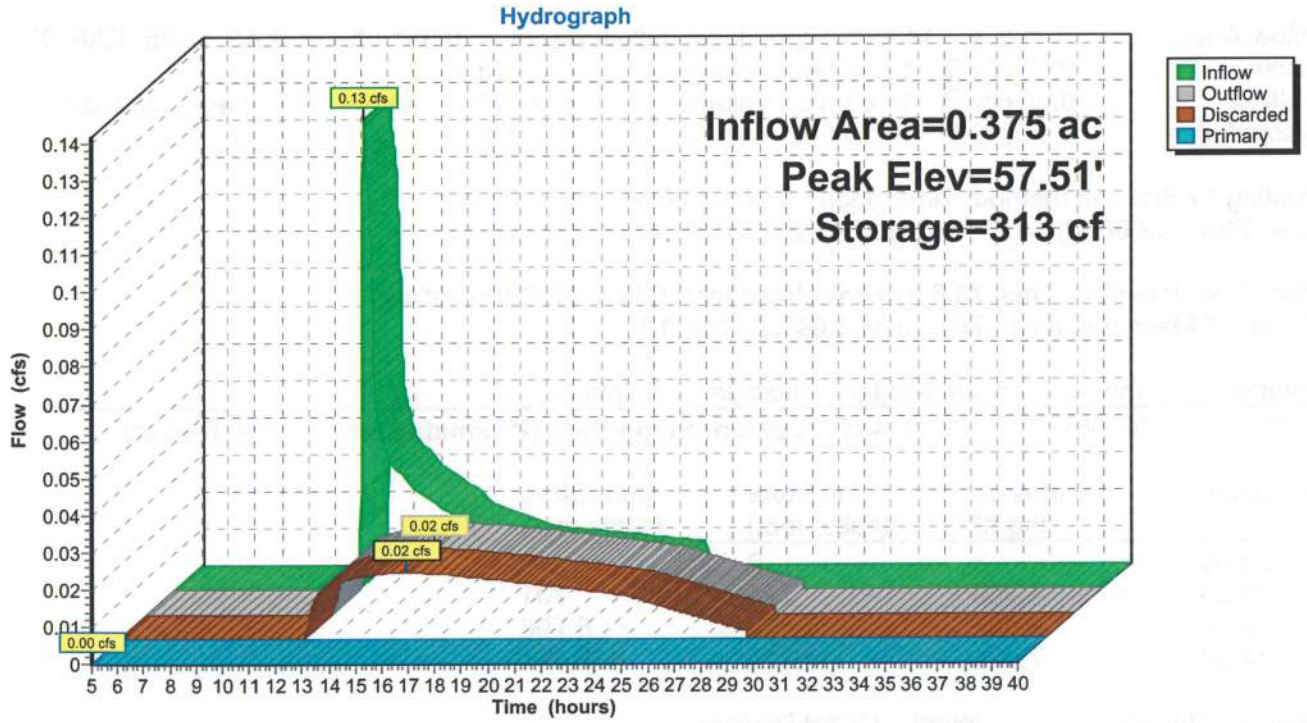
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.00	34	0	0
58.00	414	448	448
58.50	494	227	675

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**2.410 in/hr Exfiltration over Surface area from 55.90' - 58.00'** Excluded Surface area = 0 sf
#2	Primary	58.00'	**5.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.02 cfs @ 15.84 hrs HW=57.51' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=50.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 1P: Low Area Infiltration Basin w leaching galley



Summary for Pond 2P: Ex. Central Low Area Infiltration Basin

Inflow Area = 1.168 ac, 14.13% Impervious, Inflow Depth = 0.39" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.17 cfs @ 12.35 hrs, Volume= 0.038 af
Outflow = 0.05 cfs @ 14.83 hrs, Volume= 0.038 af, Atten= 69%, Lag= 148.8 min
Discarded = 0.05 cfs @ 14.83 hrs, Volume= 0.038 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 69.68' @ 14.83 hrs Surf.Area= 954 sf Storage= 326 cf

Plug-Flow detention time= 78.6 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 78.6 min (1,042.7 - 964.1)

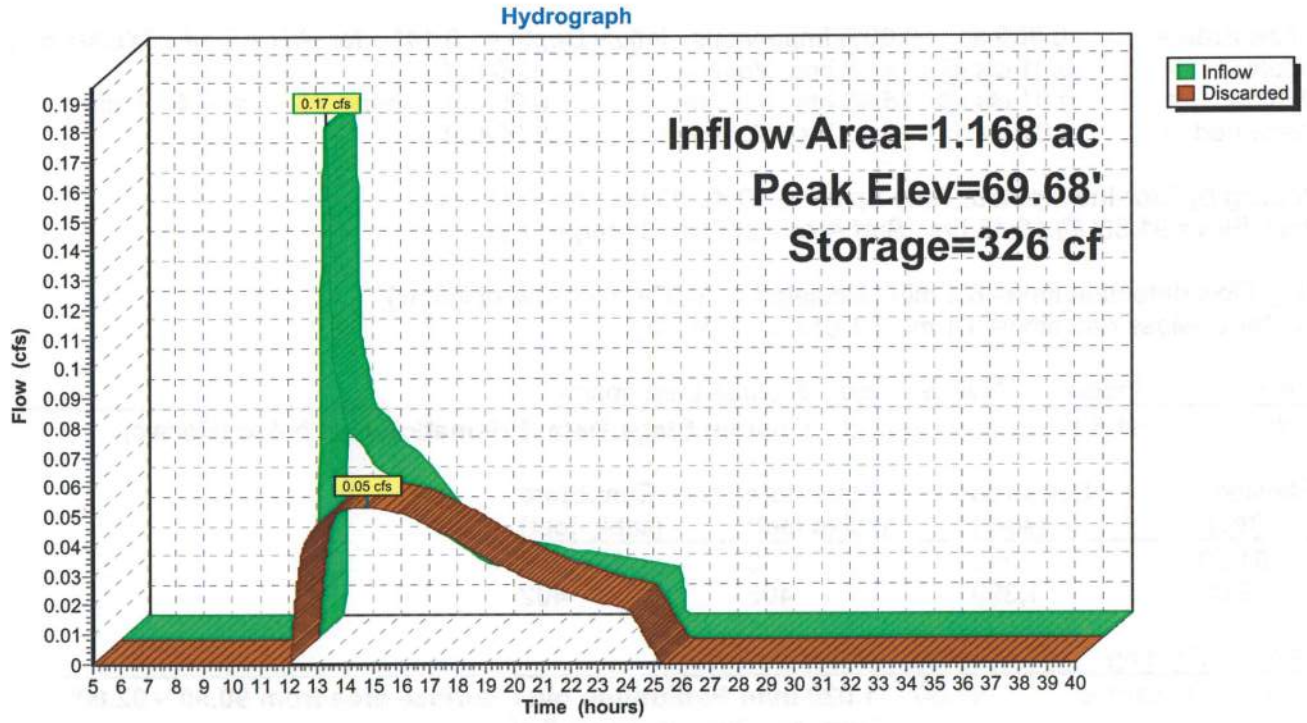
Volume	Invert	Avail.Storage	Storage Description
#1	69.00'	16,914 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.00	3	0	0
70.00	1,398	701	701
72.00	3,697	5,095	5,796
74.00	7,421	11,118	16,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	69.00'	**2.410 in/hr Exfiltration over Surface area from 67.90' - 74.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.05 cfs @ 14.83 hrs HW=69.68' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Pond 2P: Ex. Central Low Area Infiltration Basin



Summary for Pond 3P: Ex. Eastern Low Area Infiltration Basin

Inflow Area = 0.365 ac, 0.00% Impervious, Inflow Depth = 0.14" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.01 cfs @ 14.65 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 15.46 hrs, Volume= 0.004 af, Atten= 7%, Lag= 48.5 min
Discarded = 0.01 cfs @ 15.46 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 91.53' @ 15.46 hrs Surf.Area= 279 sf Storage= 7 cf

Plug-Flow detention time= 8.1 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 8.1 min (1,057.1 - 1,049.0)

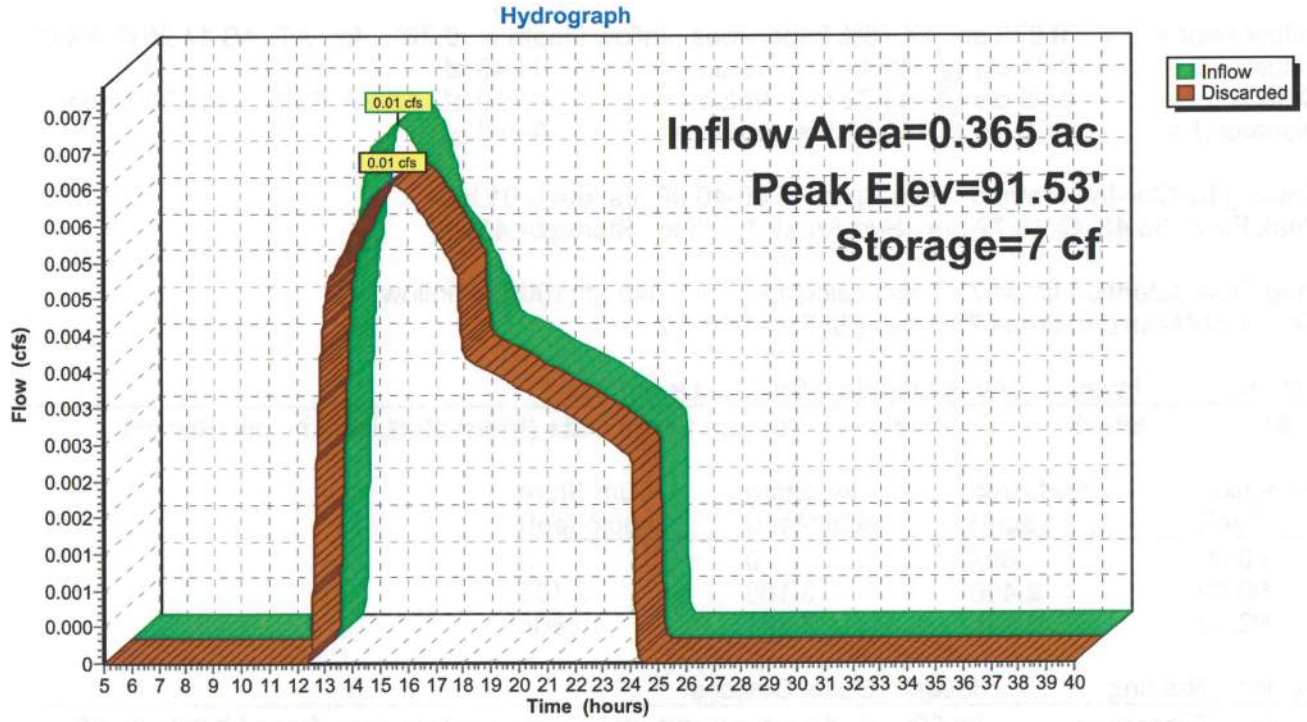
Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	402 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	213	0	0
92.00	1,393	402	402

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**1.020 in/hr Exfiltration over Surface area from 90.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.01 cfs @ 15.46 hrs HW=91.53' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Pond 3P: Ex. Eastern Low Area Infiltration Basin



Summary for Pond 4P: Ex. Central Low Area Infiltration Basin

Inflow Area = 0.670 ac, 27.76% Impervious, Inflow Depth = 0.72" for ATLAS 14 25YEAR BREWSTER ev
Inflow = 0.34 cfs @ 12.11 hrs, Volume= 0.040 af
Outflow = 0.06 cfs @ 13.72 hrs, Volume= 0.040 af, Atten= 82%, Lag= 96.5 min
Discarded = 0.06 cfs @ 13.72 hrs, Volume= 0.040 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 88.48' @ 13.72 hrs Surf.Area= 1,105 sf Storage= 430 cf

Plug-Flow detention time= 73.7 min calculated for 0.040 af (100% of inflow)
Center-of-Mass det. time= 73.6 min (993.2 - 919.6)

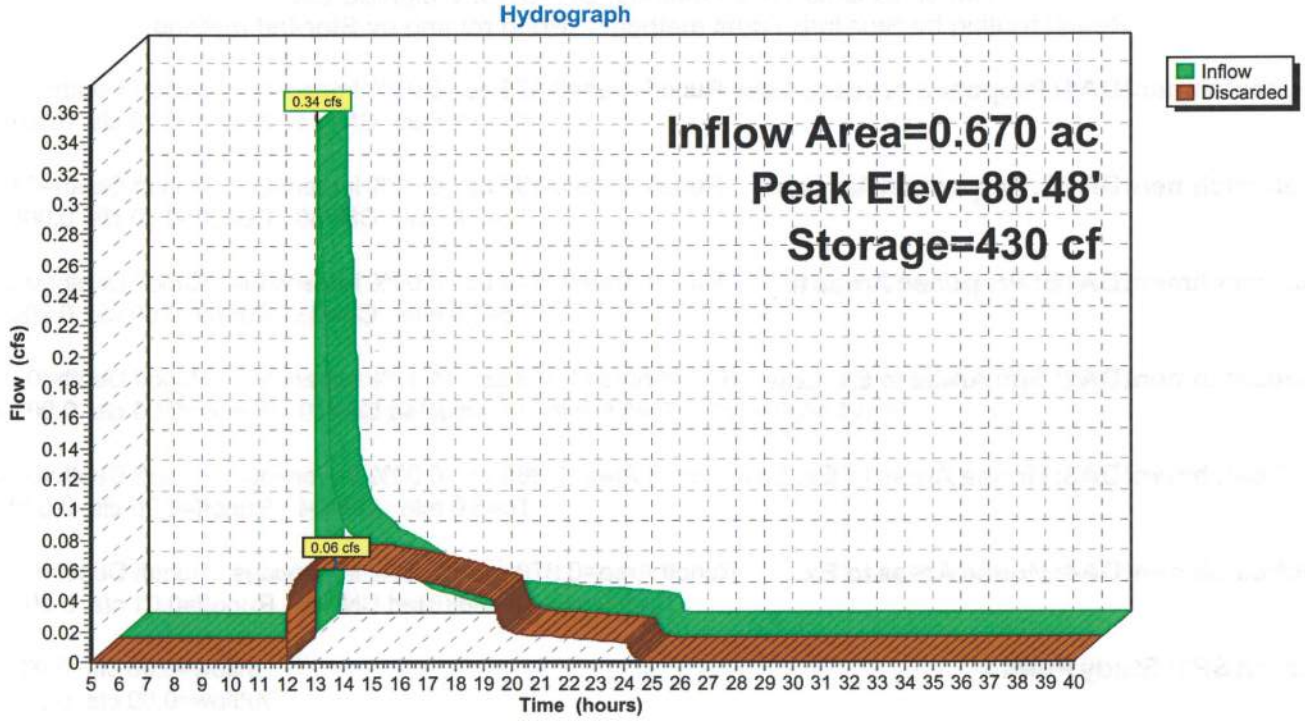
Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	10,864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	697	0	0
90.00	2,406	3,103	3,103
92.00	5,355	7,761	10,864

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	**2.410 in/hr Exfiltration over Surface area from 87.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.06 cfs @ 13.72 hrs HW=88.48' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Pond 4P: Ex. Central Low Area Infiltration Basin



Time span=5.00-40.00 hrs, dt=0.01 hrs, 3501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA1: Proposed Areas to Low Runoff Area=0.375 ac 0.00% Impervious Runoff Depth=0.04"
Tc=5.0 min CN=44 Runoff=0.00 cfs 0.001 af

SubcatchmentDA1A: Proposped Areas to Runoff Area=0.153 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=30 Runoff=0.00 cfs 0.000 af

SubcatchmentDA1B: Proposed Areas to Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=33 Runoff=0.00 cfs 0.000 af

SubcatchmentDA2: Site Areas to Ex. Low Runoff Area=1.168 ac 14.13% Impervious Runoff Depth=0.01"
Flow Length=181' Tc=5.6 min UI Adjusted CN=40 Runoff=0.00 cfs 0.001 af

SubcatchmentDA3: House Areas to Ex. Low Runoff Area=0.365 ac 0.00% Impervious Runoff Depth=0.00"
Tc=5.0 min CN=34 Runoff=0.00 cfs 0.000 af

SubcatchmentDA4: House Areas to Ex. Runoff Area=0.670 ac 27.76% Impervious Runoff Depth=0.07"
Tc=5.0 min UI Adjusted CN=46 Runoff=0.01 cfs 0.004 af

Reach SP1: Study Point 1 Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 1P: Low Area Infiltration Basin w leaching Peak Elev=56.00' Storage=44 cf Inflow=0.00 cfs 0.001 af
Discarded=0.00 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.00 cfs 0.000 af

Pond 2P: Ex. Central Low Area Infiltration Basin Peak Elev=69.02' Storage=0 cf Inflow=0.00 cfs 0.001 af
Outflow=0.00 cfs 0.001 af

Pond 3P: Ex. Eastern Low Area Infiltration Basin Peak Elev=91.50' Storage=0 cf Inflow=0.00 cfs 0.000 af
Outflow=0.00 cfs 0.000 af

Pond 4P: Ex. Central Low Area Infiltration Basin Peak Elev=88.01' Storage=4 cf Inflow=0.01 cfs 0.004 af
Outflow=0.01 cfs 0.004 af

Total Runoff Area = 3.271 ac Runoff Volume = 0.006 af Average Runoff Depth = 0.02"
89.27% Pervious = 2.920 ac 10.73% Impervious = 0.351 ac

Summary for Subcatchment DA1: Proposed Areas to Low Area

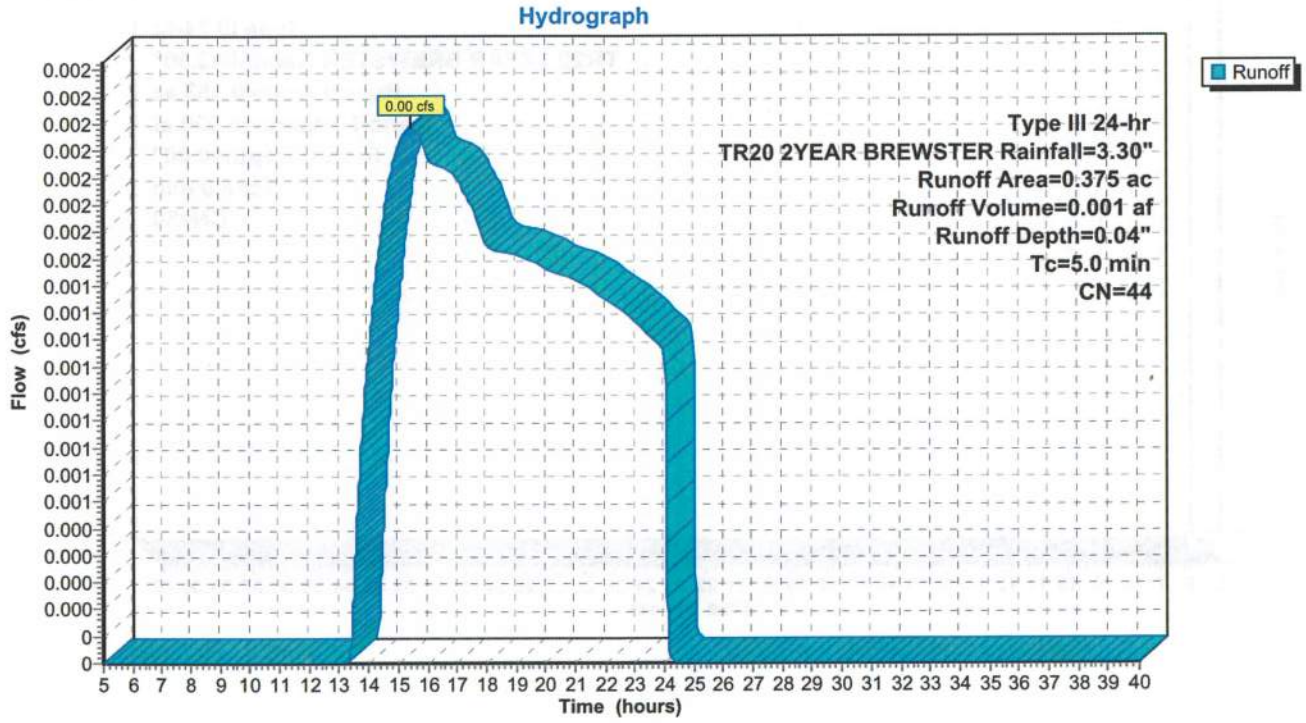
Runoff = 0.00 cfs @ 15.42 hrs, Volume= 0.001 af, Depth= 0.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.076	96	Gravel surface, HSG A
0.289	30	Woods, Good, HSG A
0.010	39	>75% Grass cover, Good, HSG A
0.375	44	Weighted Average
0.375		100.00% Pervious Area

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

Subcatchment DA1: Proposed Areas to Low Area



Summary for Subcatchment DA1A: Proposped Areas to North

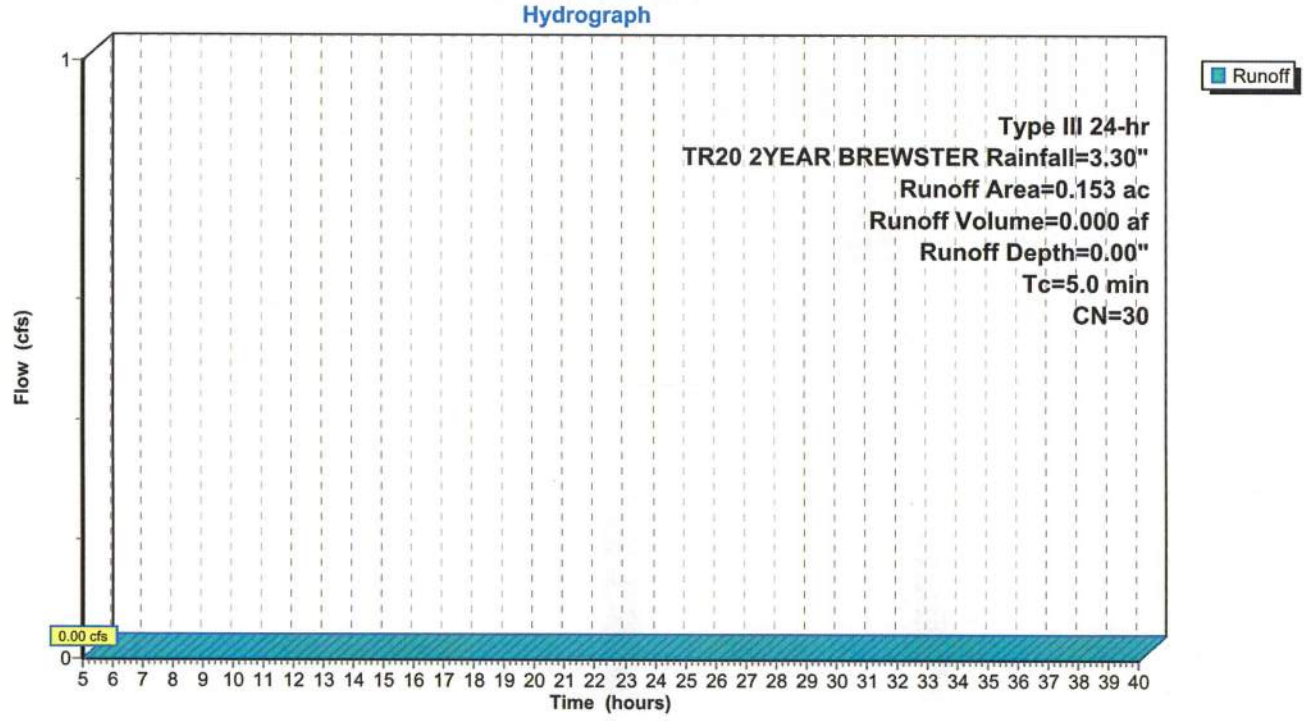
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.153	30	Woods, Good, HSG A
0.153		100.00% Pervious Area

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

Subcatchment DA1A: Proposped Areas to North



Summary for Subcatchment DA1B: Proposed Areas to East

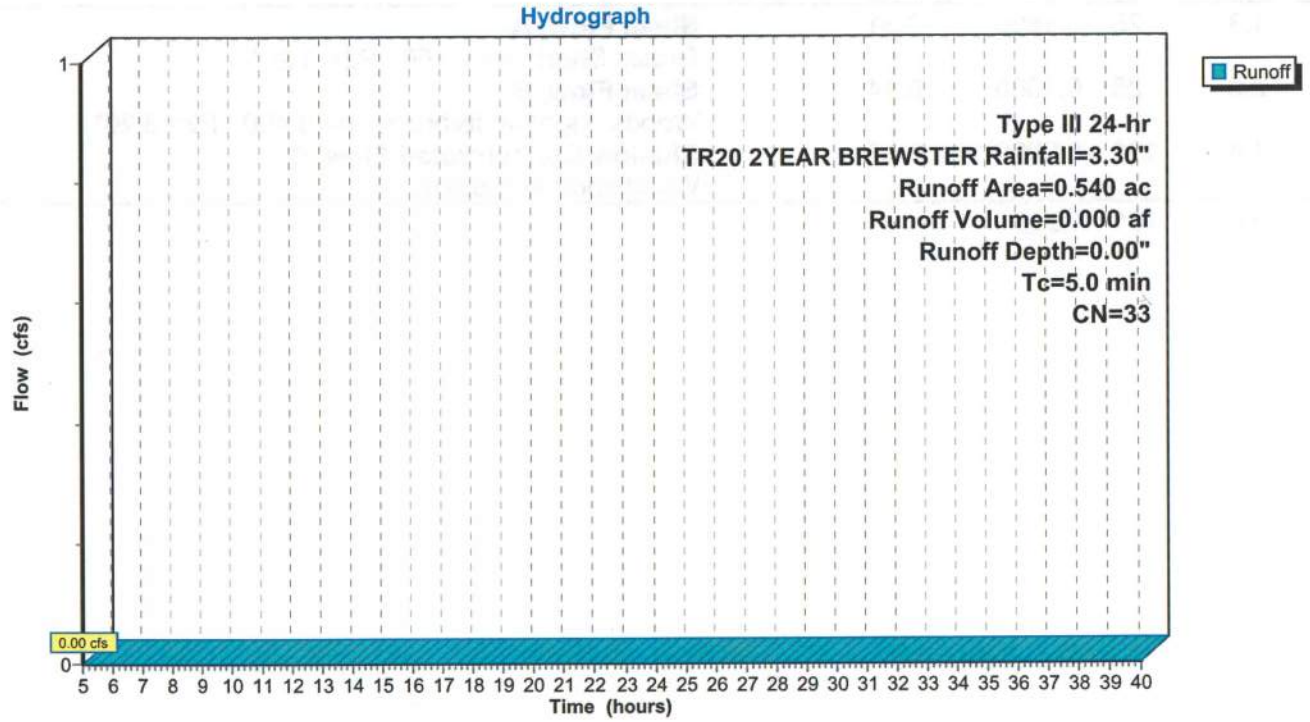
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.340	30	Woods, Good, HSG A
0.200	39	>75% Grass cover, Good, HSG A
0.540	33	Weighted Average
0.540		100.00% Pervious Area

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

Subcatchment DA1B: Proposed Areas to East



Summary for Subcatchment DA2: Site Areas to Ex. Low Area

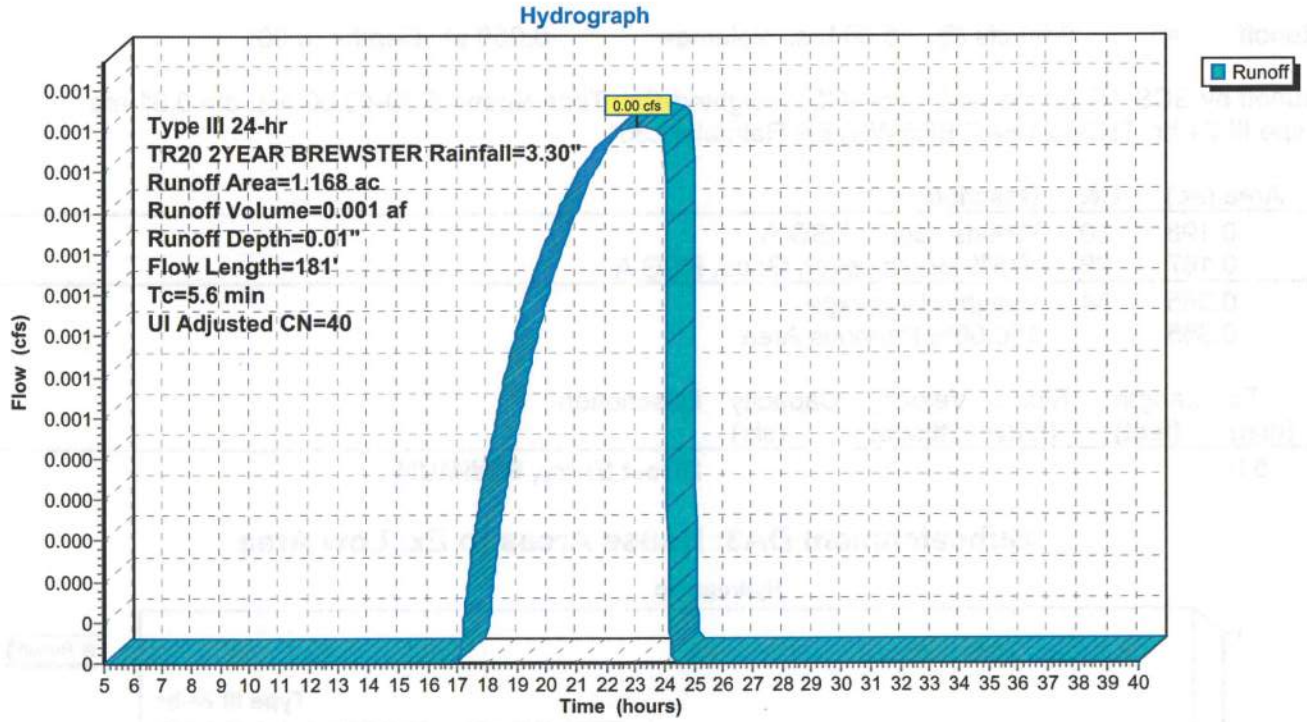
Runoff = 0.00 cfs @ 23.04 hrs, Volume= 0.001 af, Depth= 0.01"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Adj	Description
0.040	96		Gravel surface, HSG A
0.686	30		Woods, Good, HSG A
0.277	39		>75% Grass cover, Good, HSG A
0.165	98		Unconnected pavement, HSG A
1.168	44	40	Weighted Average, UI Adjusted
1.003			85.87% Pervious Area
0.165			14.13% Impervious Area
0.165			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	25	0.1800	0.31		**Sheet Flow, A** Grass: Short n= 0.150 P2= 3.20"
2.9	25	0.1800	0.14		**Sheet Flow, B** Woods: Light underbrush n= 0.400 P2= 3.20"
1.4	131	0.0990	1.57		**Shallow Concentrated Flow, C** Woodland Kv= 5.0 fps
5.6	181	Total			

Subcatchment DA2: Site Areas to Ex. Low Area



Summary for Subcatchment DA3: House Areas to Ex. Low Area

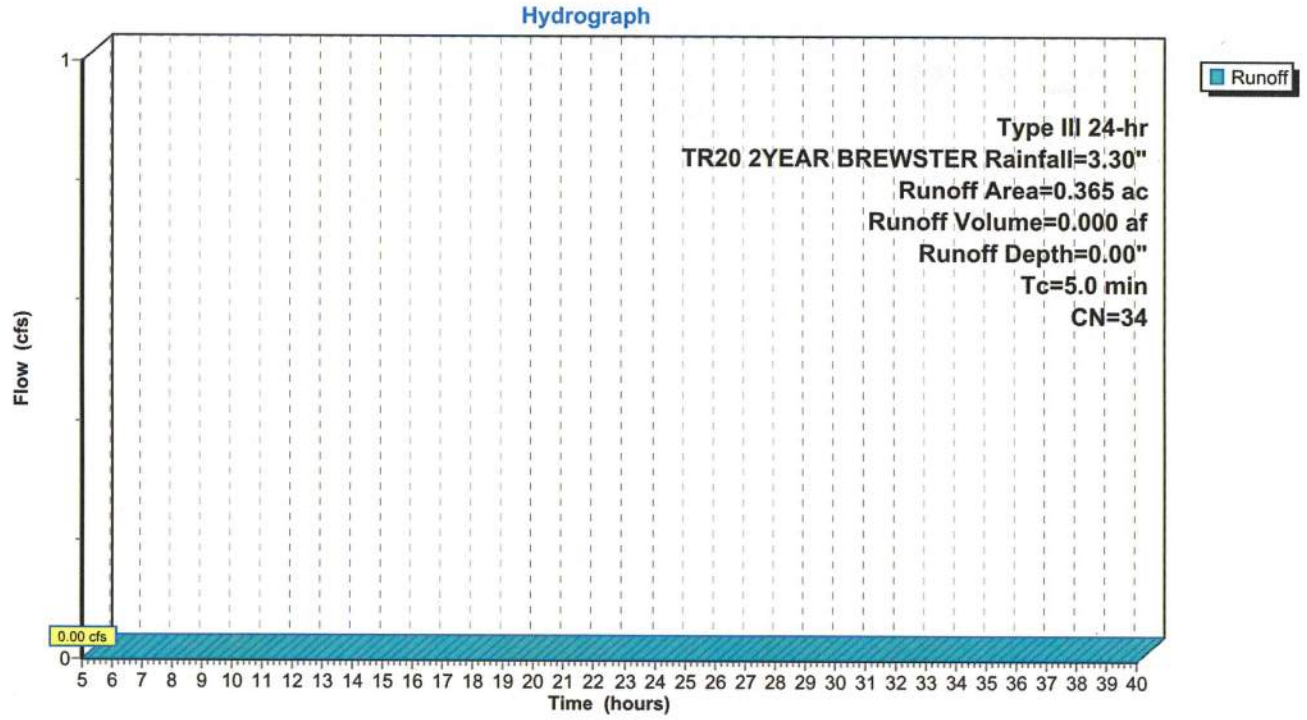
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Description
0.198	30	Woods, Good, HSG A
0.167	39	>75% Grass cover, Good, HSG A
0.365	34	Weighted Average
0.365		100.00% Pervious Area

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

Subcatchment DA3: House Areas to Ex. Low Area



Summary for Subcatchment DA4: House Areas to Ex. Low Area

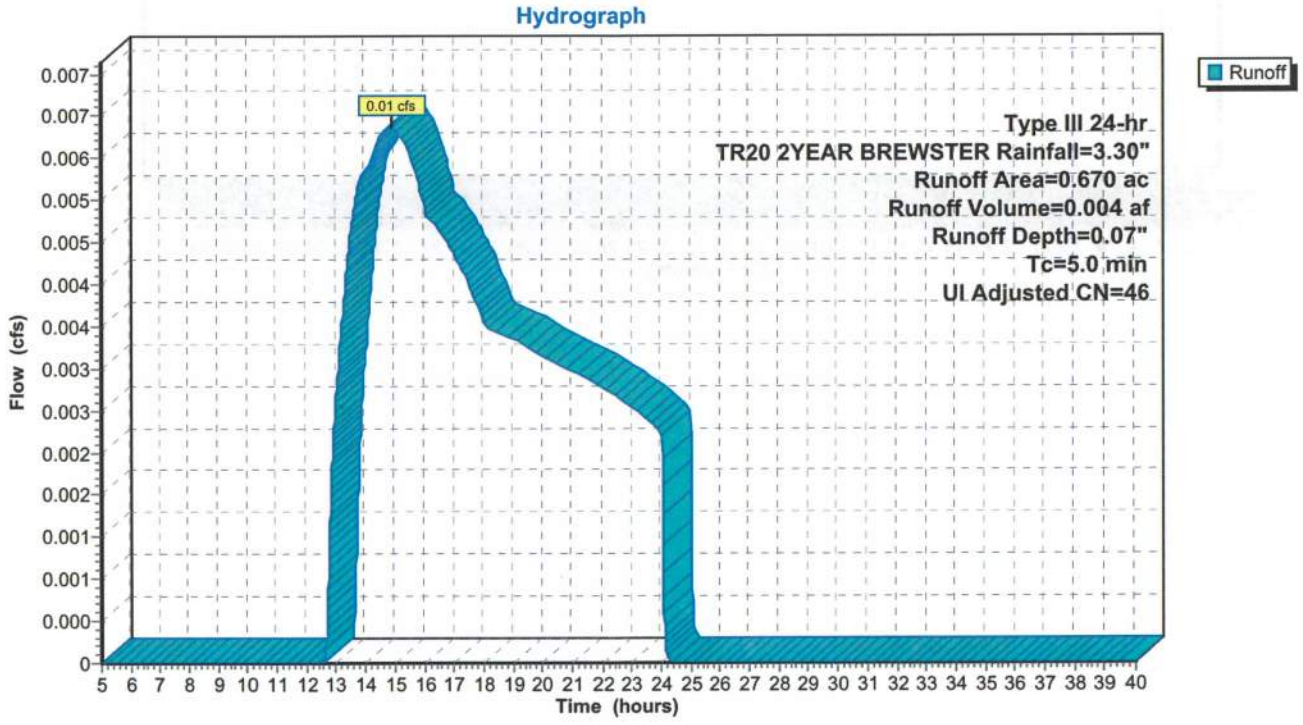
Runoff = 0.01 cfs @ 14.85 hrs, Volume= 0.004 af, Depth= 0.07"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Type III 24-hr TR20 2YEAR BREWSTER Rainfall=3.30"

Area (ac)	CN	Adj	Description
0.330	30		Woods, Good, HSG A
0.154	39		>75% Grass cover, Good, HSG A
0.100	98		Unconnected pavement, HSG A
0.086	98		Roofs, HSG A
0.670	51	46	Weighted Average, UI Adjusted
0.484			72.24% Pervious Area
0.186			27.76% Impervious Area
0.100			53.76% Unconnected

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

Subcatchment DA4: House Areas to Ex. Low Area

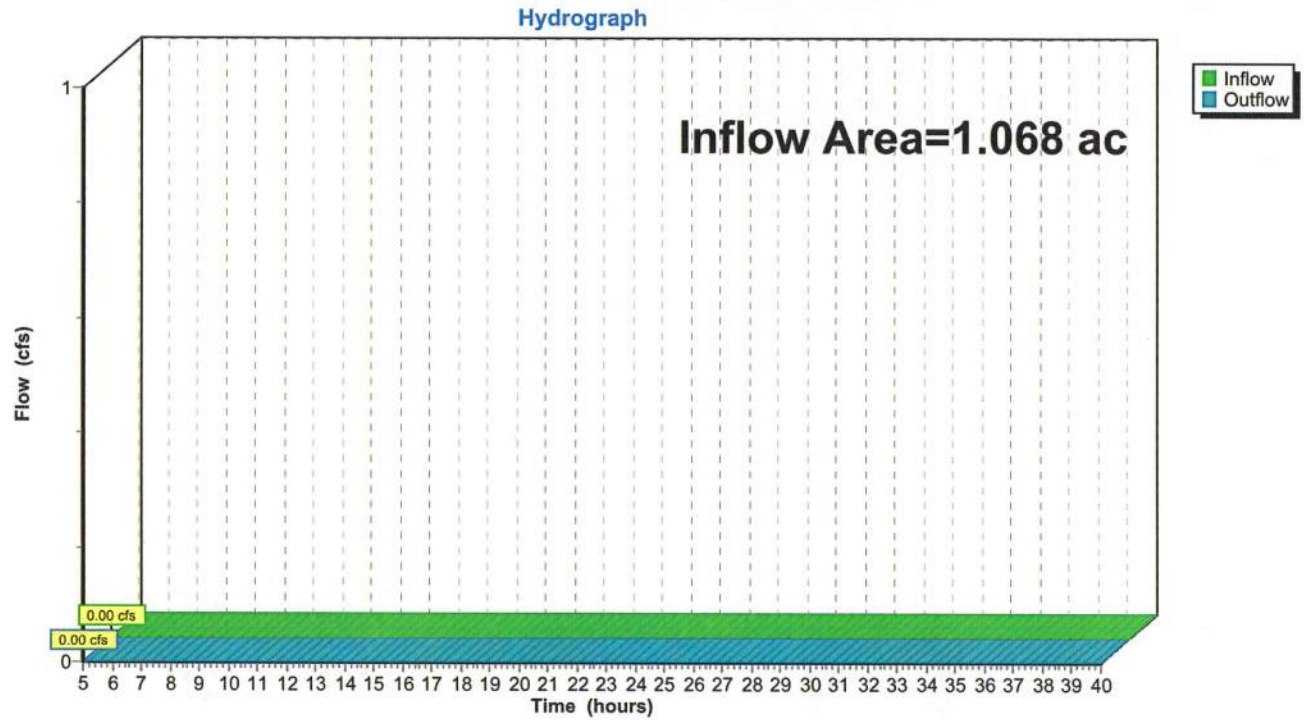


Summary for Reach SP1: Study Point 1

Inflow Area = 1.068 ac, 0.00% Impervious, Inflow Depth = 0.00" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs

Reach SP1: Study Point 1



Summary for Pond 1P: Low Area Infiltration Basin w leaching galley

Inflow Area = 0.375 ac, 0.00% Impervious, Inflow Depth = 0.04" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 15.42 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 21.26 hrs, Volume= 0.000 af, Atten= 13%, Lag= 350.2 min
Discarded = 0.00 cfs @ 21.26 hrs, Volume= 0.000 af
Primary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 56.00' @ 21.26 hrs Surf.Area= 0 sf Storage= 44 cf

Plug-Flow detention time= 452.4 min calculated for 0.000 af (29% of inflow)
Center-of-Mass det. time= 245.5 min (1,358.1 - 1,112.7)

Volume	Invert	Avail.Storage	Storage Description
#1	56.00'	675 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	50.00'	44 cf	**Galley 4x4x4** Inside= 42.0"W x 43.0"H => 12.67 sf x 3.50'L = 44.3 cf Outside= 52.8"W x 48.0"H => 14.72 sf x 4.00'L = 58.9 cf
		719 cf	Total Available Storage

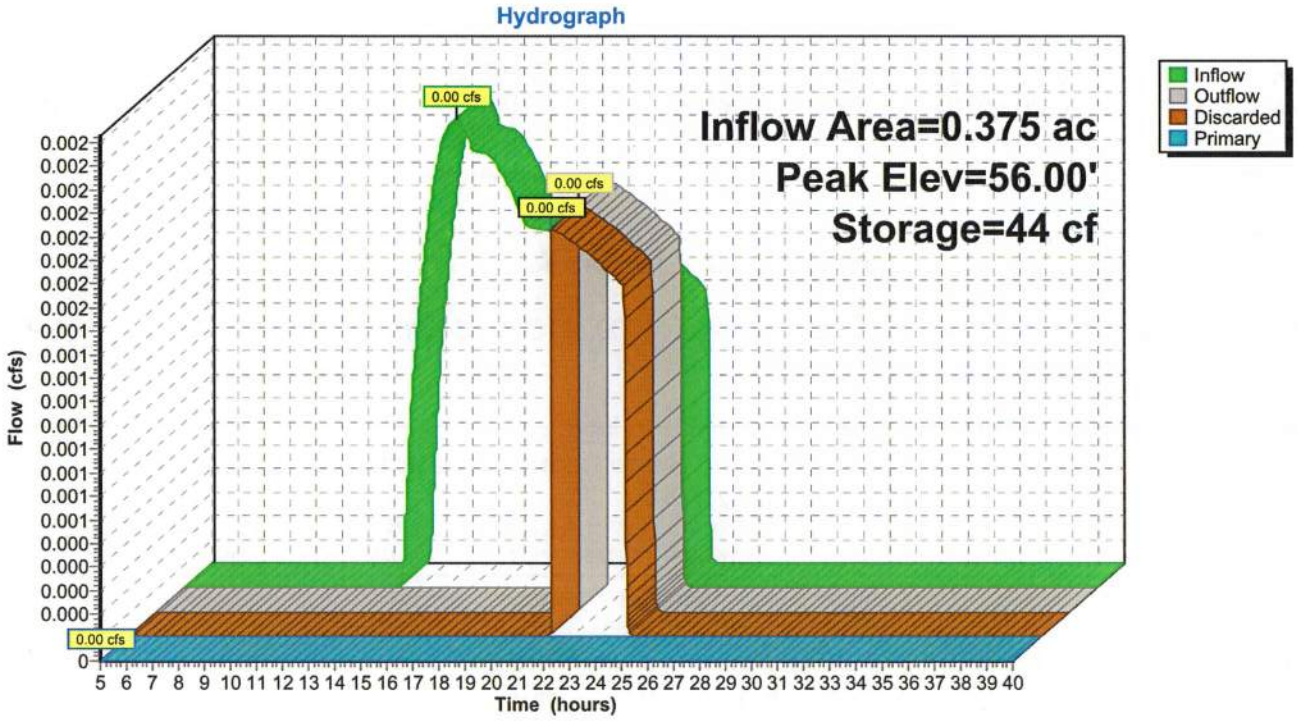
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
56.00	34	0	0
58.00	414	448	448
58.50	494	227	675

Device	Routing	Invert	Outlet Devices
#1	Discarded	55.90'	**2.410 in/hr Exfiltration over Surface area from 55.90' - 58.00'** Excluded Surface area = 0 sf
#2	Primary	58.00'	**5.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.00 cfs @ 21.26 hrs HW=56.00' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 5.00 hrs HW=50.00' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir**(Controls 0.00 cfs)

Pond 1P: Low Area Infiltration Basin w leaching galley



Summary for Pond 2P: Ex. Central Low Area Infiltration Basin

Inflow Area = 1.168 ac, 14.13% Impervious, Inflow Depth = 0.01" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 23.04 hrs, Volume= 0.001 af
Outflow = 0.00 cfs @ 23.15 hrs, Volume= 0.001 af, Atten= 0%, Lag= 6.9 min
Discarded = 0.00 cfs @ 23.15 hrs, Volume= 0.001 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 69.02' @ 23.15 hrs Surf.Area= 26 sf Storage= 0 cf

Plug-Flow detention time= 7.8 min calculated for 0.001 af (100% of inflow)
Center-of-Mass det. time= 7.8 min (1,283.1 - 1,275.3)

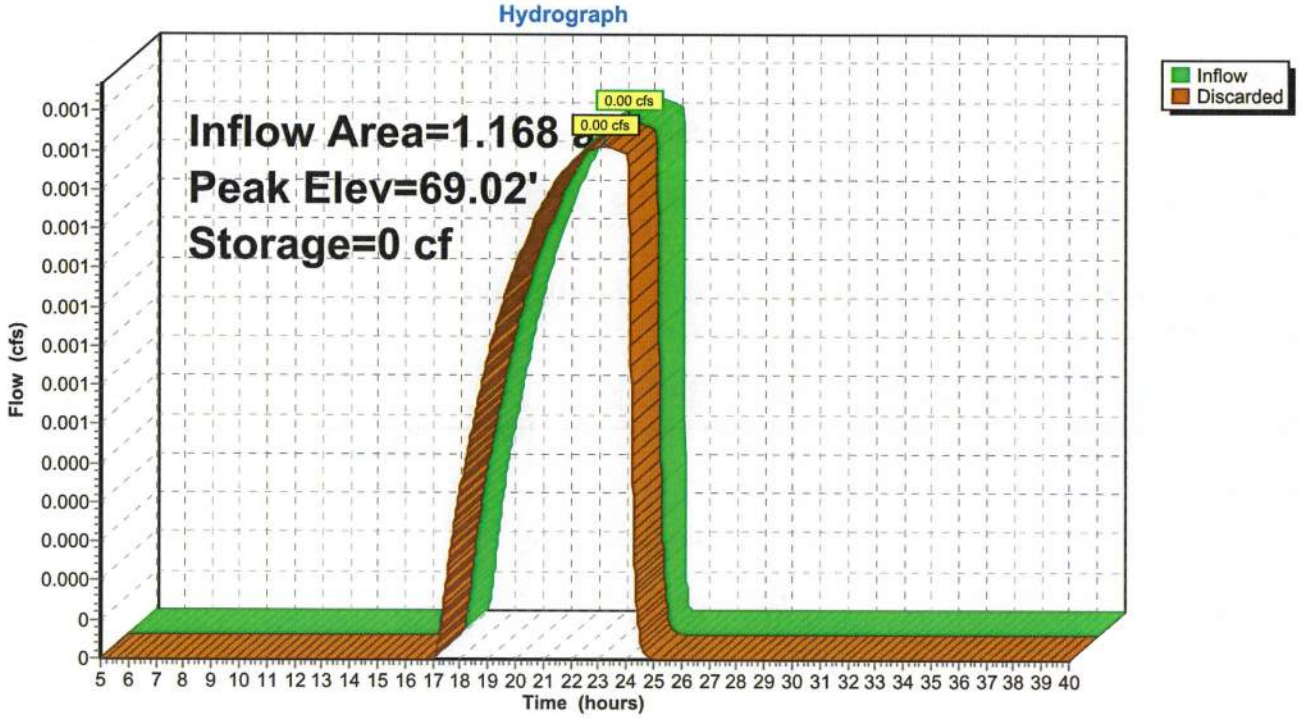
Volume	Invert	Avail.Storage	Storage Description
#1	69.00'	16,914 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
69.00	3	0	0
70.00	1,398	701	701
72.00	3,697	5,095	5,796
74.00	7,421	11,118	16,914

Device	Routing	Invert	Outlet Devices
#1	Discarded	69.00'	**2.410 in/hr Exfiltration over Surface area from 67.90' - 74.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 23.15 hrs HW=69.02' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Pond 2P: Ex. Central Low Area Infiltration Basin



Summary for Pond 3P: Ex. Eastern Low Area Infiltration Basin

Inflow Area = 0.365 ac, 0.00% Impervious, Inflow Depth = 0.00" for TR20 2YEAR BREWSTER event
Inflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af
Outflow = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 91.50' @ 5.00 hrs Surf.Area= 213 sf Storage= 0 cf

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

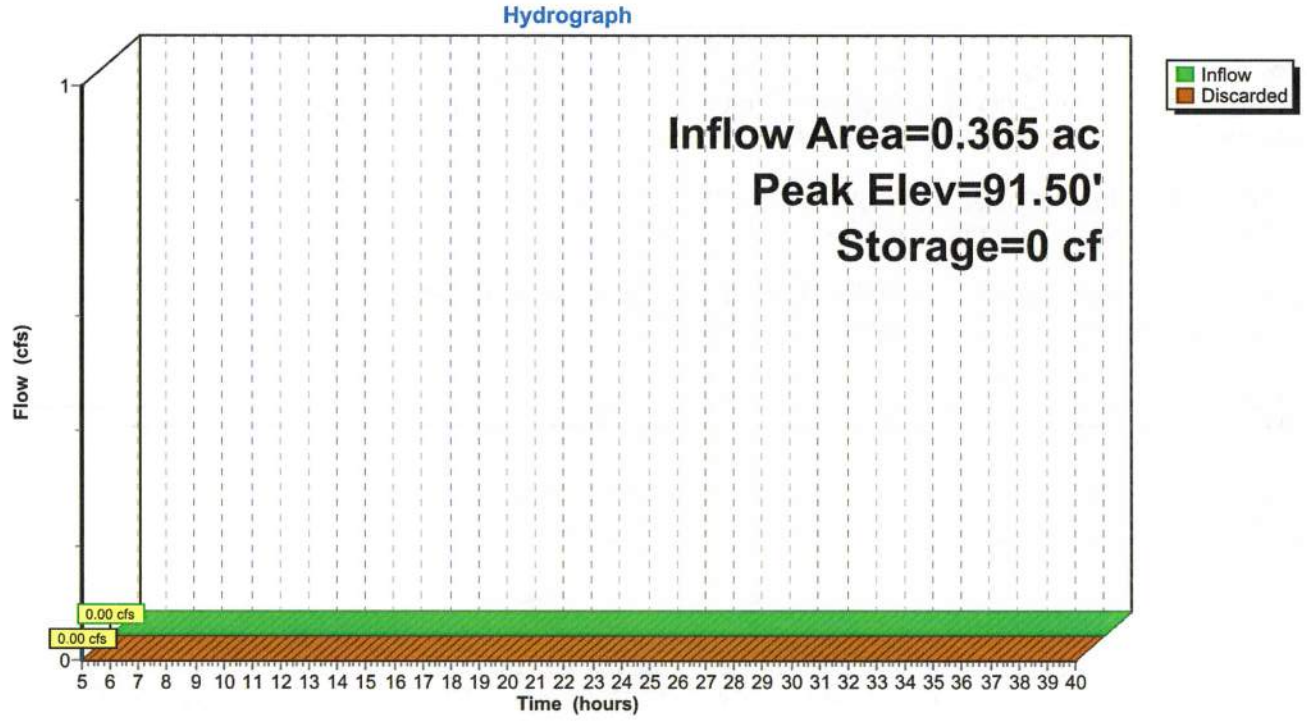
Volume	Invert	Avail.Storage	Storage Description
#1	91.50'	402 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.50	213	0	0
92.00	1,393	402	402

Device	Routing	Invert	Outlet Devices
#1	Discarded	91.50'	**1.020 in/hr Exfiltration over Surface area from 90.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.00 cfs @ 5.00 hrs HW=91.50' (Free Discharge)
↑**1=Exfiltration** (Passes 0.00 cfs of 0.01 cfs potential flow)

Pond 3P: Ex. Eastern Low Area Infiltration Basin



Summary for Pond 4P: Ex. Central Low Area Infiltration Basin

Inflow Area = 0.670 ac, 27.76% Impervious, Inflow Depth = 0.07" for TR20 2YEAR BREWSTER event
Inflow = 0.01 cfs @ 14.85 hrs, Volume= 0.004 af
Outflow = 0.01 cfs @ 15.03 hrs, Volume= 0.004 af, Atten= 0%, Lag= 11.3 min
Discarded = 0.01 cfs @ 15.03 hrs, Volume= 0.004 af

Routing by Stor-Ind method, Time Span= 5.00-40.00 hrs, dt= 0.01 hrs
Peak Elev= 88.01' @ 15.03 hrs Surf.Area= 702 sf Storage= 4 cf

Plug-Flow detention time= 11.7 min calculated for 0.004 af (100% of inflow)
Center-of-Mass det. time= 11.7 min (1,076.2 - 1,064.5)

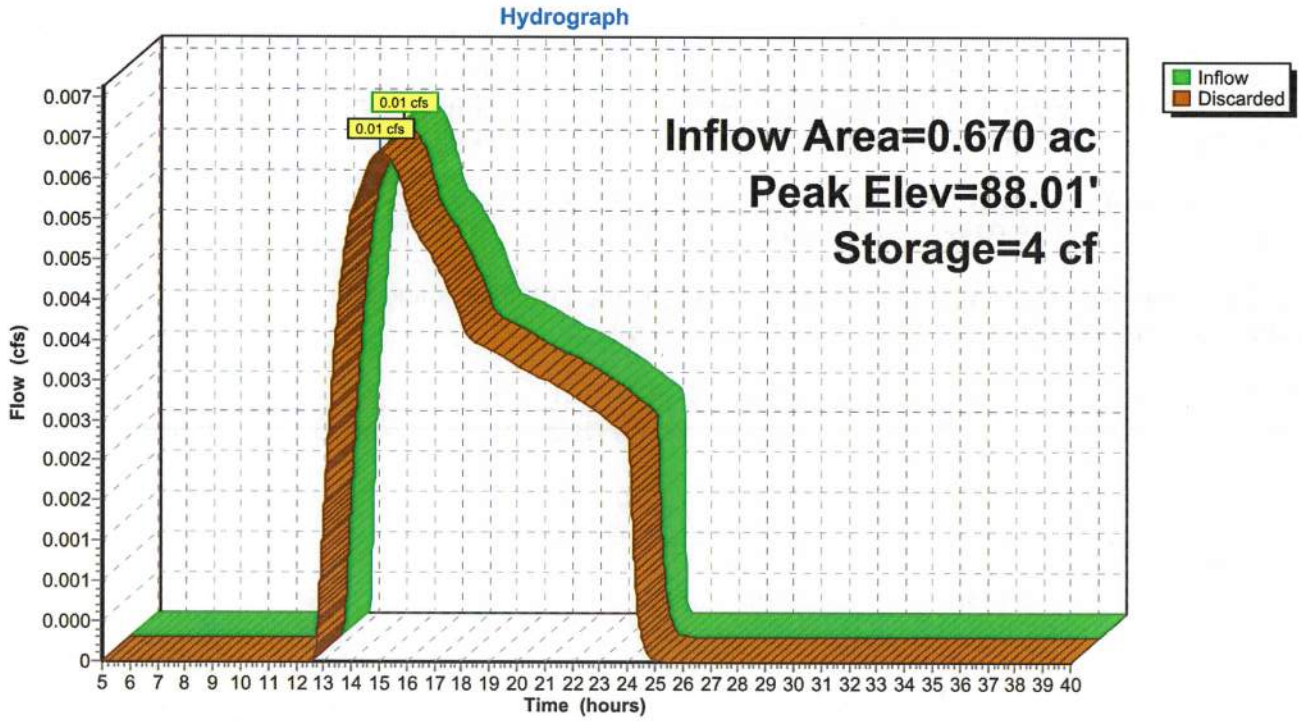
Volume	Invert	Avail.Storage	Storage Description
#1	88.00'	10,864 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
88.00	697	0	0
90.00	2,406	3,103	3,103
92.00	5,355	7,761	10,864

Device	Routing	Invert	Outlet Devices
#1	Discarded	88.00'	**2.410 in/hr Exfiltration over Surface area from 87.90' - 92.00'** Excluded Surface area = 0 sf

Discarded OutFlow Max=0.04 cfs @ 15.03 hrs HW=88.01' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Pond 4P: Ex. Central Low Area Infiltration Basin



APPENDIX D

GROUNDWATER RECHARGE & WATER QUALITY

- GROUNDWATER RECHARGE VOLUME CALCULATIONS
- WATER QUALITY TREATMENT VOLUME CALCULATIONS
- TSS REMOVAL CALCULATION WORKSHEET
- DEWATERING TIME
- MDEP CHECKLIST FOR SWM REPORT

BAXTER NYE ENGINEERING & SURVEYING
1597 Falmouth Road,, Suite 1 ■ *Centerville, MA 02632*
Tel: 508-771-7502 ■ Fax: 508-771-7622 ■ www.baxter-nye.com

Date: 2023-07-14
Job #: 2023-108
Job Name: 50 Fishermans Landing Road
Calculations by: JKL

RECHARGE TO GROUNDWATER VOLUME
(MADEP Standard 3)

All site soils within area of proposed impervious cover are HSG A. Therefore, the recharge rate is:

=	0.6"	x	total impervious area
=	0.6"	x	19301 sf
=	965 cf		

The underground Infiltration Basins are used for recharge and quantity control for post-development site runoff.

1) Infiltration Basin 1: Infiltration Storage Volume Provided up to Outlet Invert
= 500 cf at Weir Elev=58.00
Infiltration Basin 2: Infiltration Storage Volume Provided in basin is:
=1172 cf up to Elev 70.30
Infiltration Basin 3: Infiltration Storage Volume Provided in basin is:
=152 cf up to Elev 70.30
Infiltration Basin 4: Infiltration Storage Volume Provided in basin is:
=1191 cf up to Elev 91.36

Therefore, total Volume of Recharge which is provided:
= 3,015 cf > 965 cf/ Design Reqmts met

The Volume of Recharge well exceeds the required amount of recharge.

WATER QUALITY
VOLUME CALCULATIONS
(MADEP Standard 4-6)

The site is in an area with rapid infiltration. Therefore, the Water Quality Treatment must address the first one (1) inch of runoff over the total impervious area for each drainage area. The proposed building roof area is 0.260 acres, which is conveyed directly to the swm facilities and is not included in impervious area.

DA1:

The total impervious area (gravel driveway) to receive water quality treatment is 3084 sf.

WQV = 1.0 " x (acres of impervious area)
= 1.0" x (3084 sf))
= 257 cf

The total WQV to be treated through BMP's is 257 cf.

Infiltration Basin 1 – Water Quality Storage Volume Provided up to elevation 57.5 = 281 cf

DA2:

The total impervious area (gravel driveway) to receive water quality treatment is 7200 sf.

WQV = 1.0 " x (acres of impervious area)
= 1.0" x (7200 sf))
= 600 cf

Infiltration Basin 2 – Water Quality Storage Volume Provided up to elevation70.0 = 1096 cf

DA3: No impervious areas

DA4:

The total impervious area (gravel driveway) to receive water quality treatment is 9017 sf.

WQV = 1.0 " x (acres of impervious area)
= 1.0" x (9017 sf))
= 751 cf

Infiltration Basin 4 – Water Quality Storage Volume Provided up to elevation 89.0 = 1552 cf

The combined BMP treatments are designed in accordance with the MDEP sizing requirements and provide the Water Quality Volume requirements.

Single-family residence
50 Fishermans Landing Road, Brewster, MA
Project # 2023-108
July 14, 2023

TSS REMOVAL CALCULATION WORKSHEET

A BMP	B TSS Removal Rate	C Starting TSS Load *	D Amount Removed (BxC)	E Remaining Load (C-D)
Grassed Channel	50%	1.00	0.50	0.50
Infiltration Basin	80%	0.50	0.40	0.10
		Total TSS Removed =	**0.90**	

*Equals remaining load from previous BMP (E)

DEWATERING TIME FOR SWM FACILITIES

The rate of infiltration used in the analysis of these facilities is based on on-site investigations of the soils. The infiltration rate (or perc rate) is converted from min/in into ft/min or ft/sec. This rate is entered into HydroCad in this format of velocity (ft/min) or flow rate (cfs – which is obtained by applying the velocity over the infiltratable area of the SWM facility [ft/sec x sf = cfs])

Time to drain basin = Rate of infiltration across depth of ponding at bottom of basin on 100-year design storm

Rate of Infiltration in Loamy Sand soils = 2.41 in/hr

Infiltration Basin 1:

= 2.02 feet x 12 in/ft / 2.41 inches per hour

= 7.52 hours

Infiltration Basin 2:

= 1.30 feet x 12 in/ft / 2.41 inches per hour

= 3.39 hours

Infiltration Basin 3:

= 0.23 feet x 12 in/ft / 2.41 inches per hour

= 1.15.hours

Infiltration Basin 4:

= 1.04 feet x 12 in/ft / 2.41 inches per hour

= 5.18 hours

[times fall within the 72 hour max draining time] GOOD

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

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

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

The Stormwater Report must include:

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

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

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

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

---

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

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

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

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

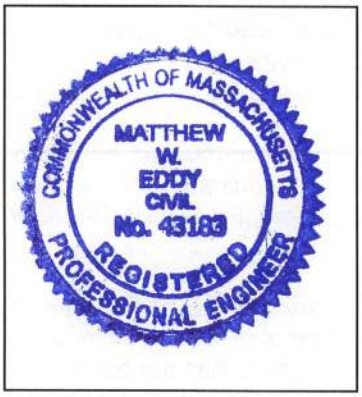
Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the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

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

Registered Professional Engineer's Certification

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

Registered Professional Engineer Block and Signature



7/14/23

Signature and Date

Checklist

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

☒ New development

☐ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

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

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

Standard 1: No New Untreated Discharges

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

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☒ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☐ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☐ Static ☒ Simple Dynamic ☐ Dynamic Field[1]

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

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

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

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

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

Standard 4: Water Quality

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

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

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

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

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☒ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

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

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

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

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

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

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

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

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

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

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

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

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

☐ All exposure has been eliminated.

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

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

Standard 6: Critical Areas

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.

N/A

- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☐ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

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

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

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

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

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

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

Checklist for Stormwater Report

Checklist (continued)

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

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

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

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

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

Standard 9: Operation and Maintenance Plan

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

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

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

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

Standard 10: Prohibition of Illicit Discharges

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

☐ An Illicit Discharge Compliance Statement is attached;

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

APPROVAL OF MEETING MINUTES: JULY 26, 2023

Brewster Planning Board
2198 Main Street
Brewster, MA 02631-1898
(508) 896-3701 x1133
brewplan@brewster-ma.gov
MEETING MINUTES
Wednesday, July 26, 2023 at 6:30 pm
Brewster Town Office Building

Approved:
Vote:

Chair Amanda Bebrin convened a meeting of the Planning Board at 6:30 pm with the following members participating: Charlotte Degen, Tony Freitas, Rob Michaels, Elizabeth Taylor, and Alex Wentworth. Madalyn Hillis-Dineen was not present. Also participating: Jon Idman, Town Planner, and Lynn St. Cyr, Senior Department Assistant. Bebrin declared that a quorum of the Planning Board was present. She read the Meeting Participation Statement and Recording Statement.

6:32 PM PUBLIC ANNOUNCEMENTS AND COMMENT
No citizen comments.

6:33 PM PUBLIC MEETING
Approval Not Required, Case No. 2023-07: Applicant/Owner: Jodie Cash-Eddy and Robert and Cheryl Dolan through their representative BSC Group seeks endorsement of an Approval Not Required Plan for property located at 23 Franklin Cartway shown on Tax Map 50, Parcel 11 and 33 Franklin Cartway shown on Tax Map 50, Parcel 12, both within the Residential Medium Density (R-M) Zoning District. The plan is pursuant to MGL c. 41 §81L and §81P and §290-4 of the Brewster Subdivision Rules and Regulations.
Documents:
- 07/11/23 Approval Not Required Application and Plan
- 07/18/23 Staff Report

Kieran Healy of BSC Group was present on behalf of the Applicant Jodie Cash-Eddy and Robert and Cheryl Dolan. Healy described the plan as a land transfer from a large to a small parcel which is currently 2752 SF. The proposed transfer is approximately 1000 SF and the parcel will become 3685 SF in size.

Michaels stated that he visited the property and noted a concrete pad in the land that is proposed for transfer. Healy confirmed that the concrete pad would be part of the transfer.

Idman stated that frontage is not changing for either lot. A lot is being created to be conveyed to the smaller parcel. The lot being created does not purport to be a building lot.

Motion by Degen to Endorse Approval Not Required, Case No. 2023-07. Second by Michaels. Vote: 6-0-0.

6:39 PM PUBLIC MEETING
Major Stormwater Management Permit, Case No. 2023-31: Applicant/Owner: The Latham Center, Inc. through their representative TF Moran, Inc. has submitted a major stormwater permit application for property located at 1439 Main Street and shown on Tax Map 48, Parcel 61, pursuant to Brewster Town Code Chapter 272 and its accompanying Regulations.
Documents:
- 10/23/19 Site Development Plans, revised 06/19/23
- 12/11/19 Stormwater Management Report revised January 30, 2020 and June 26, 2023
- 07/07/23 Major Stormwater Management Permit Application

- 07/19/23 Staff Report

Bebrin recused herself as she is a member of the Latham Centers Board of Directors. Wentworth took over as Chair.

Robert Duval, Chief Engineer, of TF Moran was present on behalf of the Applicant. Duval stated that the project was originally approved in March 2020 by the Planning Board. The Applicant filed an application with the Zoning Board of Appeals who rendered a decision which was appealed. Negotiations took place, the scope of the initial proposed project changed and the stormwater regulations have changed since the initial application was approved by the Planning Board. Duval stated that the existing lot has several buildings and two of the buildings will be torn down. Additions will be made to one of the remaining buildings and renovations to both remaining buildings will take place. The site will be used as administrative offices, educational classrooms, gymnasium, and cafeteria.

Duval described proposed stormwater management. The site has approximately 16000 SF of existing impervious surfaces. Stormwater runoff currently goes into wetlands to the north and northwest as well as onto Main Street to the south or into wetlands to the southeast. The site will be regraded and a closed system of storm drainage with an underground stormwater infiltration system will be used to capture and treat the new 8000 SF area of impervious surface as well as most of the runoff from the original 16000 SF of impervious surface. There is a small area to the northwest for which roof runoff cannot be captured but there is little to no pollutant load. Six catch basins will be used on the site. Rate and volume of discharged are being reduced for all storm events. Requirements by DEP and the Town for removal of TSS and nitrates and phosphates are being met with this system. Duval stated that during construction the entire site will be surrounded by a silt sock. There are two existing infiltration basins which will be protected with silt bags. The new catch basins will also be protected with silt bags as they are being brought online. There will also be a stabilized stone construction entrance for all construction vehicles. Duval stated that no waivers from the stormwater requirements are being requested and he believes the application complies with all stormwater requirements.

Taylor requested clarification from the Applicant on information provided on the existing site conditions plan. Taylor confirmed with the Applicant that it is their intent to keep as many of the existing trees on site as possible, that the use of fertilizer would be limited, and that invasive plants would be physically removed. Taylor asked for clarification on the "meadow' areas described on the plan and their maintenance. Idman stated that the project is also being reviewed by the Conservation Commission and he believed questions raised by Taylor would be covered in the Order of Conditions issued by the Conservation Commission.

Jeremy Belanger of TF Moran joined the meeting via Zoom. Belanger stated that the project was before the Conservation Commission last night for review. The Conservation Commission was amenable to the New England roadside seed mix shown along the eastern property line. Belanger stated that a note was added to the landscape plan at the request of the Conservation Commission stating that natural fertilizers would be used in accordance with manufacturer's standards within the 100' buffer to the wetlands.

Michaels noted that the stormwater regulations require that the NOAA Atlas 14 be used to calculate precipitation events and the Applicant used a different. Michaels wondered if the use of a different source would impact the volume calculations provided. Michaels asked for clarification on the two existing catch basins and Duval responded that the existing structures would be removed. Michaels asked whether the Applicant considered using nature-based swales and Duval responded that swales were being used in the lawn area between the two buildings but due to limited room and steep pavement there are no other swales proposed.

Degen asked whether the Planning Board needed assurance from the Applicant that the volume calculations complied with the bylaw given a different source was used to calculate precipitation events. Duval responded that the overall conclusion and effective treatment will be the same but there may be a slight shift in the reduction of runoff. Degen confirmed with the Applicant that there is no longer a dorm proposed on site.

Freitas inquired as to the status of the Conservation Commission review and wondered if the Planning Board needed to hear from the Conservation Commission before completing their stormwater review. Idman responded that the Conservation Commission would review and issue an order for any activity within the 100' buffer to the wetlands. Belanger responded that the Conservation Commission hearing was continued to August 8th. The Conservation Commission asked the Applicant to add a note to the landscape plan regarding fertilizer use and identify the curb on the plans provided to them. There was a discussion on buffer impacts as well.

The Planning Board discussed whether supplemental information was needed to determine whether the application complied with the stormwater bylaw and regulations. Duval asked the Planning Board to consider approving the application with the condition that the Applicant provide revised calculations using the data source identified in the stormwater regulations.

Motion by Michaels to Approve Major Stormwater Management Permit, Case No. 2023-31, subject to Submission of Revised HydroCAD Report, Conservation Commission Approval of Work Within the 100' Buffer, and the Conditions Required by the Stormwater Management Regulations. Second by Degen. Vote: 5-0-0.

There was discussion regarding the NOAA 14 precipitation chart assuming higher levels of precipitation in the future than the Massachusetts Stormwater Handbook.

7:17 PM PUBLIC MEETING

Continued review and discussion on the Accessory Dwelling Unit (ADU) provisions of the zoning bylaw including review and discussion of potential amendments.

Documents:

- Draft Article I General Provisions
- Draft Article IX Special regulations
- Draft Table 1 Use Regulations
- Draft Table 2 Area Regulations
- 07/21/23 Email from Jack Chandler
- 07/21/23 Email from Bill Kargman
- 07/21/23 Email from Elizabeth Hoffman

Building Commissioner Davis Walters, Assistant Town Manager Donna Kalinick, and Housing Coordinator Jill Scalise were present.

The Planning Board reviewed and discussed Article 1, General Provisions. There was discussion on the term "accessory use" which is defined in the zoning bylaw. The Planning Board discussed revisions to the net floor area definition. Freitas asked for clarification on the definition and noted consideration of conditioned space versus unconditioned space. Idman stated that revisions to the definition attempt to identify ADU/living space areas. Walters discussed habitable spaces. He also provided examples of spaces such as stairwells and entryways that should not be included in calculating the size of the ADU.

The Planning Board reviewed and discussed Article IX, Special Regulations. Idman stated that a purpose statement has been drafted to be included with the provisions. It focuses on three things: creation of year-round rental dwelling units, increasing housing choice and diversity of housing types, preserving the community by facilitating housing that allows seniors, working people, and young adults to remain and live in Brewster. Idman directed the Planning Board to Section A which now includes all forms of ADUs allowed through zoning. He reviewed proposed revisions to Section B which includes removal of special permit requirements for properties located in Zone II, and the Herring River and Pleasant Bay watersheds. Requirements for special permits based on lot size remains although the Planning Board will need to decide what size lot will require a special permit. Idman stated that Table 1, Use Regulations, will need to conform with Section B. There was discussion on lot sized of 15000 SF and 25000 SF.

The Planning Board reviewed Section C which requires an ADU to meet building height, coverage, and setback requirements for the underlying lot. Idman stated that Section D deals with owner occupancy including bona fide absences. Michaels asked if bona fide absences needed to be considered if part time residents are allowed to have an ADU. Idman responded that part time residents would need to obtain a special permit for an ADU whereas a year-round resident may not need a special permit. Idman also stated that this section proposes language to allow a full-time owner to lease an ADU for 6 months. The value of the special permit for part-time owners is that provides accountability for property and issue management. The Planning Board discussed the option of allowing both dwelling units to be rented with 12-month leases. Idman summarized revisions to Section E including a proposed size of no more than 1000 SF of net floor area. It removes the 40% calculation for size and removes the cap of 20 building permits. Idman stated that Section F deals with the intent of ADUs including that they are not to be used for short-term rental use. Section G notes that ADUs are subject to all other state and local laws and regulations.

The Planning Board reviewed and discussed the language in Section H. Wentworth stated that he thought the language should include that no more than one ADU should be allowed on a lot. Idman stated that Section I has been revised to require one parking space per ADU instead of one parking space per bedroom of the ADU. Idman stated that language in Section J has been revised to clarify that the property should remain as single-family residential in nature. Idman reviewed Section K which states that a detached residential accessory building in which an ADU is located shall not contain bedrooms not associated with the ADU. Idman reviewed Section L which states that an ADU shall not be severed in use or ownership from the principal dwelling including that an ADU cannot be held in a condominium form of ownership. The Planning Board discussed creating ADU permits to not only track and enforce ADUs but also to make future owners aware of ADU requirements. Idman stated that Sections M and N deal with enforcement and give the Building Commissioner some flexibility with affidavit content and establishment of administrative permitting/registration. Idman stated that Section O discusses enforcement remedies including removal of cooking facilities within an ADU to abate or address a violation.

The Planning Board reviewed and discussed revisions to Table 1, Use Regulations. Idman pointed out a proposed change from special permit use to permitted use for ADUs in the Village Business zoning district as single-family residences are a permitted use in this district. Idman stated that a note is proposed for this section that states “except as may be permitted for pre-existing nonconforming single-family residential properties under Article VIII’. This note would be added to the table under the Commercial High Density zoning district for residential uses of accessory residential building and ADUs.

The Planning Board reviewed and discussed revisions to Table 2, Area Regulations including revisions to the notes. Note 1 includes incorrect information that ADUs are allowed in the Industrial zoning district and that information is proposed for deletion. A change has also been proposed for Note 13 removing the use of an accessory apartment. Language is proposed to be added to the note stating that “except for single family residential use/structures, in which case the RM district requirements in this Table 2 shall apply”. This language will help clarify Table 2 as a single-family dwelling is not allowed in the Village Business district on a lot of 15000 SF. Removal of Note 12 is proposed as the “S-I” referenced could not be found in the bylaw. Idman also proposed removal of the Editor’s Note regarding the C-L district.

The Planning Board discussed lot size and most lots being between 15000 SF – 18000 SF. The Planning Board discussed the procedure moving forward for amending the bylaw for Town Meeting in November. They discussed providing a draft bylaw to the public for review and feedback as soon as possible.

The Planning Board reviewed items for further discussion including: 1. Whether the accessory apartment use should be removed? 2. What is the appropriate lot size to trigger a special permit? 3. Owner occupancy-should part time residents have to apply for a special permit? 4. If special permits are being kept, who serves as the special permit granting authority (ZBA or PB)? 5. For year-round housing, is 12 months or 6 months an appropriate lease period? 6. Does one property have to be year-round use and the other can be for personal use?

Bebrin noted that the Planning Board received some public comment which is available for review in the online public meeting packet.

Jillian Douglass stated that she would like the town to think about a larger issue which is the commercial use of residential property. Douglass further stated that many towns have a rental registration system and she believes Brewster needs to think about a rental registration system. She suggested language for the purpose statement: "to increase the potential for more affordable housing options, reduce economic displacement, and to encourage year-round occupancy of residential property".

Steve Najarian, 571 Stony Brook Road, expressed concern with the proposed ADU size limitation of 1000 SF. He stated that his property currently has two houses and he would like to use one as an ADU, but it is 1400 SF. Najarian has been working on a design for a 750 SF ADU which would leave approximately 600 SF remaining in the home which he intended to use as bedrooms for family and friends. Currently, the proposed changes would not allow him to use the remaining 600 SF as bedrooms. He stated that he would like to create an ADU but the easiest route for him to take may be to rent it through VRBO.

Kalinick stated that evaluation of the ADU provisions is one of the strategies listed in Brewster's Housing Production Plan (HPP). The community provided feedback on the HPP and agreed that the ADU provisions needed to be revisited. Kalinick asked whether additional language needed to be added regarding family usage of the ADU or whether it was intended for a lease to exist between family members. She gave an example of parents living in the main house and adult children living in the ADU. There was discussion on whether the ADU provisions needed to be revised further to include additional language regarding use by family members and whether leases would be required for family. Idman reminded the Planning Board that accessory apartments were currently allowed without lease requirements and asked them to consider whether accessory apartments should continue to be allowed to allow for guesthouses.

Taylor referenced information the Planning Board received on ADUs prepared by AARP. She stated that zoning was only one part of creating ADUs and that the town needed to be prepared to provide information and resources to residents interested in creating ADUs. Taylor asked whether the town would be providing information on grants and loans offered to those creating ADUs and if design help would be provided. She asked the Planning Board to consider more than just the zoning. Scalise responded to Taylor stating that additional strategies of the HPP include working with residents and providing information and resources to those creating ADUs and staff have been working internally and with outside agencies to collect ADU information and resources.

8:33 PM APPROVAL OF MEETING MINUTES

Approval of Meeting Minutes: July 12, 2023.

The Board reviewed the July 12, 2023 meeting minutes**. Motion by Degen to Approve July 12, 2023 Meeting Minutes. Second by Michaels. Vote: 6-0-0.**

8:34 PM COMMITTEE REPORTS

Degen summarized a recent Select Board meeting and noted the public forum that would be taking place at the Sea Camps property on Saturday, August 5th. She also noted rebates available through the Cape Cod Light Compact and that more information was available on the Brewster website. The Select Board has encouraged public comment from residents regarding the Pilgrim Nuclear plant as well as herbicide spraying. Wentworth stated that the Vision Planning Committee continues its work on the Local Comprehensive Plan and is working on public outreach and engagement opportunities. Bebrin provided more details on the upcoming public forum at the Sea Camps including that some buildings will be open for public viewing.

8:36 PM FOR YOUR INFORMATION

The Planning Board received a public hearing notice from the Harwich Planning Board for Tuesday, July 25, 2023.

8:37 PM MATTERS NOT REASONABLY ANTICIPATED BY THE CHAIR

None.

Motion by Wentworth to Adjourn. Second by Michaels. Vote: 6-0-0. The meeting adjourned at 8:38 PM.

Next Planning Board Meeting Date: August 9, 2023.

Respectfully submitted,

_____

Lynn St. Cyr, Senior Department Assistant, Planning

FOR YOUR INFORMATION

HARWICH PLANNING BOARD
PUBLIC HEARING NOTICE

The Harwich Planning Board will hold public hearings beginning no earlier than **6:30 PM, Tuesday, August 22, 2023** in the Don B. Griffin Room, Town Hall, 732 Main Street, Harwich, MA 02645 to consider the following matters. Any member of the public is invited to attend and provide comments to the Board. Written comments may also be submitted to the Board prior to the hearing by mailing them to the Planning Department, Town Hall, 732 Main Street, Harwich, MA 02645 or by emailing them to the Planning Assistant, Shelagh Delaney at sdelaney@harwich-ma.gov

Case # PB2023-25 The Harwich Fire Association, Inc., via its Agent, Attorney William Crowell has applied for a Special Permit and Site Plan Special Permit in order to modify an existing structure and use to accommodate a first-floor non-profit historical museum and three second-floor apartments along with a reconfigured parking area. The application is pursuant to the Code of the Town of Harwich Sections 325-51, 325-55 and the Table of Uses. The property is located at 203 Bank Street, Map 23, Parcel B3 in the RR and RL Zoning Districts.

Documents and plans related to these applications may be viewed on the Planning Board's home page: www.harwich-ma.gov/planning-board and are on file with the Town Clerk and may be viewed at the Planning Department, Town Hall, 732 Main Street, Harwich, MA 02645 during regular Town Hall hours. For additional information contact the Planning Assistant, Shelagh Delaney at sdelaney@harwich-ma.gov

Duncan Berry, Chair

Cape Cod Chronicle Print Dates: August 3 and August 10, 2023

TOWN OF DENNIS – PLANNING BOARD
ZONING BYLAW NOTICE

Pursuant to Chapter 2 of the Acts of 2023, signed into law on March 29, 2023, the Planning Board will hold a public meeting on August 28, 2023, at 6:30 pm in the Dennis Town Hall, STONE HEARING ROOM 685 Route 134 Dennis MA. The public is welcome to attend either in-person or via the alternative public access provided below on the following petition:

The Planning Board will hold a Public Hearing to see if the Town of Dennis will vote to amend the Dennis Zoning By-law to establish a Multi-Family Housing Overly District.

Or take any action relative thereto.

A complete copy of the draft text of this proposed Zoning By-Law and map amendment is available for inspection in the Dennis Planning Office from 8:30 am – 4:30 pm or can be found on the Town of Dennis Planning Department webpage.

ZOOM Meeting information
Zoom Link: https://us02web.zoom.us/j/7660036712
Meeting ID: **766-003-6712** OR **By Phone Dial**: **646-558-8656**
When prompted enter Meeting ID: Passcode: **766-003-6712**