Relationships.
Responsiveness.
Results.

Lincoln Village

Final Subdivision
Permit Application
Saco, Maine

VOLUME 1

PREPARED FOR:
321 Lincoln Street
Development, LLC

40 Farm Gate Road,
Falmouth, ME 04105

July 2023

SUBMITTED BY:
Gorrill Palmer
300 Southborough Drive
Suite 200
So. Portland, ME 04106
207.772.2515

GORRILL PALMER

300 Southborough Drive, Suite 200
South Portland, Maine 04106
207.772.2515

July 25, 2023

Ms. Emily Cole-Prescott, City Planner
Saco City Hall
300 Main Street
Saco, Maine 04072-1538

Subject: Lincoln Village
321 Lincoln Street, Saco, ME
Final Subdivision Application

Dear Ms. Cole-Prescott:

Gorrill Palmer has been retained by **321 Lincoln Street Development, LLC** to assist in the preparation of plans and permitting for the construction of a proposed mixed residential community located at 321 Lincoln Street in Saco, ME.

The property is identified as Map 52 and Lot 19 on the Town of Saco's tax map. The proposed project will include a mixed residential development with a network of roadways and walkways, landscaped areas, trails, and stormwater maintenance facilities.

On June 29th, 2023, the Planning Board granted Conditional Use Approval, Site Plan Approval, and Preliminary Subdivision Approval for this project.

PROPOSED PROJECT

Located between Lincoln and Bradley Street in Saco, ME, the subject property is ±56.70 acres of land proposed for development of a new mixed residential community. This project will include different housing options, recreational locations, and natural areas. The project is designed to accommodate 332 housing units through the construction of multifamily units, duplexes, and single-family homes. The breakdown of unit types are as follows:

- Single Family – 12 units
- Duplex (two-family) - 32 units
- Multifamily Units – 288 units
- Total Proposed – 332 units

Recreational areas and open spaces have been designed for residents of all ages (and uses):

- Two parks are centrally located within the project for passive and active recreational uses as well as a dog park for the residents.
- A fenced-in basketball court and playground area provides an active recreational area.
- Trailways spanning approximately 5,200 feet are proposed – including a mix of terrain between natural pathways in the woods and boardwalks over wetlands.

The proposed development is in the Medium Density Residential District Zone. The development requires the City of Saco Site Plan (approved), Preliminary Subdivision (approved) and Final Subdivision (pending) as well as conditional use review (approved) for the construction of 3-8 unit multifamily buildings. In addition, the proposed development requires Site Location of Development Act (SLDA) approval, which was requested that the City of Saco provide delegated review. A Natural Resource Protection Act Tier II (approved) and Army Corp Permit (approved) is also required for the proposed wetland impacts as a result of the development. This application was submitted concurrently to the Maine DEP and ACOE.

The narrative provided in Attachment 5 provides further information on the project's conformance with applicable Federal, State and Local regulations.

As discussed with your office, an electronic version of this response letter and attachments are submitted for your review. We look forward to continuing discussion of this project at the next available Planning Board hearing.

If you have any questions on the information being submitted, please contact our office.

Sincerely,

GORRILL PALMER

Drew Gagnon, PE
Project Manager
Phone 207-772-2515 x288
dgagnon@gorrillpalmer.com

c: Loni Graiver, 321 Lincoln Street Development, LLC
Angelo Coppola, 321 Lincoln Street Development, LLC

u:\3831_helios_mixed residential development - lincoln & bradley - saco\p applications\local\final subdivision application\ready for review\0_cover letter_final sub app.docx

TABLE OF CONTENTS

Attachment	Section
1	Final Subdivision Application & Checklist
2	Title, Right, or Interest
3	Project Location Map
4	Abutters Mailing List
5	Project Narrative
6	Historic & Natural Areas Correspondences
7	Stormwater Management Report
8	Ability to Serve Letters – MWC & WRRD
9	Solid Waste Disposal Plan
10	Erosion and Sedimentation Control Report
11	Surficial Geology, Significant Sand and Gravel Aquifers, & FEMA Maps
12	High Intensity Soil Report & Survey and Test Pit Map & Analysis
13	Financial Capacity
14	Traffic Impact Study
15	Revised Sight Distance Figures
16	Revised AutoTURN Exhibits
17	Lighting Fixtures Cut Sheet
18	Wetlands & Vernal Pool Survey • Wetland Delineation Report (Flycatcher, LLC) • Vernal Pool Survey (include Land Bureau Determination of VPs)
19	Draft Condo/HOA Documents
20	Landscaped Management Plan
21	Construction Sequencing Plan
22	Tree Protection Plan
23	Aerial Project Rendering

ATTACHMENT 1

FINAL SUBDIVISION REVIEW APPLICATION & CHECKLIST

Planning Department
Saco City Hall
300 Main Street
Saco, Maine 04072-1538
Phone: (207) 282-3487

Emily Cole-Prescott, AICP
City Planner
EPrescott@sacomaine.org

Shannon Chisholm, Asst. Planner
SChisholm@sacomaine.org

TO: Applicant

FROM: Emily Cole-Prescott, City Planner
Shannon Chisholm, Assistant Planner

RE: Planning Department - Application & Process Requirements

On behalf of the City of Saco's Planning Department, we want to thank you for your interest in being a part of Saco's smart growth and development. Our Department is here to discuss potential projects and help explain the standards to navigate the processes of development in Saco. We are people-focused and strive to provide the best level of customer service to our applicants.

Planning & Development Review Committee (PDRC): The City hosts meetings two (2) times a month to review conceptual development plans for feedback about the City's regulations and ordinance standards. This is often considered the first step in the review process. To be added to an upcoming PDRC meeting, please contact the Department by emailing: SChisholm@sacomaine.org. To review the PDRC's meeting schedule and deadline requirements, please see the Planning section of the website: www.sacomaine.org.

Submission Requirements: To assist with assembling your application, the attached checklist is provided. We look forward to answering any questions about the requirements. Please keep in mind that the Department only accepts complete applications.

Timeline: The ordinances require that applications be submitted at least three (3) weeks before the Planning Board meeting. However, Saco has adopted a streamlined staff review process that allows many of the initial questions and standards to be reviewed by City Staff. Therefore, we encourage you to plan for a five-week review process before the Planning Board meeting, as this will ensure time for both staff review and applicant responses. To review the Planning Board's meeting schedule and deadlines, please see the Planning section of the website: www.sacomaine.org.

For your reference, attached are the following documents:

- Application
- Submission Requirements Checklist

Subdivision Review Application

__Preliminary X Final

Planning Department

Planning Board

Street Address of Proposed Project: 321 Lincoln Street Tax Map & Lot: 52 & 19

York County Registry of Deeds Book & Page Number: 18975 & 512 Zoning District: MDR

Applicant: 321 LINCOLN STREET DEVELOPMENT LLC

Applicant's Address: 40 Farm Gate Road, Falmouth, Maine 04105

Applicant's Email & Phone #: loni@graiverhomes.com & 207-329-7355

Architect/Engineer's Name: Drew Gagnon, Gorrill Palmer

Architect/Engineer's Email & Phone #: dgagnon@gorrillpalmer.com & 207-772-2515

Architect/Engineer's Address: 300 Southborough Drive, Suite 200, South Portland, ME 04106

Property Owner: 321 Lincoln Street Development, LLC

Property Owner's Email & Phone #: loni@graiverhomes.com & 207-329-7355

Property Owner's Address: 40 Farm Gate Road, Falmouth, Maine 04105

Area of Parcel: 56.7 +/- ac Proposed Developed Area: 27.8 +/- ac Proposed Height: < 35 ft

Description of Proposal: Lincoln Village - Residential Community

Signature & Application Requirements: Applications are due at least three weeks in advance of Planning Board meetings, but the Department encourages applicants to plan for five weeks before a Planning Board meeting. Staff will schedule your application for a Planning Board meeting once all reviews are complete and comments have been sufficiently addressed.

Signature of Owner/Applicant | 7-25-23 Date

Subdivision Review Checklist

Article 5: Submission Requirements

Applicant	City staff	Submission Requirement
☑	☐	The Department requires three hard copies and one electronic copy (PDF) of the following list of items sent to: SChisholm@sacomaine.org.
☑	☐	Two location plans of the subdivision and neighboring areas within at least a 2,000 foot radius at scales of 800 feet to the inch and 200 feet to the inch, showing right of way lines of all proposed streets in the subdivision and their location in relation to existing streets and readily identifiable as to locus on the Zoning Map of Saco, Maine, as most recently amended.
☑	☐	The preliminary plan must be a contact print of an original drawing in permanent black ink on mylar, or other reproducible, stable based transparent originals. It must be clearly designated as "preliminary plan," drawn at the scale not less than one inch equals 100 feet. Sheets shall be 24" by 36" and plans shall be prepared by an engineer, architect, landscape architect, or land surveyor registered in Maine. Surveyed plans shall be stamped and signed. If multiple sheets are used, they must be accompanied by an index sheet as a cover showing the entire subdivision. The preliminary plan shall be prepared using the following standards: a. Projection shall be Maine State Plane West. b. Vertical Datum shall be NAD 83. c. Units shall be measured in feet. d. Coordinates shall be shown on at least four corners of the site plan. Coordinates shall be referenced to the Maine State Coordinate System.
☑	☐	The preliminary plan shall contain the following information: Subdivision name, boundaries, acreage, tax map and lot numbers, date and graphic scale, and a magnetic and true north arrow.
☑	☐	Name and address of record owner, subdivider, and engineer, surveyor, firm, and/or individual who prepared the plan.
☑	☐	An actual field survey of the boundary lines of the tract, giving complete descriptive data by bearings and distances, made and certified by a registered land surveyor.
☑	☐	Boundary lines of adjacent land and names of owners as determined from most recent tax list.
☑	☐	Location, name, and present width of each street and public or private way bounding, approaching or within 500 feet of the subdivision, and any easements within or adjacent to the subdivision.
☑	☐	Locations and outlines of all existing buildings and significant site features such as stone walls, fences, large trees (24 inch diameter breast height) or wooded areas, rock ridges and outcroppings, cemeteries, water courses, wetlands and water bodies on the site. Wooded areas, watercourses, wetlands

		and water bodies within 200 feet of the site shall also be identified, when possible.
☑	☐	Topography with two-foot contours of existing and proposed grades to include the demarcation of wetlands, 100-year flood elevations, and flood hazard areas.
☑	☐	The location, direction, and length of every proposed street line, lot line and boundary line established on the ground, the location of temporary markers adequate to enable the Board to locate the layout in the field, and the names of proposed streets.
☑	☐	Lot lines with dimensions, zoning setback lines, and the area of each lot in square feet and acres, and lot numbers.
☑	☐	Locations of existing and proposed monuments, hydrants and the location and size of public utility facilities, sewers, culverts, drains, and water pipes.
☑	☐	Park, open, recreation, or common areas within a subdivision and a plan of any formal recreation area.
☑	☐	A plan for the management of surface drainage waters, including existing waterways and the proposed disposition of water from proposed subdivision to new or existing subsurface drainage systems with sufficient capacity to dispose of the storm flows.
☑	☐	Locations and species of proposed street trees and/or wooded areas to be retained within the sidelines of each street, and other no-cut areas.
☑	☐	Street plans and profiles showing the percent slope of each grade, and the radius, length, point of curvature and point of tangency of each curve.
☑	☐	Street plans and profiles showing proposed centerline grades and existing ground grades at fifty (50) foot stations. All existing and proposed elevations shall be based on the U.S.C. & G.S. Datum.
☑	☐	Location of all of the following proposed improvements unless specifically waived in writing by the Board: proposed monuments, parking areas, street lights, sidewalks, street signs, all utilities above and below ground, curbs, gutters, street trees, storm drainage, and all easements, service buildings and structures, and dumpsters.
☑	☐	Erosion control plan showing the placement of all berms, silt fences, hay bales, sedimentation ponds and other erosion control devices, detention ponds, to the standards of the "Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices," by the Cumberland County Soil and Water Conservation District and the Maine Department of Environmental Protection, latest revision.
☑	☐	Areas within or adjacent to the proposed subdivision which have been identified as high or moderate value wildlife habitat by the Maine Department of Inland Fisheries and Wildlife or within the Comprehensive Plan. If any portion of the subdivision is located within an area designated as a critical natural area by the Comprehensive Plan or the Maine Natural Areas Program, the plan shall indicate appropriate measures for the preservation of the values which qualify the site for such designation.
☑	☐	The location of any identified historic and/or archaeological resources together with a description of such features.

☑	☐	Verification of subdivider's legal right, title, or interest in the property (deed or purchase and sale agreement)
☑	☐	A copy of the deed upon which the survey was based. A copy of all easements, covenants, and restrictions applying to the area proposed to be subdivided.
☑	☐	Proposed arrangements for water supply as required by the Maine Water Company, and a letter from the water company stating that the water supply is adequate to serve the subdivision.
☑	☐	Proposed arrangements for storm drainage, with supporting data and design analysis, including plans and profiles showing location and size of drain lines and culverts, catch basins and manholes, and such other information as may be required to define the drainage provisions, stamped by an engineer registered in Maine, and an operating and maintenance plan for any detention basins.
☑	☐	A copy of that portion of the county Soil Survey covering the subdivision superimposed on a copy of the plan. When the medium intensity soil survey shows soils which are questionable for the uses proposed, the Planning Board may require the submittal of a high intensity soil survey.
☑	☐	An estimate of the amount and type of traffic to be generated daily and at peak hours. For developments involving 40 or more parking spaces or projected to generate more than 200 vehicle trips per day, a traffic impact analysis, prepared by a traffic engineer, shall be submitted. The analysis shall show, at a minimum, the expected average number of vehicle trips per day, peak-hour volumes, access conditions at the site, distribution of traffic, types of vehicles expected, effect upon the level of service of the street giving access to the site, neighboring streets which may be affected, the intersection(s) nearest to the site and other intersections which may be affected, and recommended improvement to maintain the level of service on the road.
☑	☐	The names, addresses and tax map and lot numbers of owners of record of adjacent property, including any property directly across an existing street from the subdivision, and (B) the names, addresses and tax map and lot numbers of owners of record of all property within 600 feet of the subdivision.
☑	☐	Description of how proposed open space will be owned and managed.
☐	☐	When sewage disposal is to be accomplished by subsurface disposal systems, test pit analyses prepared by a Licensed Site Evaluator shall be provided. A map showing the location of all test pits dug on the site shall be submitted. (The plumbing inspector must be notified before test pits are dug.)
☑	☐	Proof of financial and technical capacity as described in Article 8.7 and 8.8.
☑	☐	A letter from Maine Water stating that it can serve the proposed development
☑	☐	The anticipated amount of land to be covered by buildings and structures expressed in square feet and as a percentage of the site and lots.
☑	☐	The anticipated amount of land to be covered by buildings, pavement, and other impervious coverage expressed in square feet, percentage of site, and percentage of lot.

☑	☐	If the project is subject to the stormwater quality standards of section 10.12.4, a stormwater quality management plan that includes the following: a. A narrative describing how the site is oriented within the watershed, identifying downstream waterbodies including wetlands, and addressing the potential effects of site runoff. The narrative shall identify and discuss the stormwater treatment methods proposed to be used on the site. b. A plan showing relevant existing contours, proposed contours, existing and proposed subwatersheds, proposed topographic features, and existing and proposed site features including buildings and other facilities, natural and manmade drainageways, streams, channels, culverts, catch basins, and stormwater treatment facilities. The plan shall include detail drawings of the stormwater Best Management Practices proposed to be used and the location of both structural and non-structural BMP's. c. Calculations demonstrating that the proposed stormwater treatment facilities will meet the standards of Section 10.12.4. A stormwater facilities management plan which sets forth the types and frequencies of proposed maintenance activities needed to maintain the efficiency of the stormwater treatment facilities and which identifies the party that will be responsible for carrying out each maintenance activity and for submitting the Annual Maintenance Report and the proposed institutional arrangements that will assure that all maintenance occurs as proposed.

Waiver Requests

If you are asking for a waiver, please indicate the type of waiver and the reason for the waiver request. Waiver requests are reviewed uniquely to each project, so the request should clearly demonstrate the unique aspect of the project.

Waiver Request #1: Section-________: ____

Waiver Request #2: Section-________: ____

Waiver Request #3: Section-________: ____

Waiver Request #4: Section-________: ____

Waiver Request #5: Section-________: ____

February 25, 2022

Re: **Mixed-Use Residential Development**
321 Lincoln Street – Saco, Maine
Agent Authorization

To Whom it May Concern:

We have retained Gorrill Palmer to prepare local, state and federal permit applications for the above referenced project. Gorrill Palmer is authorized to act as an agent on our behalf in matters related to these permits.

Sincerely,

Loni Gravier

321 Lincoln Street Development

ATTACHMENT 2

TITLE, RIGHT, OR INTEREST

NANCY E HAMMOND, REGISTER OF DEEDS
E-RECORDED Bk 18975 PG 512
Instr # 2022011546
03/11/2022 03:23:05 PM
Pages 5 YORK CO

Maine R.E. Transfer Tax Paid

DLN: 1002240186006

TRUSTEES' DEED

Jay D. St. John, Anthony M. LeBlanc, Robert C. Quentin, Diana L. Huot, Timothy S. Murphy and Thomas E. Wells, Trustees of THE LUCIA KIMBALL DEERING TRUST (formerly known as the Lucia Kimball Deering Fund as established by City of Saco on December 30, 1929), by the power conferred by law, and every other power, for consideration paid, grant to 321 LINCOLN STREET DEVELOPMENT LLC, a Maine limited liability company with a mailing address of 40 Farm Gate Road, Falmouth, Maine 04105, a certain lot or parcel of land, situated in the City of Saco, County of York and State of Maine, bounded and described as follows:

Beginning at an iron pipe driven into the ground on the Northeasterly side of Lincoln Street, also called the Boom Road, at the Southerly corner of land formerly of Fred Sawyer, and now or formerly of the John D. Downing Agency, Inc.; thence North 42° 39' East by said land now or formerly of said Agency 173.21 feet to an iron pipe driven into the ground; thence North 42° 42' West by said land of said Agency, 30.55 feet to an iron pipe driven into the ground and land of said John D. Downing Agency, Inc.; thence North 51° 46' East by said land of said Agency and by an old fence 236.62 feet to an iron pipe driven into the ground; thence North 52° 02' East by said land of said Agency and by an old fence 1,742.03 feet to an iron pipe driven into the ground; thence the same course and by land formerly of F. O. L. Hobson, 875.42 feet to an iron pipe driven into the ground on the Southwesterly side of Bradley Street, also called the New County Road; thence South 36° 44' East by said Road, 296.21 feet to an iron pipe driven into the ground; thence South 35° 45' East by said Road, 195.69 feet to an iron pipe driven into the ground; thence South 31° 12' East by said Road, 179.48 feet to an iron pipe driven into the ground and land formerly of one Goldthwaite and later of Vernon Rand; thence South 53° 11' West by said land formerly of said Rand, 135.77 feet to an iron pipe driven into the ground; thence South 36° 08' East by said land formerly of Rand, 673.53 feet to an iron pipe driven into the ground and land formerly of Burnis R. Bean; thence by said Bean land (portions of said Bean land being later owned by Martha E. Bean, one Emmons and one Welch) on the following courses and distance: South 52° 17' West 550.89 feet to an iron pipe driven into the ground, South 53° 42' West by the remains of an old fence 144.47 feet to an iron pipe driven into the ground, South 50° 00' West by said remains of a fence 141.31 feet to an iron pipe driven into the ground, South 52° 36' West 298.56 feet to an iron pipe driven into the ground, South 51°51' West 934.98 feet to an iron pipe driven into the ground at remaining land of Henry A. McKeen and Evelyn McKeen Wormwood; and thence North 68° 37' West by said remaining land 258.76 feet to an iron pipe driven into the ground; thence South 21° 23' West by said remaining land 100 feet to an iron pipe driven into the ground and said Lincoln Street; thence North 68° 37' West by said Street, 487.57 feet to an iron pipe driven into the ground; thence North 62° 49' West by said Street, 103.26 feet to an iron pipe driven into the ground; thence North 57° 38' West by said Street, 637.15 feet to the point of beginning.

The above bearings refer to the 1968 Magnetic Meridian.

EXCEPTING those portions of the above-described premises described in the following deeds:

1. Deed to Kimball Health Center, dated February 11, 1980, and recorded in the York County Registry of Deeds in Book 2622, Page 271, and corrective deed dated March 7, 1980, recorded in said Registry in Book 2626, Page 173;

2. Deed to Eugene J. Doyon and Carol A. Doyon, dated June 16, 1989, and recorded in said Registry in Book 5094, Page 64;

3. Deed to Greek Orthodox Community, Biddeford and Saco, dated March 17, 1997, and recorded in said Registry in Book 8247, Page 349;

4. Deed to Greek Orthodox Community, Biddeford and Saco, dated September 6, 2016, and recorded in said Registry in Book 17322, Page 57.

TOGETHER WITH the benefit of the easements reserved in Deed to Kimball Health Center, dated February 11, 1980, and recorded in the York County Registry of Deeds in Book 2622, Page 271, and corrective deed dated Mach 7, 1980, recorded in said Registry in Book 2626, Page 173.

To have and to hold, with all the benefits and privileges appurtenant thereto, for itself, and for its successors and assigns, now and forever.

In witness whereof, The Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund) has caused this instrument to be signed and sealed by its Trustees on the dates shown below.

WITNESS:

THE LUCIA KIMBALL DEERING TRUST (formerly known as the Lucia Kimball Deering Fund

03-07-2022 By: ______________________
Jay D. St. John, its Trustee

03-09-2022 By: ______________________
Anthony M. LeBlanc, its Trustee

03-04-2022 By: ______________________
Robert C. Quentin, its Trustee

03-07-2022 By: Diana L Huot
Diana L. Huot, its Trustee

03-04-2022 By:
Timothy S. Murphy, its Trustee

02-25-2022 By: Thomas E Wells
Thomas E. Wells, its Trustee

STATE OF MAINE
YORK, ss.

March 7, 2022

Then personally appeared before me Jay D. St. John, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be his free act and deed in his said capacity.

Before me,

Notary Public/Attorney At Law

CARLY B. HALL
NOTARY PUBLIC
State of Maine
My Commission Expires October 30, 2028

STATE OF MAINE
YORK, ss.

March 9, 2022

Then personally appeared before me Anthony M. LeBlanc, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be her free act and deed in his said capacity.

Before me,

Notary Public/Attorney At Law

CARLY B. HALL
NOTARY PUBLIC
State of Maine
My Commission Expires October 30, 2028

STATE OF MAINE
YORK, ss.

March 4, 2022

Then personally appeared before me Robert C. Quentin, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be his free act and deed in his said capacity.

Before me,

Notary Public/Attorney At Law

CARLY B. HALL
NOTARY PUBLIC
State of Maine
My Commission Expires October 30, 2028

STATE OF MAINE
YORK, ss.

March 7, 2022

Then personally appeared before me Diana L Huot, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be her free act and deed in her said capacity.

Before me,

Notary Public/Attorney At Law

CARLY B. HALL
NOTARY PUBLIC
State of Maine
My Commission Expires October 30, 2028

STATE OF MAINE
YORK, ss.

March 4, 2022

Then personally appeared before me Timothy S. Murphy, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be his free act and deed in his said capacity.

Before me,

Notary Public/Attorney At Law

CARLY B. HALL
NOTARY PUBLIC
State of Maine
My Commission Expires October 30, 2028

STATE OF MAINE
YORK, ss.

February 25, 2022

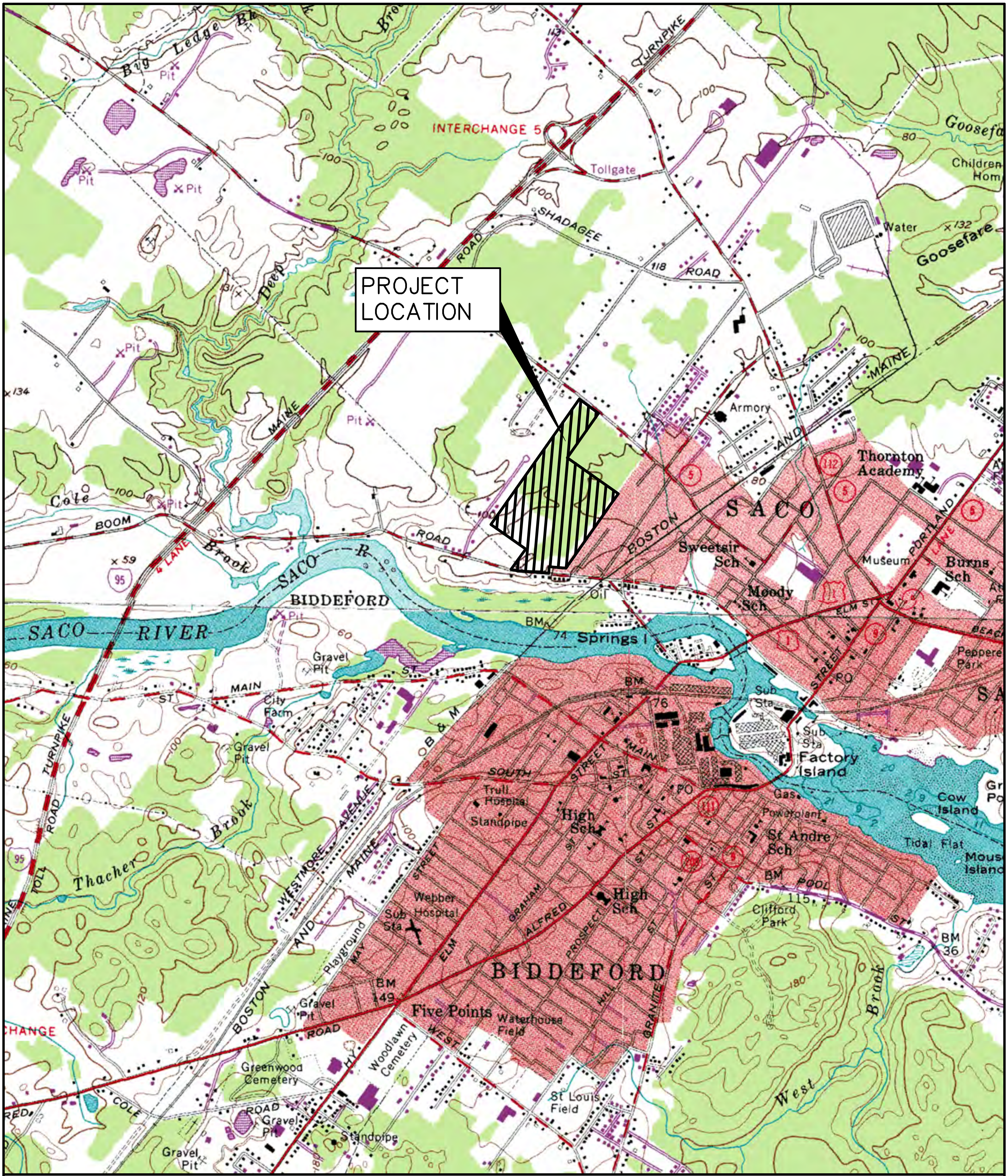
Then personally appeared before me Thomas E. Wells, Trustee of the Lucia Kimball Deering Trust (formerly known as the Lucia Kimball Deering Fund), who gave oath and acknowledged the foregoing to be his free act and deed in his said capacity.

Before me,

Notary Public/Attorney At Law
Barbara J. Dresser
Attorney At Law

ATTACHMENT 3

PROJECT LOCATION MAP



U.S.G.S. Location Map

Lincoln Street - Saco, Maine

U.S.G.S. Old Orchard Beach & Biddeford, State-7.5 Minute Series (Topographic)

Design: LL	Date: MARCH 2022
Draft: CEH	Job No.: 3831
Checked: DJG	Scale: None
File Name: 3831-LOCATION.dwg	

GORRILL PALMER

Relationships. Responsiveness. Results.
www.gorrillpalmer.com
207.772.2515

Figure

1

City of Saco Zoning Map

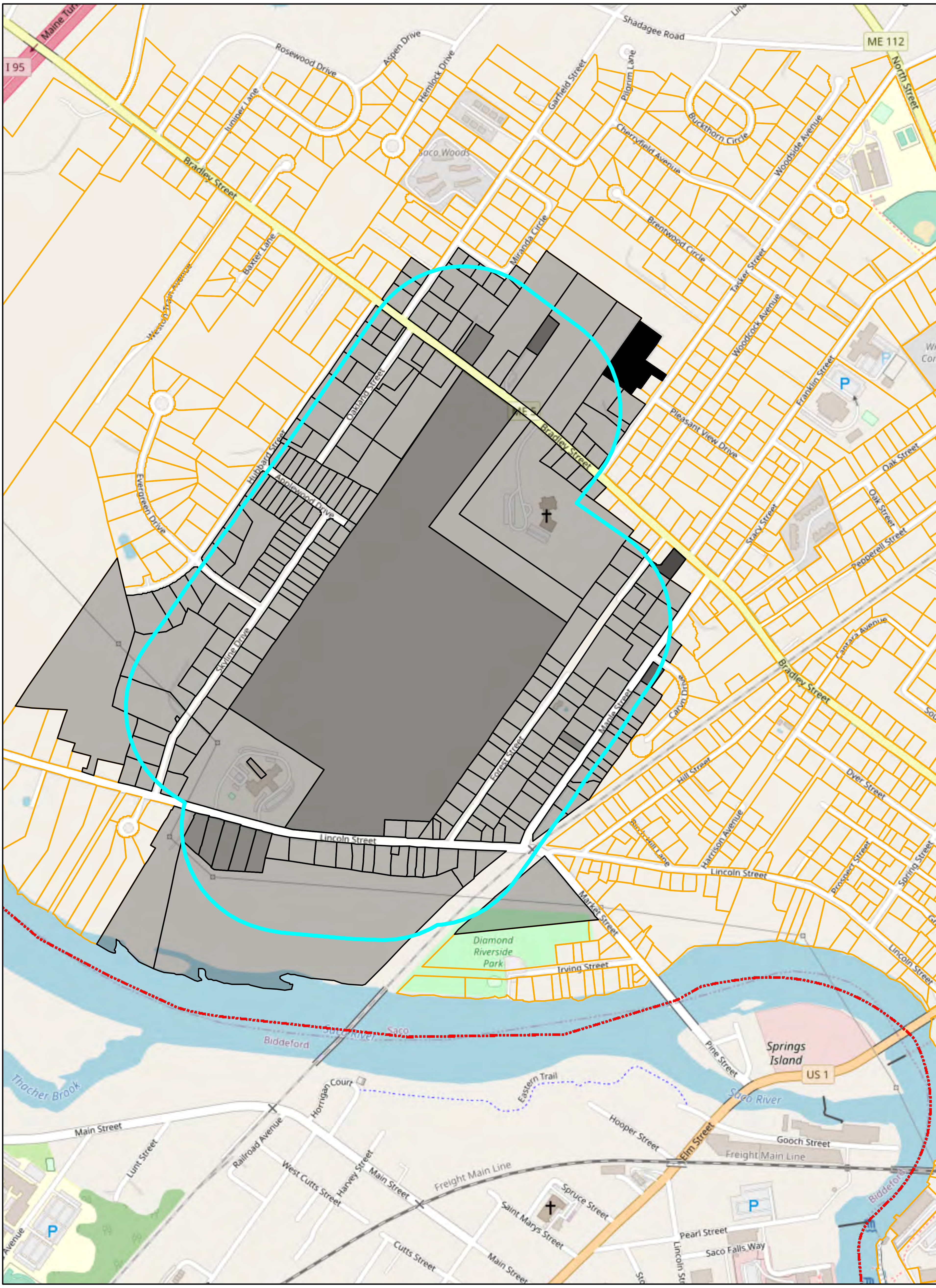
Adopted 4/12/2021

(Amended 7/12/2021)

ATTACHMENT 4

ABUTTERS MAILING LIST

Saco GIS



April 27, 2022

- Override 1
- Parcels
- City_Townline_Polygons

1:9,028

0 400 800 1,600 ft

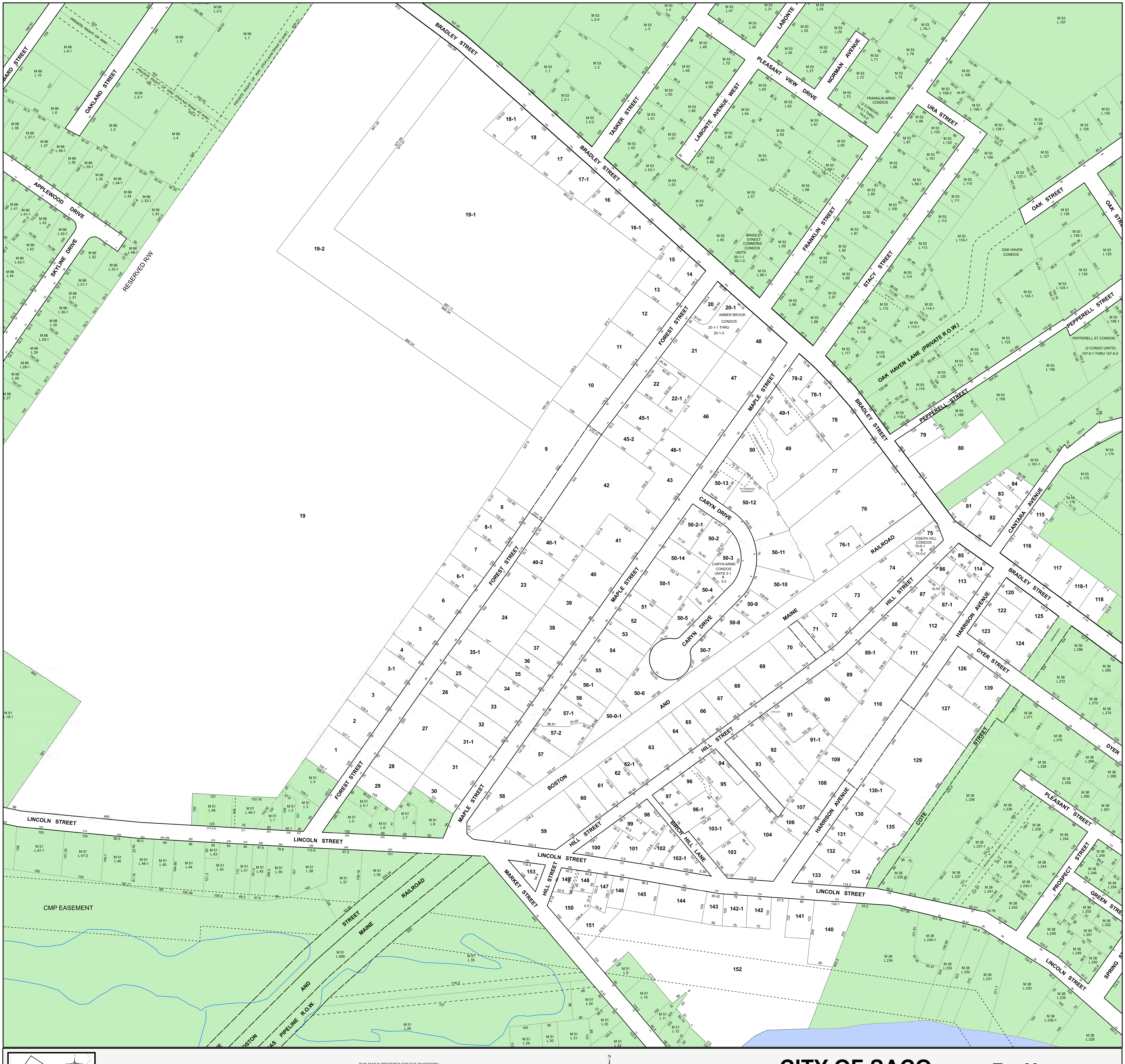
0 120 240 480 m

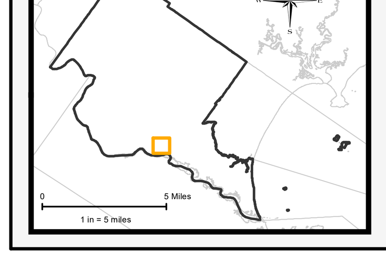
City of Saco

This map is for planning purposes only. The City of Saco is not responsible for the accuracy of the data within.

Map-Lot	Grantee	Co-Grantee	Mailing	City	State	Zip
65010000000	EON MIKE ASSOCIATES INC		260 MAIN ST	BIDDEFORD	ME	4005
67020014000	LETELLIER ROBERT A	LETELLIER SYLVIE M	5 MIRANDA CIR	SACO	ME	04072-2436
67022001000	MORNEAU LAURENT	MORNEAU GERMAINE	3 GARFIELD ST	SACO	ME	04072-2405
66032001000	SAWYER MARY JANE	SAWYER CARL R	2 APPLEWOOD DR	SACO	ME	4072
52018001000	KILCOLLINS TRENT O	KILCOLLINS JORDAY R	182 BRADLEY ST	SACO	ME	4072
66008000000	DUBE ERIKA J	DUBE STEVEN T	270 BRADLEY ST	SACO	ME	4072
66045000000	WALLS-OTT LINDSAY		32 SKYLINE DR	SACO	ME	4072
66005001000	PAN CHUNCHANG	XUEYAN GUAN	14 OAKLAND ST	SACO	ME	4072
66031001000	MCGONAGLE DIANE		39 SKYLINE DR	SACO	ME	04072-3146
67028000000	GILBERT RITA H		191 BRADLEY ST	SACO	ME	4072
67007000000	SEARCY ANTHONY E		2 GARFIELD ST	SACO	ME	4072
67026000000	BUNKER ANNE J	BUNKER EVERETT E III	243 BRADLEY ST	SACO	ME	4072
67021000000	CECCHETTI STEVEN J	CECCHETTI MARY	PO BOX 147	NORTH WATERBORO	ME	4061
52019001000	GREEK ORTHODOX COMMUNITY		186 BRADLEY ST	SACO	ME	4072
66047000000	APPELL DAVID P	APPELL SUZANNE M	24 SKYLINE DR	SACO	ME	4072
66033001000	BURNHAM JUNE		3 APPLEWOOD DR	SACO	ME	4072
67020013000	BOIVIN LINDA		110 GRANITE POINT RD	BIDDEFORD	ME	4005
66046000000	WOOD JESSICA	MILLER LEO	28 SKYLINE DR	SACO	ME	4072
67021001000	GOMEZ SISO A.		5 GARFIELD ST	SACO	ME	4072
66028000000	HARRIMAN KENNETH L JR	HARRIMAN JAYNE E	25 SKYLINE DR	SACO	ME	4072
52019000000	DEERING JOSEPH G TRUSTEES OF	C/OWARREN ERWIN C	KIMBALL HEALTH CENTER	SACO	ME	4072
66045001000	LEE JEANNIE K		30 SKYLINE DR	SACO	ME	4072
66039001000	REED LINDA C		18 APPLEWOOD DR	SACO	ME	4072
66037001000	WEISS JADE J		19 APPLEWOOD DR	SACO	ME	4072
66042000000	BERUBE CLARICE M	BLANEY KIMBERLY M & PAUL R	8 APPLEWOOD DR	SACO	ME	4072
67020011000	KIMBALL SUSAN E		11 MIRANDA CIR	SACO	ME	04072-2436
66049002000	HOUDE TONYA A		32 HUBBARD ST	SACO	ME	4072
66049010000	BURGESS DALE K	BURGESS CAROL D	8 EVERGREEN DR	SACO	ME	4072
66005000000	MARAGNI ANTHONY		18 OAKLAND ST	SACO	ME	4072
66001000000						
66044000000	ULDBJERG DONALD	ULDBJERG CHARLENE	11 GLENHAVEN CIRCLE	SACO	ME	4072
66009000000	BRYANT B ABIGAIL	BRYANT D JEREMY	11 OAKLAND ST	SACO	ME	4072
66038001000	MARTIN LORI A		23 APPLEWOOD DR	SACO	ME	4072
66006001000	DOYON RICHARD P	DOYON DIANE M	15 OAKLAND ST	SACO	ME	04072-3115
66049014000	CURRY DONALD A	CURRY KATHLEEN A	42 HUBBARD ST	SACO	ME	4072
67026001000	BROCKMAN WILLIAM FREDRICK	BROCKMAN LAURA SUE	245 BRADLEY ST	SACO	ME	4072
66043001000	THE MICHELLE L HERWOOD REVOCABLE TRUST		38 SKYLINE DR	SACO	ME	4072
66006000000	SAUNDERS JANICE E		43 MARSHALL FARM LN	ELIOT	ME	03903-1640
66009003000						
66004000000	LILLY ROBERT A	LILLY LIESL P	25 COUNTRY CLUB RD	SACO	ME	4072
66002001000	LILLY PATRICIA		258 BRADLEY ST	SACO	ME	4072
67020015000	BOGER AMANDA C	BOGER DAVID R	3 MIRANDA CIR	SACO	ME	4072
66049012000	BURGESS CRAIG A	BURGESS ANGELA M	40 HUBBARD ST	SACO	ME	4072
66002002000	KIERSTEAD BARBARA P	GAGNE EDWARD	4 OAKLAND ST	SACO	ME	4072
67023001000	MADDIX MICHAEL		7 ISABELLA LN	SACO	ME	4072
66030000000	SHAUGHNESSY PAUL J.	BRIMIGION SUSAN D.	33 SKYLINE DR	SACO	ME	4072
66037000000	JOHNSTON MARK A		17 APPLEWOOD DR	SACO	ME	4072
66001001000						
66035000000	SHAW MARY		PO BOX 1583	BIDDEFORD	ME	4005
67025001000	SOUTHWICK JASON R	SOUTHWICK CHRISTINE A	247 BRADLEY ST	SACO	ME	4072
66032000000	QUEZADA JON		4 APPLEWOOD DR	SACO	ME	4072
66028001000	DUNN PAUL D	DUNN DIANE	27 SKYLINE DR	SACO	ME	4072
66049001000	SMITH JASON S	SMITH LACEY L	30 HUBBARD ST	SACO	ME	4072
67020000000	NASON RICHARD L	NASON BARBARA A	251 BRADLEY ST	SACO	ME	4072
66048000000	APPLEWOOD SUBDIVISION		SKYLINE DR	SACO	ME	4072
67020012000	BOURGOIN SCOTT	MADORE BOURGOIN DAWN M	9 MIRANDA CIR	SACO	ME	4072
66027000000	LASKEY DANIEL J		23 SKYLINE DR	SACO	ME	4072
66033000000	ZAITLIN DAVID	ZAITLIN DIANE H	1 APPLEWOOD DR	SACO	ME	04072-3100
67022000000	HENRY KEVIN D	HENRY BONNIE C	253 BRADLEY ST	SACO	ME	04072-3104
66002000000	MCINTYRE NICHOLAS		260 BRADLEY ST	SACO	ME	4072
52019002000	GREEK ORTHODOX COMMUNITY BIDDEFORD SACO		186 BRADLEY STREET	SACO	ME	4072
66030001000	CLINGENSMITH ADAM J		35 SKYLINE DR	SACO	ME	04072-3145
67026001000	CONDO MAIN		245 BRADLEY ST	SACO	ME	4072
67024000000	PENNELL JEREMY J		255 BRADLEY ST	SACO	ME	04072-3104
66043000000	SIMMONS LISA C		40 SKYLINE DR	SACO	ME	4072
67020000000	NASON RICHARD L	NASON BARBARA A	251 BRADLEY ST	SACO	ME	4072
66049003000	IFANTIDES MELISSA M	LIBBY TIMOTHY M JR	7 EVERGREEN DR	SACO	ME	4072
66035001000	GONYEA GAETANE HELENE	GONYEA MATTHEW ERIC	11 APPLEWOOD DR	SACO	ME	4072
66044001000	MCDONOUGH ADAM W	MCDONOUGH LYNNSEY M	34 SKYLINE DR	SACO	ME	4072
66009001000	DIMITROVA ROBIN		4 HUBBARD ST	SACO	ME	4072
67023000000	GODIN SHAUN A	GODIN ANGIE F	259 BRADLEY ST	SACO	ME	4072
66034000000	DUMONT LAURA Z		5 APPLEWOOD DR	SACO	ME	4072
66031000000	MITCHELL DARCY L		37 SKYLINE DR	SACO	ME	4072
66040001000	SCAMMAN LINDA L		14 APPLEWOOD DR	SACO	ME	04072-3144
67008000000	DOYON CLEMENT J		281 BRADLEY ST	SACO	ME	04072-2406
66039000000	LESINSKI JOEL M	LESINSKI SAMAN M	20 APPLEWOOD DR	SACO	ME	4072
66048001000	EON MIKE ASSOCIATES INC		PO BOX 444	BIDDEFORD	ME	4005
66049015000	EON ABBY L	SHREFLER COLBY J	44 HUBBARD ST	SACO	ME	4072
66007000000	CHENARD JON H	CHENARD ELIZABETH A	264 BRADLEY ST	SACO	ME	4072
66046001000	STARBIRD PATRICIA		93 PIPELINE DR	RAYMOND	ME	04071-6665
66009002000	TRAN CHI		10 HUBBARD ST	SACO	ME	4072
66029001000	STANTON JOY E		31 SKYLINE DR	SACO	ME	4072
66029000000	MA DAVID	LEE NGAN FONG	15 STACY ST	SACO	ME	4072
66041000000	GUERNSEY GARRETT J	GUERNSEY KATHRYN G	8 HILLVIEW DR	BANGOR	ME	4401
66038000000	OLSEN BEVERLY ANN		21 APPLEWOOD DR	SACO	ME	4072
66048000000	APPLEWOOD SUBDIVISION		SKYLINE DR	SACO	ME	4072
66007001000	ROUSSEAU MELISSA A		3 OAKLAND ST	SACO	ME	4072
66041001000	SMOTHERS JOYCE M		10 APPLEWOOD DR	SACO	ME	4072
66036000000	RUSSELL KIMBERLY		13 APPLEWOOD DR	SACO	ME	4072
66002003000	KATANOV ALEXANDER	KATANOV ALINA	8 OAKLAND ST	SACO	ME	4072
66008001000	MARRO CHRISTOPHER J	MARRO JANICE T	2 HUBBARD ST	SACO	ME	4072
67026001000	SMITH SHARON L		245 BRADLEY ST	SACO	ME	4072
52018000000	ROUSSELLE HELENE	LONGMORE WILLIAM	180 BRADLEY ST	SACO	ME	4072
66010000000	SKIDGEL ROBERT	SKIDGEL ROSEMARY A	18 HUBBARD ST	SACO	ME	04072-3112
66036001000	GAUDREAU ERIN K		15 APPLEWOOD DR	SACO	ME	4072
66003000000	DOYON MICHAEL	DOYON KARLA	11 OAKLAND ST	SACO	ME	04072-3116
66042001000	CLARK JENNIFER L		6 APPLEWOOD DR	SACO	ME	4072
67007001000	SOUZA PAMELA L		4 GARFIELD ST	SACO	ME	4072
67025000000	HERTEL VAN JR E	HERTEL LORA C	5 SHADY CREEK LN	SCARBOROUGH	ME	4074
67020016000	GAGNE ROBERT A	GAGNE JACQUELINE D	1 MIRANDA CIR	SACO	ME	04072-2436
66040000000	KELLEY BRYAN ALAN		16 APPLEWOOD DR	SACO	ME	4072
66034001000	LYNCH JOSEPH E	LYNCH MARY LEE A	15 SPRINGBROOK HILL RD	CAMDEN	ME	4843
67027000000	GILBERT RITA H		191 BRADLEY ST	SACO	ME	4072
51008000000	MCINNIS CRAIG W	MCINNIS HEATHER J	55 OLD CAPE RD	KENNEBUNKPORT	ME	4046
51039000000	MASSIE CHARLES C JR		264 LINCOLN ST	SACO	ME	4072
51046001000	ARNOLD LAUREN		300 LINCOLN ST	SACO	ME	4072
51047000000	MAILMAN LINDSAY R	MAILMAN GARON C	328 LINCOLN ST	SACO	ME	4072
65022000000	MILLIGAN THOMAS JR	MILLIGAN POLLY J	8 SKYLINE DR	SACO	ME	4072
51004000000	HERRERA ALEJANDRA P & GUZMAN CARLOS A		14 FOREST STREET	SACO	ME	4072
52001000000	IFANTIDES VASSILIS I		20 FOREST ST	SACO	ME	4072
51044012000	CANTARA YVONNE L		342 LINCOLN ST	SACO	ME	4072
52005000000	SIMKOWITZ DAVID R	SIMKOWITZ SUSAN E	48 FOREST ST	SACO	ME	04072-3126
51044015000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
51037000000	MARIER JAMES A		248 LINCOLN ST	SACO	ME	4072
52034000000	BERNAICHE DARRELL		36 MAPLE ST	SACO	ME	4072
52006001000	VILLARREAL ABBY M		52 FOREST ST	SACO	ME	4072
52029000000	WHITE MATTHEW R		15 FOREST ST	SACO	ME	4072
51041000000	PITMAN DAVID C	PITMAN AURELIA U	272 LINCOLN ST	SACO	ME	04072-3127
65018000000	OUELLETTE ARTHUR R	OUELLETTE MOLLY A	16 SKYLINE DR	SACO	ME	04072-3120
51035000000	CITY OF SACO		300 MAIN ST	SACO	ME	4072
51044014000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
52026000000	BEAULIEU ARMAND J JR	BEAULIEU DONNA R	39 FOREST ST	SACO	ME	04072-3125
52031000000	FOURNIER RITA R	CHARITY-MCGUIRK VICTORIA F	561 SEAPORT TERRACE SE	PALM BAY	FL	32909
51036000000	MARIER JAMES A		248 LINCOLN ST	SACO	ME	04072-3127
51001000000	CLOUGH PAMALA A	PORTER KYLE C	263 LINCOLN ST	SACO	ME	4072
51047002000	CONLEY VALARIE L	CONLEY MATTHEW M	310 LINCOLN ST	SACO	ME	4072
51044016000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
52008001000	TOPPI CHARLES	TOPPI CATHERINE	58 FOREST ST	SACO	ME	4072
65023000000	RAY JEREMY A	HUSSEY SUZANNE M	6 SKYLINE DR	SACO	ME	4072
52032000000	BOUCHER ROGER G	BOUCHER COLETTE B	24 MAPLE ST	SACO	ME	4072
65012000000	JANELLE ARMAND R	JANELLE SIMONE F	3 SKYLINE DR	SACO	ME	04072-3119
65017000000	SICARD ROGER J		13 SKYLINE DR	SACO	ME	04072-3119
52023000000	GRAVES RICHARD A JR	GRAVES RICHARD A SR	57 FOREST ST	SACO	ME	4072
66025000000	CLARK ELLEN J	FARRAR RICHARD H	21 SKYLINE DR	SACO	ME	4072
51044002000	LILLY JARROD S	LILLY KRISTIE V	25 COUNTRY CLUB DR	SACO	ME	4072
51046000000	ALBERT TRACY L		304 LINCOLN ST	SACO	ME	4072
52058000000	COTE GHISLAIN		15 MAPLE ST	SACO	ME	4072
65013000000	LOOMIS ELIZABETH A		5 SKYLINE DR	SACO	ME	4072
51006000000	EMERSON ALBERTINA A		245 LINCOLN ST	SACO	ME	04072-3128
66024000000	MCCORMACK ROBERT J TRUSTEE		15 SKYLINE DR	SACO	ME	4072
52002000000	GRANT RICHARD		26 FOREST ST	SACO	ME	04072-3126
51044015000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
51044013000	CAMIRE BERNARD N		35 TASKER ST	SACO	ME	04072-2423
51005000000	TARDIFF ARTHUR J	ORLANDO SUZANNE TARDIF DONALD	249 LINCOLN ST	SACO	ME	4072
65010004000	SMITH HEATHER L		7 BOOM RD	SACO	ME	4072
51042000000	GRIFFETH CRAIG		276 LINCOLN ST	SACO	ME	4072
52035000000	CONAWAY CLARA E	OSKOUIE BIJAN	40 MAPLE ST	SACO	ME	4072
65016000000	OUELLETTE ROGER R	OUELLETTE BONNIE	11 SKYLINE DR	SACO	ME	04072-3119
52030000000	BERNIER LINDA J		4 MAPLE ST	SACO	ME	04072-3130
65014000000	WHITE GORDON M	WHITE THERESA D	812 WEST MILLBROOK ST	HANFORD	CA	93230
52057000000	LOUIS HARRY P		23 MAPLE ST	SACO	ME	04072-3130
65024000000	DOODY GEORGE J	DOODY JUDITH G	4 SKYLINE DR	SACO	ME	4072
66026000000	MORSE FRANK H	MORSE BETTY A	20 SKYLINE DR	SACO	ME	4072
51040000000	PERREAULT RAYMOND		268 LINCOLN ST	SACO	ME	04072-3127
51044013000	JOHNSEN CHARLES S	OUELETTE ELIZABETH A	340 LINCOLN ST	SACO	ME	4072
52024000000	BEAUSOLEIL ERIC R		55 FOREST ST	SACO	ME	4072
65010002000	LITTLEFIELD BRETT L	LITTLEFIELD ELENA	13 BOOM RD	SACO	ME	4072
65020000000	RICCI ALEXANDRA KENT		12 SKYLINE DR	SACO	ME	4072
52003000000	MAHONEY TRACY M	MAHONEY III CHARLES D	26 PINE RIDGE RD	SACO	ME	04072-2119
51044001001	CITY OF SACO		300 MAIN ST	SACO	ME	4072
51044016000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
65022001000	CITY OF SACO		300 MAIN ST	SACO	ME	4072
52033000000	DALLAIRE KIMBERLY	DALLAIRE MARK H	28 MAPLE ST	SACO	ME	4072
51003000000	CLOUGH WILLIAM J	CLOUGH HEIDI	257 LINCOLN ST	SACO	ME	4072
51044012000	CONDO MAIN		342 LINCOLN ST	SACO	ME	4072
51019001000	KIMBALL HEALTH CENTER	C/O ERWIN C WARREN	333 LINCOLN ST	SACO	ME	04072-3158
52006000000	CAROLAN MARY ELIZABETH		50 FOREST ST	SACO	ME	4072
51048000000	SHAW STEPHANIE G		P O BOX 1688	SACO	ME	4072
52008000000	LINO CRUZ WILLIAM A		62 FOREST ST	SACO	ME	4072
51007000000	KELLEY, THOMAS R		241 LINCOLN ST	SACO	ME	4072

65019000000	HEMENWAY CHARLES G	HEMENWAY BETH A	14 SKYLINE DR	SACO	ME	4072
65010001000	GOODWIN BENJAMIN D	GOODWIN KAREN T	3 BOOM RD	SACO	ME	4072
51048001000	SOUZA JAMES	SOUZA ALICE	271 LINCOLN ST	SACO	ME	04072-3129
52027000000	ABDULLAH GHASSAN M	AL-FRAJI SHAYMAA S	21 FOREST ST	SACO	ME	4072
51005001000	TARDIF ARTHUR	ORLANDO SUZANNE & TARDIFF DONALD	249 LINCOLN ST	SACO	ME	4072
52009000000	DEERING LUCIA KIMBALL TRUST	C/OWARREN ERWIN C	KIMBALL HEALTH CENTER	SACO	ME	4072
52004000000	SCHMIDT NICOLE D		44 FOREST ST	SACO	ME	4072
51044000000	ZIMMERMANN LISELOTTE		280 LINCOLN ST	SACO	ME	04072-3127
65021000000	BILOTTA PAUL V	BILOTTA JOANNA	10 SKYLINE DR	SACO	ME	04072-3120
52031001000	CLOSE WILLIAM P	CLOSE HEATHER L, A/K/A HEATHER MITCHELL	20 MAPLE ST	SACO	ME	4072
52025000000	STUDTMANN KENNETH M	STUDTMANN TERRI C	45 FOREST ST APT 201	SACO	ME	4072
51044014000	J BROWN INVESTMENTS LLC		161 SACO AVE	OLD ORCHARD BEACH	ME	4064
52035001000	LABRECQUE MARCEL R		49 FOREST ST	SACO	ME	04072-3125
51002000000	BERNATEK FREDERICK	BERNATEK EVA	259 LINCOLN ST	SACO	ME	4072
52028000000	CHARETTE LISA M	CHARETTE RICHARD R	19 FOREST ST	SACO	ME	4072
51038000000	DE LIMA CARLOS LEONARDO HABACHE	DE LIMA NYIESHA CELESTINE GRADNEY	256 LINCOLN ST	SACO	ME	4072
51045000000	ZIMMERMANN LISELOTTE L		280 LINCOLN ST	SACO	ME	04072-3127
51047001000	TROTTIER WILFRED R	TROTTIER JEANINE R	15 KING AVE	SACO	ME	4072
65015000000	KALAGIAS PETER M		9 SKYLINE DR	SACO	ME	4072
51043000000	LALIME JASON	LALIME AMY	278 LINCOLN ST	SACO	ME	4072
52036000000	FRAZIER MICHAEL VINCENT	FRAZIER CHRISTINA	44 MAPLE ST	SACO	ME	4072
52007000000	CLOUTIER MAURICE J	CLOUTIER THERESA M	56 FOREST ST	SACO	ME	04072-3126
51019001001	VOLUNTEERS OF AMERICA	NORTHERN NEW ENGLAND INC	14 MAINE ST	BRUNSWICK	ME	4011
52003001000	GREEN ARTHUR E	GREEN AMY F	36 FOREST ST	SACO	ME	4072
53002005000	HARVEY THOMAS E	BAXTER SUSAN Y	22 TASKER ST	SACO	ME	4072
53002005000	ANGERS MARC A	ANGERS SUSAN P	22 TASKER ST	SACO	ME	4072
52021000000	FAUCHER STEVEN	FAUCHER JENNIFER	81 FOREST ST	SACO	ME	4072
52017001000	WILBAR-SANDIDGE THEODORE R	LEVY MICHELLE L	176 BRADLEY ST	SACO	ME	4072
53002005000	KASHINSKY SHANNON L		22 TASKER ST UNIT 7	SACO	ME	4072
53002005000	ROBERTS JULIE A		22 TASKER ST	SACO	ME	4072
52017000000	DANLEY, RYAN		178 BRADLEY ST	SACO	ME	4072
52020001000	SCHELL MICHAEL	SCHELL DAWN-MARIE	87 FOREST ST	SACO	ME	4072
52022000000	HOLMQUIST KYLE A	DE ROSA BRADLEY J	75 FOREST ST	SACO	ME	4072
53002005000	FINN MARY E		22 TASKER ST	SACO	ME	4072
52011000000	CRANDALL VAUGHAN JR	CRANDALL WINNIFRED	82 FOREST ST	SACO	ME	04072-3109
52047000000	BERNIER WANDA		98 MAPLE ST	SACO	ME	4072
53002005000	STEWART CHRISTINE M	STEWART PHILIP A	22 TASKER ST	SACO	ME	4072
53002005000	DESCOTEAUX THOMAS J	DESCOTEAUX JUDITH A	22 TASKER ST #2	SACO	ME	4072
52012000000	LEDOUX MARK R	LEDOUX JUNE M	84 FOREST ST	SACO	ME	04072-3109
52013000000	ROY KEVIN		88 FOREST ST	SACO	ME	4072
53001000000	CHAMBERLAIN CRAIG C	CHAMBERLAIN DORIS E	187 BRADLEY ST	SACO	ME	04072-3104
52020001000	CONDO MAIN		87 FOREST ST	SACO	ME	4072
53002005000	MAZYCK C SHANNON		22 TASKER ST	SACO	ME	4072
53002001000	ARCHER KELLEY L		185 BRADLEY ST	SACO	ME	4072
53002000000	MCINTYRE GILBERT		1136 INVERNESS ST	PORT CHARLOTTE	FL	33952
52020001000	BEAVER NANCY		87 FOREST ST	SACO	ME	4072
53002005000	LIBBY JASON A		22 TASKER ST	SACO	ME	4072
53002004000	GOSSELIN RAYMOND	GOSSELIN VIVIAN	10 TASKER ST	SACO	ME	4072
53002005000	CONDO MAIN		22 TASKER ST	SACO	ME	4072
53003000000	POITRAS DONALD		12TASKER ST	SACO	ME	4072
53002005000	ROY DONALD J	ROY PATRICIA T	22 TASKER ST	SACO	ME	4072
52022001000	YORK CUMBERLAND ASSOCIATION FOR	HANDICAPPED PERSONS	619 BRIGHTON AVE	PORTLAND	ME	4102
53002005000	ANGIS LORRAINE A		22 TASKER ST	SACO	ME	4072
53002005000	LAREAU PETE		22 TASKER ST	SACO	ME	4072
53002005000	BEAUMONT COLETTE M	MCNALLY RODERICK C	22 TASKER ST	SACO	ME	4072
52020001000	CARLSON WAYNE A		87 FOREST ST	SACO	ME	4072
53002002000	LIBBY CHARLOTTE M		183 BRADLEY ST	SACO	ME	4072
52010000000	GRAFFAM WILLIAM A	GRAFFAM DIANA	80 FOREST ST	SACO	ME	04072-3109
53002005000	DRESSER BARBARA J		22 TASKER ST	SACO	ME	4072
53002005000	CHRISTIE, COREY		22 TASKER ST	SACO	ME	4072
52050013000	BRANCO GEORGE G TRUSTEE		20 TRAILSIDE CIRCLE	SACO	ME	4072
52045001000	LAMIRANDE SUZANNE L	LABELLE HOPE A & ELLIOTT JOYCE M	73 FOREST ST	SACO	ME	4072
52037000000	MOHABBATI ESMAEIL S	GHORBANZAHEH BITA	46 MAPLE ST	SACO	ME	4072
52040002000	KELLEY MARK C		59 FOREST ST	SACO	ME	4072
52040000000	FOURNIER WILLIAM R	BRANN MICHELLE B	18 WENDY WAY	SACO	ME	4072
52053000000	PERKINS DANA R	PERKINS SHARI R	59 MAPLE ST	SACO	ME	04072-3130
52052000000	FOURNIER WILLIAM R	FOURNIER MICHELLE B	18 WENDY WAY	SACO	ME	4072
52054000000	GALLANT JEANNIE M		55 MAPLE ST	SACO	ME	4072
52050002001	LAROSE JESSICA LYNN		77 MAPLE ST #1	SACO	ME	4072
52056001000	KALOYARES STEPHEN S		45 MAPLE ST	SACO	ME	04072-3130
52057001000	TRASK MATTHEW J		35 MAPLE ST	SACO	ME	4072
52051000000	GOODWIN NANCY A		65 MAPLE ST	SACO	ME	4072
52045002000	TABOR CHRISTOPHER G	ELLIOTT JOYCE M	71 FOREST ST	SACO	ME	4072
52042000000	DEERING LUCIA KIMBALL TRUST	C/OWARREN ERWIN C	KIMBALL HEALTH CENTER	SACO	ME	4072
52037000000	MOHABBATI ESMAEIL S	GHORBANZAHEH BITA	46 MAPLE ST	SACO	ME	4072
52050002001	WHITMORE MICHAEL F		77 MAPLE ST	SACO	ME	4072
52050001000	PLANTE GARITH E	PLANTE NICOLE N	73 MAPLE ST	SACO	ME	4072
52057002000	TUBBS, JASON	TUBBS, RICHARD W , TUBBS ANDREA	33 MAPLE ST	SACO	ME	4072
52050014000	MATHER ROBERT	BURNS JEANNETTE M	75 MAPLE ST	SACO	ME	4072
52043000000	LETELLIER TRAVIS A	LETELLIER MARY	88 MAPLE ST	SACO	ME	4072
52039000000	RISINGER MARK C		56 MAPLE ST	SACO	ME	4072
52056000000	MURPHY-DEAN JAMES SIMMONS	MURPHY-DEAN THEIA ELIZABETH	43 MAPLE ST	SACO	ME	4072
52038000000	HOUDLETTE GREGORY	HOUDLETTE CHARLENE A	52 MAPLE ST	SACO	ME	4072
52046001000	MILNE FAMILY TRUST		90B MAPLE ST	SACO	ME	4072
52055000000	SERUNJOGI RONALD K		47-49 MAPLE ST	SACO	ME	4072
52050002001	CONDO MAIN		77 MAPLE ST	SACO	ME	4072
52041000000	LAMARRE BARRY P	LAMARRE DEBORAH J	68 MAPLE ST	SACO	ME	4072
52046000000	BOUCHER RITA M		94 MAPLE ST	SACO	ME	04072-3130
52040001000	STEVA ERIC A	STEVA BARBARA J	37 WILDWOOD DR	SACO	ME	4072





Misc	Hydro
Condo	Bordering Towns
Easement/ROW	Private ROW
Hook	Railway

THIS MAP IS PREPARED FOR THE INVENTORY OF REAL PROPERTY WITHIN CITY OF SACO AND IS COMPILED FROM RECORDED DEEDS, PLATS, TAX MAPS, SURVEYS, PLANIMETRIC MAPS, AND OTHER PUBLIC RECORDS AND DATA. USERS OF THIS TAX MAP SHOULD BE AWARE THAT PRIMARY INFORMATION SOURCES SHOULD BE CONSULTED FOR VERIFICATION OF THE INFORMATION CONTAINED ON THIS MAP. THE CITY OF SACO ASSUMES NO LEGAL RESPONSIBILITY FOR THE INFORMATION CONTAINED HEREIN, BEYOND IT'S USE IN THE CITY'S ASSESSMENT FUNCTION.

N W E S

Map as of April 1, 2019

Scale: 1 inch = 100'

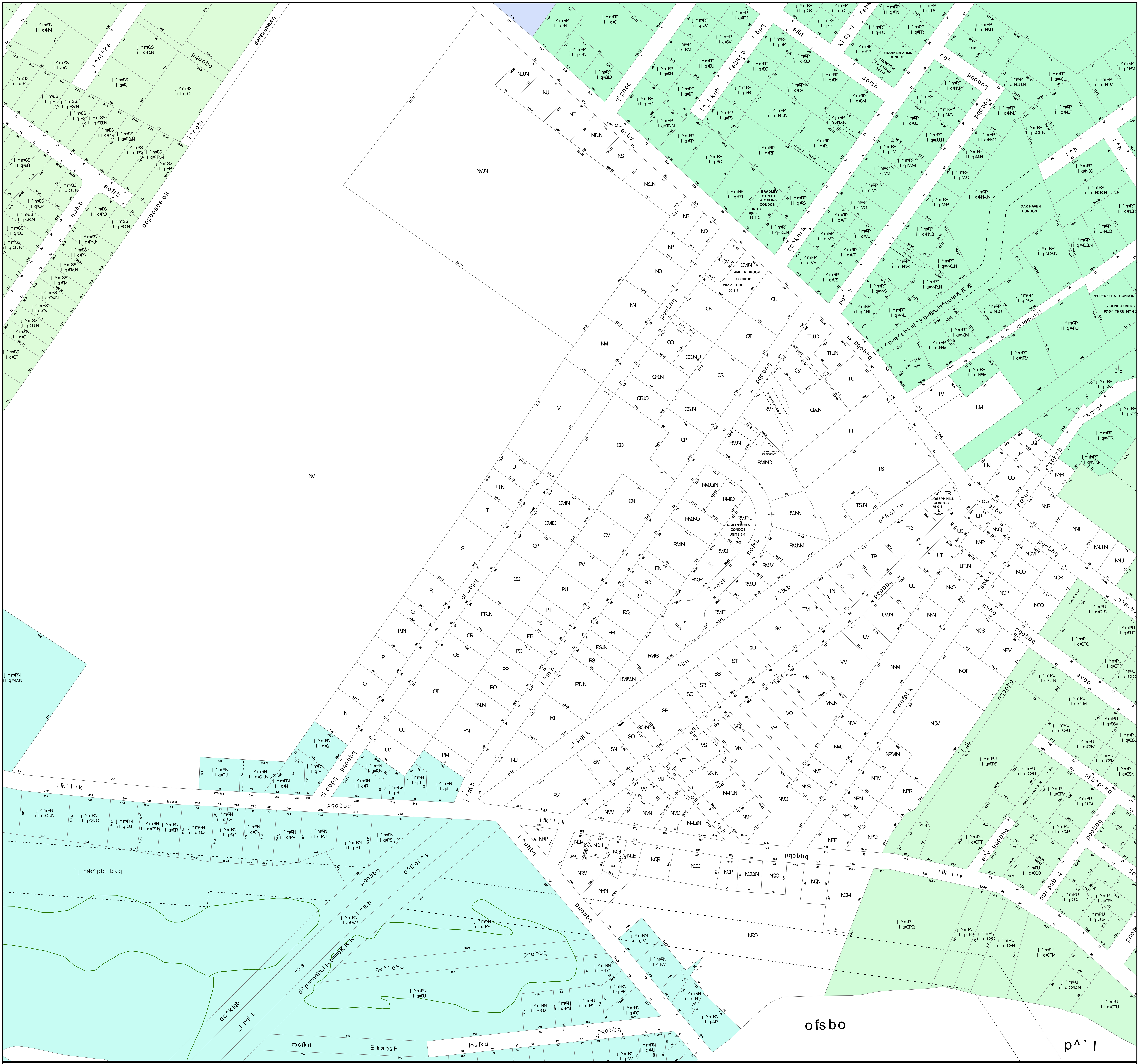
CITY OF SACO

YORK COUNTY, MAINE

100 0 100 200 300 400 Feet

Tax Map

Number 52



CITY OF SACO

YORK COUNTY, MAINE

Tax Map

Number 52

Map as of April 1, 2014

Scale: 1 inch = 100

ATTACHMENT 5

PROJECT NARRATIVE

TABLE OF CONTENTS

I. PROJECT DESCRIPTION 2
II. EXISTING CONDITIONS 3
III. EVIDENCE OF RIGHT, TITLE, AND INTEREST 4
IV. FINANCIAL AND TECHNICAL CAPACITY 4
V. STATE AND FEDERAL AGENCY REVIEWS 5
VI. PROPOSED SEQUENCING 8
VII. ZONING & LOT COVERAGE 9
VIII. OFF STREET PARKING 10
IX. SUBDIVISION OF LAND (CHAPTER 188) 12

Lincoln Village
Saco, ME
Narrative

I. PROJECT DESCRIPTION

321 Lincoln Street Development, LLC (applicant) has retained Gorrill Palmer to assist in the preparation of plans and permitting for the development of a proposed residential community located in Saco, Maine. The applicant is seeking review and approval for this proposed development.

Located between Lincoln and Bradley Street in Saco, ME, is ±56.70 acres of land proposed for development of a new mixed residential community. This project will include different housing options, recreational locations, and natural areas. The project is currently designed to accommodate 332 housing units through the construction of multifamily units, duplexes, and single-family homes. The breakdown of building types and number of units can be seen in the following table:

Unit Count		
	Buildings	Units
Single Family	12	12
Duplex	16	32
Multifamily Units	36	288
Total Proposed	64	332

Recreational areas and open spaces have been designed for residents of all ages (and uses):

- Two parks are centrally located within the project for passive and active recreational uses as well as a dog park for the residents.
- A fenced-in basketball court and playground area provides an active recreational area.
- Trailways spanning approximately 5,200 feet are proposed – including a mix of terrain between natural pathways in the woods and boardwalks over wetlands.

Due to the size and scope of the project, the development is anticipated to be constructed in multiple phases. Since the property is heavily forested and undeveloped, and the planned development area is approximately 30+ acres, infrastructure will need to occur in a sequence of working from the outside toward the center. A Construction Sequencing Plan is provided in Attachment 21 showing the intended construction of the site. In addition, notes have been added to the plan that are in line with the approved Traffic Movement Permit and City of Saco recommendations.

II. EXISTING CONDITIONS

TOPOGRAPHY

The topography and terrain for the planned development area varies in elevation from approximately 95 to 115 feet. For drainage purposes, the southern portion of the property conveys runoff to a series of streams and swales that drain south near Lincoln Street. The northern portion of the property generally drains to the central/eastern portion of the site to a tributary stream that conveys flow offsite and subsequently the Saco River. Most of the site contains slopes ranging from approximately 0.5% to 5%, and minimal area with steeper 30% slopes associated with the stream banks and existing quarry.

ENVIRONMENTAL CONSIDERATIONS

From a design standpoint, natural resource conservation and environmental protection are primary concerns. A focus on the conservation of large, contiguous natural areas, wildlife habitats, riparian corridors, buffers, and natural resource connectivity with the surrounding landscape were considered.

Wetlands

Wetlands were delineated by Flycatcher, LLC in September and October of 2021. The report dated November 4, 2021 can be found in Attachment 18. Vernal Pools were mapped by Power Engineers in September of 2018 and April & May of 2019. The accompanying report can also be found in Attachment 18. The defining natural features of the planned development area are the wetlands. Approximately 44,244 SF (1.02 AC) of forested wetlands are proposed to be filled for the project. Impacts within 25 ft of the stream crossing are non-jurisdictional for the NRPA application, therefore 41,434 sf is filed with the MaineDEP. Over 90% of the impacts are associated primarily with accessway development. Boardwalks connecting walking trails over wetland areas are proposed to minimize direct impacts. The NRPA Tier II Application, which has been approved by the Maine DEP and ACOE provides additional detail and information on proposed wetland fills.

Hydrology

The surface hydrology for the site is part of the Saco River Watershed. A series of delineated streams, natural swales and closed drainage systems convey surface flow to the Saco River. Appropriate buffers and setbacks are provided from the natural resource. There are no mapped significant groundwater aquifers present in this planned development.

High Intensity Soil Survey

A Class B High Intensity Soil Survey was conducted by Flycatcher, LLC in the winter of 2021/2022 and used to identify onsite soils. The proposed developed area is comprised of Hydrologic Soil Type B, C and D. A High Intensity Soil Survey Report dated February 10, 2022 and Test Pit Memorandum can be found in Attachment 12. A Medium Intensity Soil Survey for York County was used for the offsite locations surrounding the property to perform necessary runoff analysis calculations. Based on the soil report, it was determined that the on-site soils have moderate susceptibility to erosion. Specific erosion control measures are included in the project Erosion and Sedimentation Control Report included in Attachment 10.

III. EVIDENCE OF RIGHT, TITLE, AND INTEREST

Please see Attachment 2 for a copy of the Applicant's Deed.

IV. FINANCIAL AND TECHNICAL CAPACITY

The applicant has adequate funds to complete and operate this project in compliance with the applicable City/State regulations. A letter from Gorham Savings Bank, as well as additional information provided to the Board during preliminary deliberation, is included in Attachment 13 that demonstrates that the applicant has the financial capacity to complete the project.

In addition, a Certificate of Good Standing is included in Attachment 13. A preliminary estimate indicates the total site infrastructure project cost on the order of $17M. The Applicant understands a formal and itemized cost estimate will be required as a condition of approval for financial guarantee pursuant to Section 188-504 of the City Code.

321 Lincoln Street Development, LLC has retained a highly qualified team of professionals to undertake planning, permitting, and design tasks on this project. Services will be provided by the following firms:

The 321 Lincoln Village project consists of a partnership between Gravier Homes. Gravier Homes is a family-owned home builder business with more new homes built since 2011 than any other builders in Maine. Loni Gravier, President of Gravier Homes developed 96 market rate apartments in Cumberland Foreside Village, developed 72 market rate apartments in Westbrook, and developed 108 market rate apartments in Brunswick Landing. Gorrill Palmer has been contracted to prepare the required permit applications and development plans. Our firm has five Professional Engineers in the land development group with over 110 years of experience. We have successfully designed and permitted numerous residential and commercial projects since 1998, and our senior staff has permitted more than 10,000,000 SF of building area with agencies. Resumes are available upon request.

Below is a list of additional consultants and their responsibilities related to this project:

Firm	Services	Contact
Gorrill Palmer 300 Southborough Drive Suite 200 South Portland, ME 04106 207.772.2515	Civil Site & Traffic Engineering	Drew Gagnon, P.E. dgagnon@gorrillpalmer.com Randy Dunton, PTOE rdunton@gorrillpalmer.com
Flycatcher LLC 106 Lafayette Street, Suite 1C Yarmouth, ME 04096 207.217.0959	Wetland Delineation & HISS Mapping	Rich Jordan, (PWS/CPESC) rich@flycatcherllc.com Rodney Kelshaw, (CWB/CPSS/PWS/CPESC/LSE/LSS) rodney@flycatcherllc.com

Power Engineers 303 U.S. Route One Freeport, ME 04032 207.869.1200	Vernal Pool Surveys	Cole Peters, Professional Wetland Scientist cole.peters@powereng.com Mike Banaitis, (PWS/CPESC) mike.banaitis@powereng.com
Owen Haskell 390 US Route 1, Unit 10 Falmouth, ME 04105 207.774.0424	Surveyor	Randy Loubier, PLS rloubier@owenhaskell.com
Allied Engineering 160 Veranda Street Portland, ME 04103 207.221.2260	Electrical Engineering	Cathy Faucher, P.E. cfaucher@allied-eng.com
Long Meadow Planning & Landscape Architecture, LLC 207.604.4245	Landscape Architect	Christopher DiMatteo cdimatteo@longmeadowpla.com

After construction, the project will be managed and maintained by the applicant, 321 Lincoln Street Development, LLC. Further, future homeowners and property owners, associations will be established to manage aspects of the development that are not the responsibility of the town or public utilities. Based on the above, 321 Lincoln Street Development, LLC and the above subconsultants have the technical capacity to complete the proposed project.

V. STATE AND FEDERAL AGENCY REVIEWS

Under the Site Location of Development Law (SLODA) (38 M.R.S.A §481-490) instituted by the Maine Department of Environmental Protection, a project creating more than 3 acres of impervious area or 20 acres of more of developed area, will require a Site Law permit from the Department. The City of Saco has been delegated the authority to review developments needing approval under Title 38 M.R.S.A. §§ 420 and 481 through 500 by the Maine Department of Environmental Protection. The Applicant has worked with the City Planner, City Engineer and MaineDEP for delegated review.

The proposed wetland fills of approximately 44,244 sf (41,434 sf of NRPA jurisdictional fill) will require a Natural Resource Protection Act (NRPA) Tier II permit and an Army Corp General Permit. The Applicant has received these two permits and copies of the approvals have been submitted to the City previously. The below provides additional information and outreach with various state and federal agencies.

The proposed development will also trigger a MaineDOT Traffic Movement Permit for the creation of 100-200 trip ends in the peak hour. This Traffic Movement Permit is in draft form and will be provided to the City upon receipt.

Habitat

Related to the natural resources mentioned above is an overview of significant wildlife habitats. The following entities were contacted for information on potential wildlife that could be impacted by the project:

- Maine Natural Areas Program
- Maine Department of Inland Fisheries and Wildlife
- United States Department of the Interior Fish and Wildlife Service

The Maine Natural Areas Program stated that, "According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area."

The Maine Department of Inland Fisheries and Wildlife wrote, "Our Department has not mapped any Essential Habitats that would be directly affected by your project." They also noted several of the eight species of bats that occur in Maine likely are in the project location during migration and/or breeding season, though the project is not anticipated to significantly impact the species of bats. There was an amendment to the February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLED). On April 3, 2023 the IPaC system was used to check against this amendment. The Consistency and other information can be seen in Attachment 6. In addition, MDIFW Significant Wildlife Habitat (SWH) maps indicated there is no known presence of SWHs under protection by the Natural Resources Protection Act. Lastly, a 100-foot undisturbed vegetated buffer is recommended to be maintained along streams."

The United States Department of the Interior Fish and Wildlife Service provided an Official Species List for the approximate location of the site. For mammals, the Northern Long-eared Bat *Myotis septentrionalis* was named but no critical habitat was designated for the species. For insects, the Monarch Butterfly *Danaus plexippus* was listed but again, no critical habitat was designated for the species.

The correspondence for these entities can be found in Attachments 6.

In addition, and based on Abutter/City comments, the development team has located American Chestnut trees on the property. The Maine Natural Areas Program has classified this species as of *special concern.* Particular attention was given to the areas in which they reside. In effort to mitigate potential disturbances to the American Chestnuts, design efforts were taken to avoid the trees to the greatest extent practical, all while avoiding major impacts to other natural areas and neighborhood flow. Majority of this species of tree on the property are in the proposed park area. Maintaining the natural grading of this location with minimal slope alterations, allows for the trees to remain untouched. Selective cutting in the area will also open space for growth of the American Chestnuts. In addition, a tree protection plan has been provided in Attachment 22. This protection plan has been developed by the project's landscape architect and consulting arborist Jeff Tarling.

Other locations of these plants are outside the planned development window, thus remaining in their current state. Locations where these trees are impacted remain minimal with notes to relocate the plant if possible are included on the plans.

Historic Correspondence

To preserve local significant history and to comply with Site Law regulations, informational request letters were sent to the following sources:

- Maine Historic Preservation Commission
- Maine Tribal Historic Offices
  - Passamaquoddy Tribe of Indians
  - Houlton Band of Maliseet Indians
  - Penobscot Nation
  - Mi'kmaq Nation

Representatives from the above list were asked to provide cultural and historical insight within their areas of expertise relative to the planned location of the project. There were no raised concerns, though responses were received with requests to be notified immediately if cultural or historical material is discovered. Please refer to Attachment 6 for the correspondence between the previously mentioned sources.

TRAFFIC IMPACTS AND ANALYSIS

Lincoln Village is a 332-unit mixed residential development consisting of 12 single family homes, 32 duplex units and 288 low rise multi-family units on a +/- 56 acre parcel located between Lincoln Street and Bradley Street in Saco, ME. The proposed project is forecast to generate 138 and 176 trip ends during the AM and PM peak hours of adjacent street traffic respectively and 147 trip ends during the Saturday peak hour. The development is forecast to generate 162 trips and 196 trips ends in the AM and PM peak hours of the generator, respectively. The trip generation was calculated utilizing the Institute of Transportation Engineers' (ITE) publication, *Trip Generation*, Eleventh Edition, the most recent edition accepted by the MaineDOT.

The Applicant, design team, City of Saco, City Peer Reviewer, and MaineDOT attended a TMP Scoping Meeting on June 9th, 2022 for the proposed project. Members of the public were in attendance as well. Based on discussions at that Scoping Meeting, a Traffic Impact Study (TIS).

The study area for the TIS included the following intersections:

- Garfield Street / North Street (Rt 112) (unsignalized)
- Garfield Street / Bradley Street (unsignalized)
- North Street (Rt 112) / Industrial Park Road (signalized)
- Tasker Street / North Street (Rt 112) (unsignalized)
- Tasker Street / Bradley Street (unsignalized)
- Market Street / Lincoln Street / Maple Street (unsignalized)
- Site Driveway / Lincoln Street (unsignalized)
- Site Driveway / Bradley Street (unsignalized)

Based on review by the MaineDOT, City of Saco, and third party reviewers, the following mitigation is proposed for this development:

- Construction of offsite sidewalks along Bradley Street with updated pedestrian crossings and ADA improvements
- Construction of offsite sidewalks along Lincoln Street with updated pedestrian crossings and ADA improvements
- Construction of crosswalks, radii revisions and ADA improvements to Maple Street and Lincoln Street intersection.
- Installation of two speed radar feedback signs for both eastbound and westbound traffic on Bradley Street
- Contribute an $8,000 traffic calming impact fee to Bradley Street
- Signalization of Franklin & North Street and updated geometric improvements
- Upgrades to existing flashing beacon at Bradley Street and Spring Street intersection
- Contribute additional safety impact fees along Route 1 and Route 112.
- Develop an additional traffic study at Industrial Parkway and North Street intersection subsequent to the I95 interchange.

The Traffic Movement Permit is in draft form and a copy of the executed permit will be provided to the City upon receipt. The approved Traffic Impact Study is also provided in Attachment 14.

VI. PROPOSED SEQUENCING

As previously mentioned, this project will develop residential buildings, recreational areas, and natural areas. The buildings will be a mix between Single Family, Duplexes, and multi-family buildings. Roadways, sidewalks, trails, and utilities will be constructed to meet community needs. Based on the overall size of the proposed development, construction is anticipated to be completed in phases. The general construction sequencing pattern will work from the outside of the parcel in (off Bradley Street and Lincoln Street). A construction sequencing plan is provided in Attachment 21 of this application. The Applicant is requesting the entire project be approved under one approval.

Based on discussions with City Staff, the Applicant is committed to constructing the private access drive completely through the site (from Lincoln to Bradley), subsequent to the 66th building occupancy issued. This sequencing is in line with the approved Traffic Movement Permit. It is important to the development that certificate of occupancies are permitted in the early portions of construction, while the access drive is under construction.

Covered garages as shown throughout the plans, for use by the residents of the multi-family buildings. The Applicant reserves the right for the garages to be replaced with surface parking based on market conditions. The garages have been shown on the plans and designed for turning movements and stormwater management as they are the most conservative option from a developed and impervious area standpoint.

VII. ZONING & LOT COVERAGE

The location of the site is in the Residential District and is further classified as the Medium Density Residential District (MDR). MDR Zone permits uses of single-family and two-family dwellings. Multi-family dwellings (3 to 8 units) are a conditional use. The Applicant applied for a conditional use approval as part of this development application and was granted approval on June 29th, 2023.

Lot lines with dimensions and zoning setback lines can be found in the provided plan set. The overall lot area of the site is approximately 56.70 acres. The anticipated amount of land to be covered by buildings and accessory structures (lot coverage) for this proposed site is 12%, which is less than the zoning maximum of 35%. Additional Space and Bulk standards are shown in the attached plan set, and provided below for ease of review:

	Required	Provided
MIN. LOT SIZE (SEWERED) (SF)	7,500	56+ AC
MIN. LOT AREA/DWELLING UNIT (SEWERED) (SF)	5,000	5,637
MIN. LOT FRONTAGE (FT)	75	370
MIN. YARD SETBACKS (FT)		
FRONT	25	25+
SIDE	10	10+
REAR	10	10+
MAX. LOT COVERAGE	35%	12%
MAX. BUILDING HEIGHT (FT)	35	<35

The below table shows the net residential density allowed on the site in accordance with Section 230-402.D in the Zoning Ordinance:

Number of Dwelling Units Calculations: MDR Zone		
Total Parcel Acreage within the MDR Zone	56.68 ac	
Unusable Land (per Chapter 230-402. Dimensional Requirements, of City Zoning Ordinance)		
	Areas with sustained slope of 33% or more. Slope areas 20-33% shall be deducted unless demonstrated to planning board's satisfaction	0.43 AC
	Wetlands	13.26 AC
	Stream Channels	0.02 AC
	Areas that are, because of existing land uses of access, isolated and unavailable for building purposes for use in common with the remainder of the parcel	0 AC
	Areas within Zone V or VE and Coastal Floor w/ velocity hazard, a floodway or a 100-yr flood hazard area	0 AC
	Unusable land Subtotal	13.71 AC
Total Net Residential Acreage		42.97 AC
Net residential Density Factor		5,000 SF/ dwelling unit
Maximum # of Dwelling Units		374 Units
Proposed # of Dwelling Units		332 Units

As can be seen in the table above, the proposed number of dwelling units for Lincoln Village is less than the allowable maximum number of dwelling units according to the net residential density.

VIII. OFF STREET PARKING

General Conformance

A total of 720 parking spots have been provided, 36 of which are accessible spots. Parking on site complies with the off street parking requirements set forth in Article X, Table 10-1. A parking summary table is provided on the included plan set, and below for reference:

Parking Summary			
	Units	**Required**	**Provided**
Single Family (2 spaces/1 unit)	12	24	24
Duplex (two-family) (2 spaces/1 unit)	32	64	64
Multi-family (2 spaces/ 2-bedroom unit)	288	576	580
Guest Parking (1 space/6 units)	288	48	52
Accessible Spaces		15	36
Total		712	720

Parking areas are proposed throughout the site of the project and have been strategically located near building entrances for convenience. Larger parking areas are generalized near the multifamily units with sidewalk access.

Parking Design

A) Dimensions: All proposed parking spots are at least 9 feet in width and 18 feet in length, with accessible parking meeting the requirements set forth in ANSI 117.1.A. Drive aisles are 24 ft in width in accordance with Section 230-1002.A.

B) Handicap: 36 accessible spots were designed at 9 feet width and 18 feet length with an apron of either 5- or 8-feet width, meeting the requirements set forth in ANSI 117.1.A.

C) Pavement: Parking areas will be paved and graded to provide stormwater drainage.

D) Visual Obstructions and Internal Walkways: All driveway entrances and exits are proposed to be free from visual obstructions higher than three feet above street level for a distance greater than 15 feet.

E) Lighting: Artificial lighting has been arranged so that no direct rays from the proposed parking areas fall upon neighboring properties. Please see Photometrics Plan enclosed with this application.

F) Buffers: All parking spaces and access drives are set back a minimum of 5 feet from side and rear lot lines and the dimensional requirements have been met.

G) Landscaping: Grade changes in parking areas consist of a relatively similar appearance with those of neighboring developed areas. Since the site is in the Residential District, it will remain landscaped with the existing vegetation along the borders of abutting properties to maintain minimal disturbances and provide a separation between residential lots. Additional landscaping is provided along these locations, specifically near Forest Street, in effort to provide additional buffering near parking areas. Please see landscaping plans provided in this application.

H) The total proposed parking areas exceed 10,000 sf in size. Section 230-1001.F.2 of the Zoning Ordinance states that these parking lots shall include 10% internal landscaping. The development has exceeded this goal at over 11%. The landscaped islands are a minimum of 9 ft in width and exceed 75 sf in area. Shade trees over 2 ½ inches in caliper have been provided throughout the parking fields. Please see landscaping plans included with this Application.

I) Shared Parking: The proposed parking lots are intended to serve the residents and guests of Lincoln Village only. There are no proposed off-site parking spaces associated with this development.

J) Parking Lot Interconnections: Parking Lots are connected via access roads and drive aisles throughout the site.

<u>The following Sections of this Narrative review Subdivision Approval Criteria according to the Chapter 188 of City Code.</u>

IX. <u>SUBDIVISION OF LAND (CHAPTER 188)</u>

<u>ARTICLE VI; §188-603 APPROVAL CRITERA</u>

A *Pollution. The proposed subdivision will not result in undue water or air pollution. In making this determination, the Planning Board shall consider:*

(1) The elevation of the land above sea level and its relation to the floodplain;
(2) The nature of soils and subsoils and their ability to adequately support waste disposal;
(3) The slope of the land and its effect on effluents;
(4) The availability of streams for disposal of effluents; and
(5) The applicable state and local health and water resource rules and regulations;

The residential use of the site is consistent with the abutting properties, which is not anticipated to result in undue air pollution. In addition, the Applicant is proposed connection to the public sewer system and groundwater infiltration is not proposed as part of the Stormwater Management Plan. Please refer to the Stormwater Management Report and Erosion and Sedimentation Control Report, Attachments 7 and 10 respectively, for appropriate mitigation. Given the above information, the project is not anticipated to result in under water or air pollution.

B. *Sufficient water. The proposed subdivision has sufficient water available for the reasonably foreseeable needs of the subdivision;*

Please refer to Attachment 8 where a March 17, 2023, letter from Maine Water states, "Based on the criteria provided and the hydraulic analysis report from Tata & Howard running the Biddeford Saco Division hydraulic model, the expected increase in water usage is within the water system's available capacity."

C *Public water supply. The proposed subdivision will not cause an unreasonable burden on an existing water supply;*

Please refer to the response shown in B, directly above.

D. *Erosion. The proposed subdivision will not cause unreasonable soil erosion or a reduction in the land's capacity to hold water so that a dangerous or unhealthy condition results;*

The Stormwater Management Report and supporting calculations can be found in Attachment 7. This report includes an Operation and Maintenance manual and a Draft Maintenance Agreement. An Erosion and Sediment Control Plan will be implemented during and after construction in conformance with MaineDEP's Basic Standards. Erosion control BMP's and stormwater treatment and detention BMP's are shown on the site plans. We have prepared an Erosion & Sediment Control report which is included in Attachment 10. This Erosion and Sedimentation Control plan was reviewed and approved by the City's independent peer reviewer.

E. *Traffic. The proposed subdivision will not cause unreasonable highway or public road congestion or unsafe conditions with respect to the use of the highways or public roads existing or proposed;*

Please refer to Attachments 14, 15, and 16 for information regarding this standard. In addition, the MaineDOT has approved the Traffic Movement Permit for the development. A copy of this approval is included in this application. In addition, the development is responsible for performing the following offsite mitigation:

- Construction of offsite sidewalks along Bradley Street with updated pedestrian crossings and ADA improvements
- Construction of offsite sidewalks along Lincoln Street with updated pedestrian crossings and ADA improvements
- Construct crosswalk, turning movements and ADA improvements to Maple Street and Lincoln Street intersection.
- Installation of two speed radar feedback signs for both eastbound and westbound traffic on Bradley Street
- Contribute an $8,000 traffic calming impact fee to Bradley Street
- Signalization of Franklin & North Street and updated geometric improvements
- Upgrades to existing flashing beacon at Bradley Street and Spring Street intersection
- Contribute additional safety impact fees along Route 1 and Route 112.
- Develop an additional traffic study at Industrial Parkway and North Street intersection subsequent to the I95 interchange.

F. Sewage disposal. The proposed subdivision will provide for adequate sewage waste disposal and will not cause an unreasonable burden on the municipality;

The proposed project will connect to the public sanitary sewer system available in Lincoln Street and Bradley Street. Project Approval from the WRRD is provided in Attachment 8.

G. Municipal solid waste disposal. The proposed subdivision will not cause an unreasonable burden on the municipality's ability to dispose of solid waste;

All solid waste will be collected and disposed of in accordance with all applicable laws and regulations. Pine Tree Waste Inc. will facilitate all waste disposal needs for the facility. An ability to serve correspondence with Pine Tree Waste is provided in Attachment 9.

H. Aesthetic, cultural and natural values. The proposed subdivision will not have an undue adverse effect on the scenic or natural beauty of the area, aesthetics, historic sites, significant wildlife habitat, or rare and irreplaceable natural areas or any public rights for physical or visual access to the shoreline;

Wetlands and waterbodies at the site were delineated by Flycatcher LLC in the winter of 2021/2022. A wetland report that provides additional detail, mapping and methodology is provided in Attachment 18. Of the 56 total acre site, approximately 13.3 acres are existing wetlands. Wetland impacts were avoided and minimized to the extent practicable.

A stream crossing is proposed along the private main access drive. This crossing has been designed as an open bottom arch culvert which limits the disruption to the stream flow and habitat changes for the local wildlife. Between the stream crossings and other localized areas, the total unavoidable impacts equate to approximately 1.0 acre. Approximately 95% of the wetland impacts are associated with accessways and driveways. In addition, two vernal pools were identified on site by Power Engineers in 2019. The vernal pools were deemed non-significant by Bureau of Land Resources and the confirmation letter is also included in Attachment 18.

Undeveloped buffers will be retained for majority protected natural resources (e.g., wetlands, significant vernal pools, and streams) to the best extent practicable. Where project development within buffers is unavoidable, mitigation measures have been employed to minimize impacts. Retaining walls are proposed to be constructed to help the project minimize wetland fill from raising nearby grades to facilitate project infrastructure requirements.

The applicant is designing the project for undisturbed buffer areas for the two streams on site. For the stream in the east portion of the site, there is a 100-foot stream setback designated. The stream located in the southwest portion of the project has a 75-foot stream setback on the side with the new development, and a 125-foot stream setback on the opposite side. A 100-foot setback on the side with the new development would severely hinder the layout of the development. To prevent this, it is proposed to shift the setback 25-feet over to have 125-feet on the opposite side. This will help maintain the existed forested buffer between neighbors, allowing for the natural area to remain more intact.

A copy of the approved MaineDEP NRPA Tier II permit and ACOE permit are on file with the City.

The Applicant has corresponded with Maine Historical Preservation Authority, Maine Natural Areas Program and Maine Tribal Historic Offices including:

a. **Passamaquoddy Tribe of Indians**
b. **Houlton Band of Maliseet Indians**
c. **Penobscot Nation**
d. **Mi'kmaq Nation**

Additionally, please refer to the Landscaping Plans prepared by Long Meadow Planning and Landscape Architecture, LLC for a full list and proposed location of plants on site. In addition, trees and other existing natural flora will remain in the buffer area around the site, providing a softening between the abutters. Additionally, conformance with the zoning ordinance provisions is in the good neighbor standards and parking sections of this narrative. In addition, a landscaped management plan is included in Attachment 20.

Correspondences, including responses from the above offices are included in Attachment 6 of this submission. It was determined the proposed project would "not adversely affect historic properties" or "will not have impact on cultural and historical concerns" for the Tribes.

Based on discussion with the Planning Board at the June 29th meeting, 20% more trees have been added to the proposed landscaping plan. This is reflected on the submitted landscaping plan within the application.

I. *Conformity with local ordinances and plans. The proposed subdivision conforms with this chapter, the zoning ordinance[5] and the Comprehensive Plan;*

This narrative and additional application attachments are intended to show compliance with all ordinances, statutes and comprehensive plans for the Federal, State and Local Codes. It should be noted no waivers are requested for this development.

J. *Financial and technical capacity. The subdivider has adequate financial and technical capacity to meet the standards of this chapter;*

Please refer to section IV, Financial and Technical Capacity for information. The Applicant has demonstrated financial and technical capacity through the letters from Gorham Savings Bank, a revolving term sheet, and presentations from the Vice President of Gorham Savings Bank during preliminary subdivision deliberation.

K. *Surface waters. Whenever situated entirely or partially within the watershed of any pond or lake or within 250 feet of any wetland, great pond or river as defined in Title 38 M.R.S.A Chapter 3, Subchapter I, Article 2-B, the proposed subdivision will not adversely affect water quality or unreasonably affect the shoreline of that body of water.*

(1) When lots in a subdivision have frontage on an outstanding river segment, the proposed subdivision plan must require principal structures to have a combined lot shore frontage and setback from the normal high-water mark of 500 feet.

(a) To avoid circumventing the intent of this provision, whenever a proposed subdivision adjoins a shoreland strip narrower than 250 feet which is not lotted, the proposed subdivision shall be reviewed as if lot lines extended to the shore.

(b) The frontage and setback provisions of this section do not apply either within areas zoned as general development or its equivalent, as defined by Department of Environmental Protection Chapter 1000 Rules under Shoreland Zoning, Title 38 M.R.S.A Chapter 3, Subchapter I, Article 2-B, or within areas designated by ordinance as densely developed. The determination of which areas are densely developed must be based on a finding that existing development met the definitional requirements of Title 30-A M.R.S.A § 4401, Subsection 1, on September 23, 1983;

The proposed development meets these standards by providing the required setbacks which can be seen in Section VII. Zoning & Lot Coverage. In addition, the Applicant has an approved Tier 2 Wetland Fill permit from the MaineDEP and ACOE.

L. *Groundwater. The proposed subdivision will not adversely affect the quality or quantity of groundwater;*

The development is proposed to be served by public sewer and public water, therefore no wells or on site subsurface septic fields are proposed. The proposed stormwater treatment facilities are designed for filtration and detention, and not specifically for groundwater infiltration.

A High Intensity Soil Survey was completed by Flycatcher, LLC in the winter of 2021/2022. In addition, test pits were performed by Flycatcher, LLC in February 2021 to determine seasonal high groundwater elevations and stormwater facility design and investigations. Both reports and maps provided the design team with the necessary resources to site stormwater facilities and develop and erosion control plan based on the groundwater and soils on this site. In general, the seasonal high groundwater table was found within 24 inches of the existing grade of the lot. However, the elevations varied throughout the lot. Perforated underdrains are proposed throughout the site in cut areas to mitigate groundwater with roadway, building, stormwater ponds and parking lot design.

The mixed-residential use of the project, with a small amount of community office space are not anticipated to result in potential contamination of groundwater. The project also does not propose any activities that would degrade groundwater on the proposed development area. In addition, it is anticipated that the Applicant will store, for use or on-site, petroleum products, pesticides, herbicides, fertilizer, road salt, solvents, or acids, which would require the applicant to provide a groundwater protection plan in accordance with Maine DEP regulations.

The Applicant has reviewed the Maine Geological Survey and Sand and Gravel Aquifer Maps (included in Attachment 11), which indicate the project site is not located over a moderate to high yield groundwater aquifer.

M. Flood areas. The proposed subdivision plan must include a condition of plan approval requiring that principal structures in the subdivision will be constructed with their lowest floor, including the basement, in compliance with Chapter 106, Floodplain Management, of the City's ordinances.

The proposed development is not within a Flood Plain. Please see Attachment 11 for a copy of the FEMA map.

N. Freshwater wetlands. All freshwater wetlands within the proposed subdivision have been identified on maps submitted as part of the application, regardless of the size of these wetlands;

Wetlands were delineated by Flycatcher, LLC in September and October of 2021. The report dated November 4, 2021 can be found in Attachment 18. Vernal Pools were mapped by Power Engineers in September of 2018 and April & May of 2019. The accompanying report can also be found in Attachment 18. For additional information, please refer to section *II. Existing Conditions. The plan set submitted with this Application identifies the natrual resources.*

O. River, stream or brook. Any river, stream or brook within or abutting the proposed subdivision has been identified on maps submitted as part of the application. For purposes of this section, "river, stream or brook" has the same meaning as in Title 38 M.R.S.A § 480-B, Subsection 9;

The surface hydrology for the site is part of the Saco River Watershed. A series of delineated streams and natural swales convey surface flow to the Saco River. For additional information, please refer to section *II. Existing Conditions and the Plan Set. The plan set submitted with this Application identifies the natrual resources.*

P. Stormwater. The proposed subdivision will provide for adequate stormwater management;

The proposed development is located within the Saco River watershed. Given the size and creation of over 16 acres of impervious and 27 acres of impervious area, the proposed development will be required to meet Chapter 500 DEP standards for Water Quantity and Quality as well as City of Saco Stormwater and Erosion Control standards set forth in Section 188-803. A complete stormwater Management Report with supporting calculations and analyses is provided in Attachment 7.

To meet the Water Quality standards, 95% of the project's non-linear impervious area and 80% of the projects developed area are being treated by two gravel wetlands, nine grassed underdrain soil filters, four focal points and drip edge filtration systems. To meet the water quantity standard, the peak flow from 2, 10, 25 and 50-year storm events at the POIs have been reduced to be at or below predevelopment peak levels. Water Quality and Pre/Post Development Watershed Maps can be found in Attachment 7.

The proposed location of development does not fall under any watersheds designated by the Maine Department of Environmental Protection as an "urban impaired stream".

The Stormwater Management System Operation & Maintenance Manual (attached to the Erosion Control Report) provides detailed instructions regarding post construction maintenance of the stormwater facilities and conforms to the requirements set by the MaineDEP. A draft maintenance agreement in City of Saco format is also included within this manual. A small portion of the proposed untreated Single Family development area closest to Bradley Street is tributary to the Bradley Street storm drain system. As part of the drainage and stormwater analysis, the design team quantified the area and developed an approximate flow to analyze capacity within this system. Based on this analysis, the proposed flow to the basin just east of the access drive connection was approximately 62% of the total pipe capacity. It is Gorrill Palmer's opinion this additional flow is within capacity of the existing system. Calculations supporting this flow can be found at the end of the Stormwater Management Report in Attachment 7.

Q. Spaghetti lots prohibited. If any lots in the proposed subdivision have shore frontage on a river, stream, brook, great pond or coastal wetland as these features are defined in Title 38 M.R.S.A § 480-B, none of the lots created within the subdivision shall have a lot depth to shore frontage ratio greater than 5:1.

The proposed development does not have any spaghetti lots, therefore this standard is not applicable to the development.

R. Phosphorus concentration. The long-term cumulative effects of the proposed subdivision will not unreasonably increase a great pond's phosphorus concentration;

The proposed subdivision is not within a great pond's watershed. Please refer to the Stormwater Management Report in Attachment 7 for more information.

S. Impact on adjoining municipality. The proposed subdivision will not cause unreasonable traffic congestion or unsafe conditions.

Please refer to Traffic Impacts and Analysis section of this Narrative. Attachments 14, 15, and 16 contain additional information regarding this standard.

T. *Roads. All roads shall be designed in accordance with specifications contained in this chapter and all local ordinances.*

The development proposes the construction of private roads to serve the site. These private roads were designed in accordance with specifications contained in this chapter and all local ordinances for Private Roadways. Please refer to Attachments, 14, 15, and 16 for additional information regarding this standard.

ARTICLE VIII; INFRASTRUCTURE SPECIFICATIONS

The proposed subdivision will include the construction of a main private access drive connecting the existing Lincoln and Bradley Streets. A privately owned internal looped access drive is proposed to stem off this access drive to provide access throughout the project. Inclusive with the roadways are new utilities to service the units. These utilities consist of new electrical services, public water, sewer, natural gas, and fiberoptic infrastructure. The below standards provide additional detail related to utility and infrastructure in the project:

1) **Water Supply:** There are existing 8-inch watermains located along Lincoln and Bradley Street, providing public water via Maine Water to the surrounding residents. The proposed development will include a 12-inch watermain along the main access way. Per request from Maine Water, the development proposes to connect the Bradley Street and Lincoln Street watermains, providing additional water pressure, redundancy, and network connections for the surrounding community. A full hydraulic analysis was performed by Tata & Howard (MWC's consultant) showing the proposed development will not impact fire demand for the neighboring community. The remaining development will be provided water via services stemming from the proposed main. These services include domestic water and fire services to all units. Additional information and calculations are provided in the Ability to serve letter request within Attachment 8 of this application.

2) **Wastewater:** Sanitary Sewer is proposed to be served by the Water Resource Recovery Department (WRRD). The Applicant has worked closely with WRRD and City Engineer on the proposed sewer service and offsite sanitary improvements for approval. The conditional approval letter is included in Attachment 8.

   A new private sewer main is anticipated to be constructed via connections with existing infrastructure in both Lincoln and Bradley Street. An 8-inch sewer main exists in Lincoln Street with direct frontage to the project which conveys sanitary flow east along Lincoln Street. The project proposes an 8-inch private main connection into an existing sewer manhole. This existing manhole is identified as Manhole 1202.111 according to City of Saco GIS. This portion of the project will receive flow from 320 residential units.

On Bradley Street, an 8-inch main exists alongside the project's frontage. This sanitary main conveys sanitary flow southeast along Bradley Street. On the Northeastern side of the access drive, the project proposes connection to an existing 8-inch gravity sewer stub. This sewer stub is tributary to Manhole labeled 1037.114 according to City of Saco GIS. This portion of the project will only receive flow from 12 single family homes on site. Single-family house lots 9 through 12 will utilize a 2" low-pressure force main due to grading and elevation limitations. The force main will connect to the proposed gravity main and sequentially the existing gravity main on Bradley Street.

A pump station is proposed to serve 82 duplexes and multi-family units near the center of the parcel. It will handle approximately 15,930 gpd of average flow and 91,800 gpd at its peak. The proposed 6 ft diameter wet well will contain submersible duplex pumps. A 3-inch force main is proposed exiting the pump station to the valve pit, and subsequently to the terminus manhole near station 10+70 in the main access drive. The applicant is proposing a standby generator for the pump station.

Additionally, based on discussions with the City Engineer and the WRRD, it was determined that the proposed development would require the existing Sanitary pipe in Lincoln Street to be upgraded from 8 inch to 10 inch in diameter between Manhole ID 1202.111 and 1202.109. This is due to the proposed development utilizing nearly 57% of the 8-inch pipe capacity.

In total, the proposed development is anticipated to generate 61,420 gpd of average daily flow and 368,520 gpd of peak daily flow. Additional information and calculations are provided in the Ability to serve letter request within Attachment 8 of this application.

3) **Stormwater and Erosion Control:** The proposed development is located within the Saco River watershed. Given the size and creation of over 16 acres of impervious and 27 acres of impervious area, the proposed development will be required to meet Chapter 500 DEP standards for Water Quantity and Quality as well as City of Saco Stormwater and Erosion Control standards set forth in Section 188-803. A complete stormwater Management Report with supporting calculations and analyses is provided in Attachment 7 that has been reviewed and signed off by the City's peer reviewer. In addition, a complete Erosion Control Report with supporting calculations is provided in Attachment 10 of this submission. The below provides a brief introduction and overview of the proposed Stormwater Management System.

   To meet the Water Quality standards, 95% of the project's non-linear impervious area and 80% of the projects developed area are being treated by two gravel wetlands, nine grassed underdrain soil filters, four focal points and drip edge filtration systems. To meet the water quantity standard, the peak flow from 2, 10, 25, 50 and 100-year storm events at the POIs have been reduced to be at or below predevelopment peak levels. Water Quality and Pre/Post Development Watershed Maps can be found in Attachment 7.

   Stormwater was categorized between linear and non-linear areas. Linear areas referred to the impervious and pervious areas along the proposed main roadway and driveways. The "linear" portions of the project were treated at 75% of the impervious area and 50% of the developed area in accordance with Chapter 500 regulations. The proposed location of development does not fall under any watersheds designated by the Maine Department of Environmental Protection as an "urban impaired stream".

Temporary Sediment basins for use during construction were sized for a 10-year storm event and are shown in the attached plan set and sizing calculations are shown in Attachment 10 - Erosion and Sedimentation Control. Additional Erosion Control details, narratives and guidelines are shown in this section as well.

The Stormwater Management System Operation & Maintenance Manual (attached to the Erosion Control Report) provides detailed instructions regarding post construction maintenance of the stormwater facilities and conforms to the requirements set by the MaineDEP. A draft maintenance agreement in City of Saco format is also included within this manual.

A small portion of the proposed untreated Single Family development area closest to Bradley Street is tributary to the Bradley Street storm drain system. As part of the drainage and stormwater analysis, the design team quantified the area and developed an approximate flow to analyze capacity within this system. Based on this analysis, the proposed flow to the basin just east of the access drive connection was approximately 62% of the total pipe capacity. It is Gorrill Palmer's opinion this additional flow is within capacity of the existing system. Calculations supporting this flow can be found at the end of the Stormwater Management Report in Attachment 7.

4) **Cable Utilities:** New underground electrical service is anticipated to be extended from existing overhead electrical sources along Bradley Street and Lincoln Street. The transformer and junction box locations shown are preliminary, and the final locations will be coordinated with Central Maine Power during construction. The Applicant has discussed the proposed project with CMP and no initial concerns were raised by CMP.

   In addition, fiberoptic and cable service is proposed on site in the same trench as electrical conduit.

5) **Streetlighting:** The proposed access drives within the development will be privately owned and maintained. No new public roadways are proposed as part of this development. Street lighting has been provided along the private access drives as well as the connection locations along Bradley Street and Lincoln Street. Photometric and lighting plans are included in the plan set.

6) **Trees:** As described above, no public roadways are proposed as part of this project. Privately owned and maintained street trees have been incorporated into the landscaping design and additional details can be found in the attached plan set.

7) **Boundary Monuments:** The proposed project does not formally subdivide or create any new lots, therefore boundary monuments are not applicable.

X. CHAPTER 230 ZONING ORDINANCES

The following section outlines design conformance with zoning ordinances that have not been previously discussed.

ARTICLE IV; DIMENSIONAL STANDARDS

The dimensional standards with MDR zone have been reviewed and shown to be in compliance with the proposed development in Section VII "Zoning & Lot Coverage" of this narrative.

ARTICLE VI; GOOD NEIGHBOR PERFORMANCE STANDARDS

Section 602 Dust, Fumes, Vapors, and Gasses

It is not anticipated nor likely that the proposed development would generate significant amounts of emission of dust, dirt, fly ash, fumes, vapors, or gases, which could damage human health, animals, vegetation, or property, or which could soil or stain persons or property, at any point beyond the lot line of the establishment. The proposed Erosion and Sedimentation Control report, provided in Attachment 10 of this submission, provides standards that must be followed by the contractor and Applicant for land disturbance.

Section 603 Explosive Materials

The proposed development does not include the storage of explosive liquids, solids, or gases in bulk above ground or underground. If such materials must be stored on the premises, they will be stored in accordance with all applicable federal, state, and local regulations. Natural gas is proposed for the development of all the buildings, and therefore no freestanding propone tanks are proposed.

Section 604 Exterior Lighting

The proposed light pole locations throughout the site are shown on the Site/Utility and Lighting plans within the plan set. The proposed LED light fixtures are full cutoff and dark sky compliant. The maximum illuminance of the parking lots and access drives are 2.91 and 3.34 footcandles, respectively, which is less than the 8.0 footcandles maximum per this ordinance. A photometric plan, that has been approved by the City's peer review consultant, is provided by Allied Engineering and included in in the plan set submitted with this submission that shows compliance with the above-mentioned standards as well as uniformity ratios. Lighting fixture cut sheets is provided in Attachment 17.

Section 605 Noise

The potential sources of noise at the project site will consist of noise generated during construction of the project and typical residential noise generated by the residents. Construction activities during the hours of 7 am and 9 pm Monday through Saturday, and between 10 am and 7 pm on Sunday are exempt from the noise ordinance. It is not anticipated that the completed project will approach the sound pressure limits set by the City of Saco.

Since the adjacent land use is primarily residential buildings, a Greek Orthodox Church, and a podiatrist, it is anticipated that this residential development would not impact the surrounding area's noise limits.

Section 606 Odors

Given the nature of the proposed land use, the new residential community does not anticipate generating odors that are impactful or a nuisance on or off-site.

Section 607 Screening

The proposed development incorporates the natural landscape and preserves trees and grade changes to the extent practicable. The dumpster locations have been screened appropriately to provide buffering to the abutting neighbors. In addition, fenced dumpster enclosures are provided for screening. The City's landscaping peer review consultant has revised the buffering plan and noted it meets City Ordinances. A Landscape Plan has been prepared and is included in the plan set.

Section 608 Sanitary Waste Disposal

The proposed project will connect to the public sanitary sewer system available in Lincoln Street and Bradley Street. The Approved design from WRRD can be found in Attachment 8.

Section 609 Storage and Handling of Chemicals and Similar Materials

The proposed development does not include the storage of explosive liquids, solids, or gases in bulk above ground or underground.

Section 610 Water Quality

The property is serviced by public water and sewer. Stormwater management and water quality treatment efforts will not utilize infiltration-based design. The site has not been identified as a significant sand and gravel aquifer by Maine Geological Survey. A copy of these maps in included in Attachment 11. The High Intensity Soil Report prepared for the site is included in Attachment 12.

ARTICLE VII; PERFORMANCE STANDARDS

Discussion of the project's compliance with applicable Performance Standards of Article VII of the City of Saco Zoning Ordinance are noted below:

Section 230-720 Soil Suitability for Land Uses and Roads

Soil test pits have been conducted by Flycatcher, LLC for multiples purposes. The soils on site generally consisted of sand and sandy loam. The soil report finds that the limiting factors relative to the soils are high water table and depth to bedrock. The proposed private access drive is anticipated to consist mostly in fill, where the subbase material will be out of the seasonal high groundwater table. In cut areas, underdrains and perforated storm drain piping is proposed for groundwater relief. Where necessary, bed rock will be removed for the placement of the access drive gravels.

Section 230-723 Traffic and Highway Access

Driveway entrance locations are designed in accordance with City of Saco and MaineDOT standards. Sight distances on Lincoln Street and Bradley Street are per Table 7-3 minimum required distance for each speed in this ordinance section. The City of Saco, Peer review team and MaineDOT have reviewed this plan thoroughly and provided appropriate approvals.

ARTICLE IX; SIGNS

Approximate location of project signage are shown on the attached plan set. The Applicant will apply for a sign permit at a later date.

ARTICLE X; PARKING

The proposed development meets the parking requirements set forth in this Zoning Article. Detailed parking design and breakdown was included in Section VIII of this narrative.

ARTICLE XI; PRIVATE ROAD STANDARDS

The proposed main access drive through the site does not provide access to any formally subdivided lots due to this project being in a condominium configuration. The plan set included in this submission includes plan and profile views of the proposed access drive. The Applicant will coordinate the proposed name of the access drive with City Staff.

ARTICLE XII; STORMWATER & EROSION CONTROL STANDARDS

The proposed development meets the Stormwater and Erosion Control Standards set forth in this Zoning Article. Detailed analysis and discussion is presented in "Infrastructure Specifications" portion of this narrative and Attachment 7 and 10 of this submission.

ARTICLE XIV; CONDITIONAL USES

The City of Saco Planning Board approved the Conditional Use application for this project at the June 29th Planning Board Meeting.

ATTACHMENT 6

HISTORIC & NATURAL AREAS CORRESPONDENCES

ATTACHMENT 6

LETTER TO THE MAINE HISTORIC PRESERVATION COMMISSION AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Mr. Kirk Mohney
State Historic Preservation Officer
Maine Historic Preservation Commission
55 Capitol Street, State House Station 65
Augusta, ME 04333-0065

Subject: Presence of Historical Areas
Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Mr. Mohney,

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from your department relative to the presence of any nearby structure or area with historical, architectural or archeological significance as defined by the National Historic Preservation Act.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

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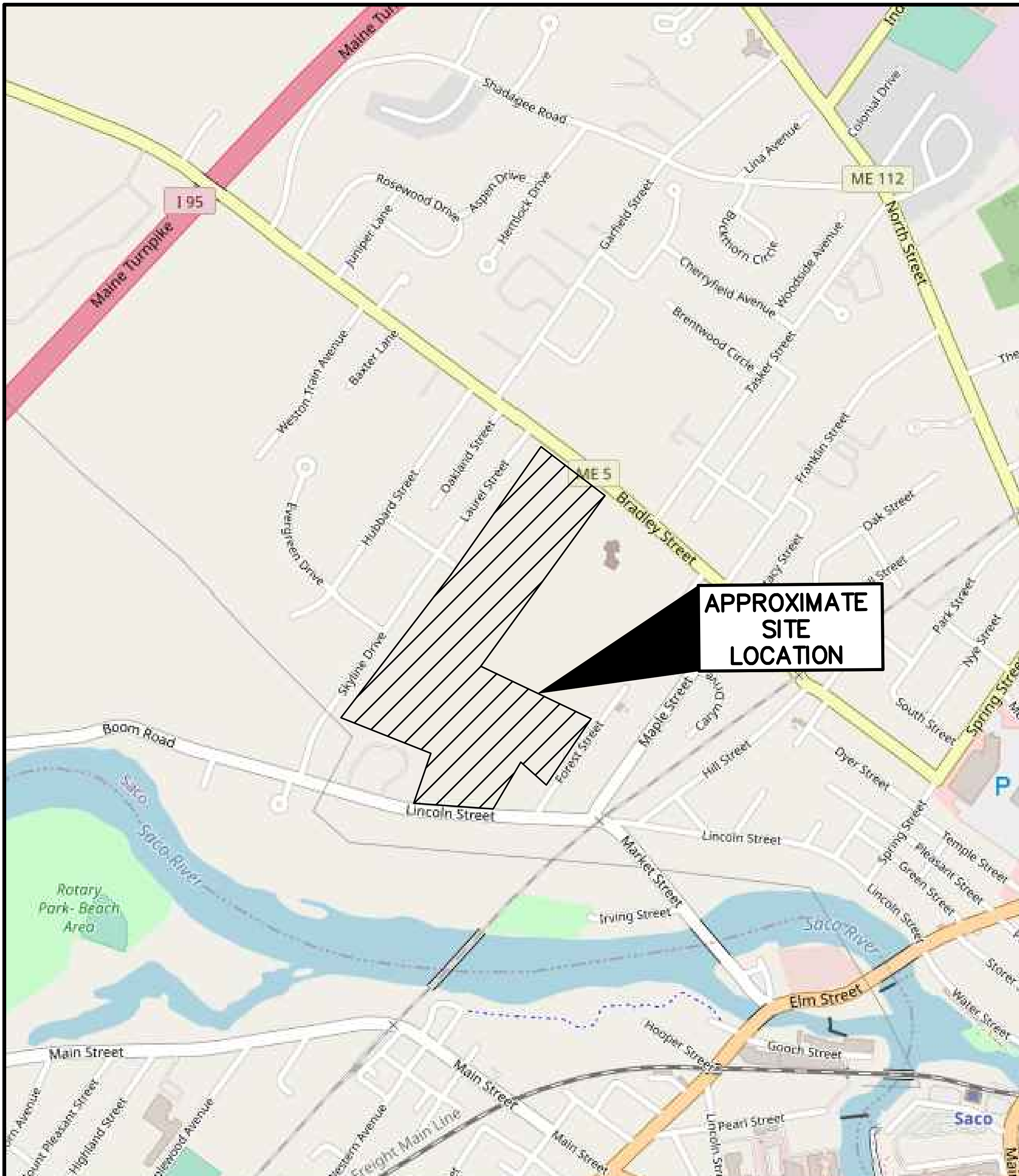

U.S.G.S. Location Map
321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021	GORRILL PALMER — Relationships. Responsiveness. Results. www.gorrillpalmer.com 207.772.2515	Figure 1
Draft: LEL	Job No.: 3831		
Checked: DJG	Scale: None		
File Name: USGS-LocMap 3831.dwg			

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

RECEIVED
SEP 23 2021
By 1617-21

Mr. Kirk Mohney
State Historic Preservation Officer
Maine Historic Preservation Commission
55 Capitol Street, State House Station 65
Augusta, ME 04333-0065

Subject: Presence of Historical Areas
Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Mr. Mohney,

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from your department relative to the presence of any nearby structure or area with historical, architectural or archeological significance as defined by the National Historic Preservation Act.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

As proposed, the project will not adversely affect historic properties. Pursuant to 800.5(c), if no consulting parties object to this finding within the 30-day review period, the project may proceed as proposed, unless resources are discovered during project implementation pursuant to 800.13

Kirk F. Mohney 9/30/21

Kirk F. Mohney,
State Historic Preservation Officer

Date

Enclosure

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ATTACHMENT 6

LETTER TO THE MAINE NATURAL AREAS PROGRAM AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Ms. Lisa St. Hilaire
Maine Natural Areas Program
93 State House Station
Augusta, ME 04333-0093

Subject: Endangered or Threatened Species
Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Lisa,

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from your department regarding the presence of any federally listed endangered or threatened species which might be impacted by this project.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

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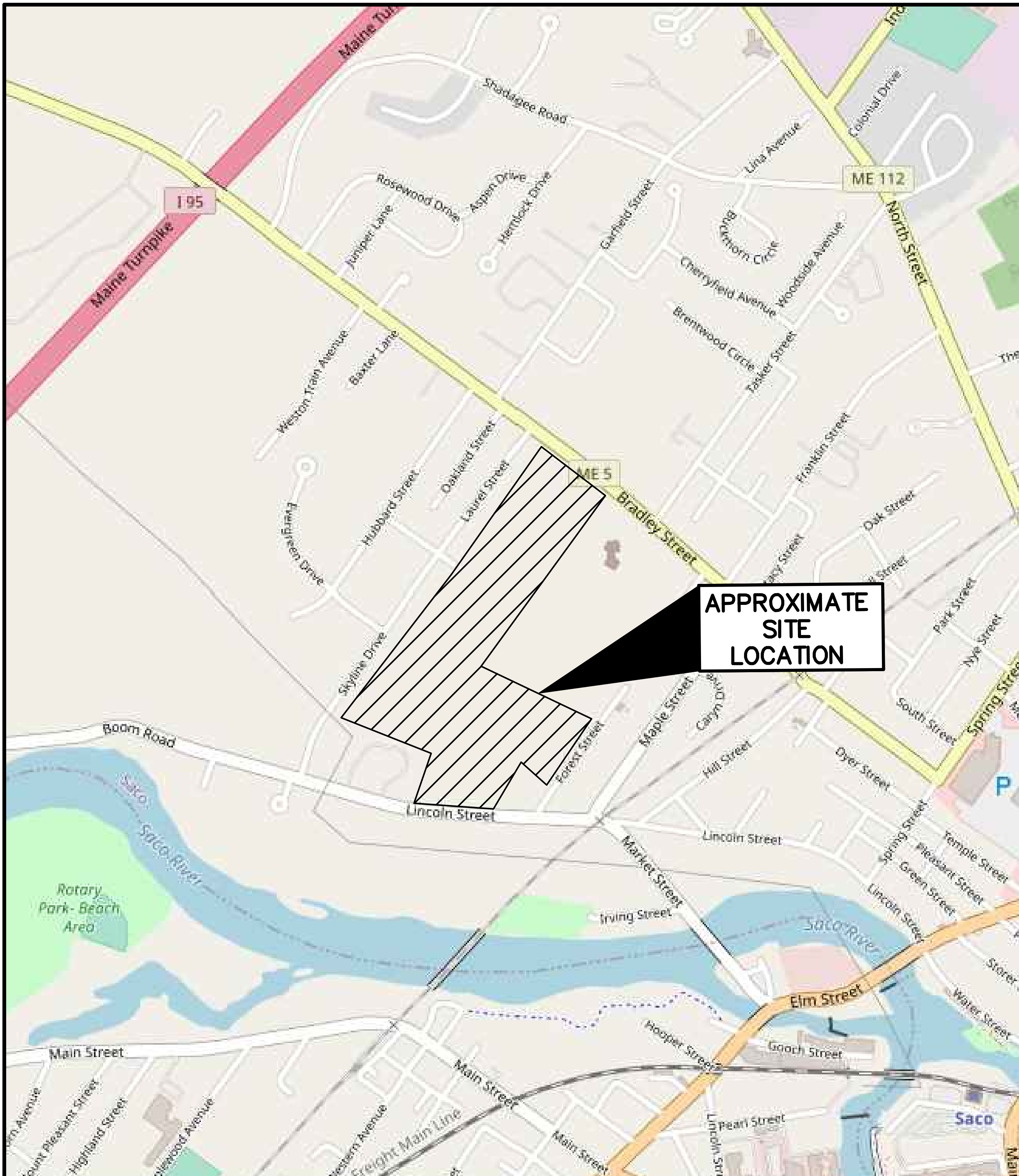

U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS-LocMap 3831.dwg	

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Figure 1

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
177 STATE HOUSE STATION
AUGUSTA, MAINE 04333

JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

September 27, 2021

Lauren Labbay
Gorrill Palmer
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

Via email: llabbay@gorrillpalmer.com

Re: Rare and exemplary botanical features in proximity to: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Dear Ms. Labbay:

I have searched the Maine Natural Areas Program's Biological and Conservation Data System files in response to your request received September 20, 2021 for information on the presence of rare or unique botanical features documented from the vicinity of the project in Saco, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

If a field survey of the project area is conducted, please refer to the enclosed supplemental information regarding rare and exemplary botanical features documented to occur in the vicinity of the project site. The list may include information on features that have been known to occur historically in the area as well as recently field-verified information. While historic records have not been documented in several years, they may persist in the area if suitable habitat exists. The enclosed list identifies features with potential to occur in the area, and it should be considered if you choose to conduct field surveys.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

MOLLY DOCHERTY, DIRECTOR
MAINE NATURAL AREAS PROGRAM
BLOSSOM LANE, DEERING BUILDING

PHONE: (207) 287-804490
WWW.MAINE.GOV/DACF/MNAP

The Maine Natural Areas Program (MNAP) is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. MNAP welcomes coordination with individuals or organizations proposing environmental alteration or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

The Maine Natural Areas Program has instituted a fee structure of $75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for $150.00 for two hours of our services.

Thank you for using MNAP in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,

Lisa St. Hilaire

Lisa St. Hilaire | Information Manager | Maine Natural Areas Program
207-287-8044 | lisa.st.hilaire@maine.gov

Rare and Exemplary Botanical Features within 4 miles of
Project: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Atlantic White Cedar						
	SC	S2	G4	2017-07-26	3	Forested wetland
Atlantic White Cedar Bog						
	<null>	S1	G3G4	2017-07-26	3	Forested wetland
Beach Plum						
	E	S1	G4	1932-09	12	Rocky coastal (non-forested, upland)
	E	S1	G4	1933-06-21	9	Rocky coastal (non-forested, upland)
Beach wormwood						
	SC	S1S2	G5T5	2011-10-28	6	<null>
Brackish Tidal Marsh						
	<null>	S3	GNR	2009-07-29	1	Tidal wetland (non-forested, wetland)
Butterfly Weed						
	PE	SX	G5	1986	1	Dry barrens (partly forested, upland)
Button Sedge						
	SC	S2	G5	1880-09-06	2	<null>
	SC	S2	G5	2017-07-26	5	<null>
Clothed Sedge						
	E	S1	G5	2006-06-07	7	Dry barrens (partly forested, upland)
	E	S1	G5	2006-06-16	8	Dry barrens (partly forested, upland)
Creeping Spike-moss						
	E	S2	G5	1920-07-30	6	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	E	S2	G5	1989-08-14	2	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)

Rare and Exemplary Botanical Features within 4 miles of
Project: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Dwarf Glasswort						
	SC	S1	G5	1981-09-16	2	Tidal wetland (non-forested, wetland)
Estuary Bur-marigold						
	SC	S3	G4	2009-07-30	35	Tidal wetland (non-forested, wetland)
Freshwater Tidal Marsh						
	<null>	S2	G4?	2009-07-30	1	Tidal wetland (non-forested, wetland)
Hollow Joe-pye Weed						
	SC	S2	G5?	1989-08-14	2	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	SC	S2	G5?	2013-09-01	23	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	SC	S2	G5?	1989-08-21	1	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
	SC	S2	G5?	1989-08-22	3	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
Horned Pondweed						
	SC	S2	G5	1907-08-18	10	Tidal wetland (non-forested, wetland)
	SC	S2	G5	2000-08-28	15	Tidal wetland (non-forested, wetland)
	SC	S2	G5	2007-07-05	19	Tidal wetland (non-forested, wetland)
Lilaeopsis						
	SC	S2	G5	2007-07-05	11	Tidal wetland (non-forested, wetland)
	SC	S2	G5	2007-08-14	12	Tidal wetland (non-forested, wetland)
	SC	S2	G5	2012-10-21	10	Tidal wetland (non-forested, wetland)
Long's Bulrush						
	T	S2	G3	2017-07-26	10	Open wetland, not coastal nor rivershore (non-forested, wetland)
Long-spined Sandbur						

Rare and Exemplary Botanical Features within 4 miles of
Project: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
	PE	SH	G5	1984	1	Rocky coastal (non-forested, upland)
Mudwort						
	SC	S3	G5	2009-07-30	35	Tidal wetland (non-forested, wetland)
Pale Green Orchis						
	SC	S2	G4?T4Q	2008-06-27	52	Non-tidal rivershore (non-forested, seasonally wet),Open wetland, not coastal nor rivershore (non-forested, wetland)
	SC	S2	G4?T4Q	2008-06-27	53	Non-tidal rivershore (non-forested, seasonally wet),Open wetland, not coastal nor rivershore (non-forested, wetland)
	SC	S2	G4?T4Q	2008-06-27	54	Non-tidal rivershore (non-forested, seasonally wet),Open wetland, not coastal nor rivershore (non-forested, wetland)
Parker's Pipewort						
	SC	S3	G3	2017-08-31	33	Tidal wetland (non-forested, wetland)
Pendulous Bulrush						
	SC	S2	G5	2008-06-28	8	Open wetland, not coastal nor rivershore (non-forested, wetland),Old field/roadside (non-forested, wetland or upland)
Pitch Pine Bog						
	<null>	S2	G3G5	2017-07-26	4	Forested wetland,Coastal non-tidal wetland (non-forested, wetland)
	<null>	S2	G3G5	2015-09-29	20	Forested wetland,Coastal non-tidal wetland (non-forested, wetland)
Pitch Pine Woodland						
	<null>	S3	G2	2016-08-09	30	Rocky summits and outcrops (non-forested, upland)
Pocket Swamp						
	<null>	S2	G5	2014-05-08	4	Forested wetland,Hardwood to mixed forest (forest, upland)
	<null>	S2	G5	2004	18	Forested wetland,Hardwood to mixed forest (forest, upland)
Pygmyweed						
	SC	S2S3	G5	2009-07-29	25	Open water (non-forested, wetland)

Rare and Exemplary Botanical Features within 4 miles of
Project: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
	SC	S2S3	G5	2007-07-05	28	Open water (non-forested, wetland)
Raised Level Bog Ecosystem						
	<null>	S4	GNR	2017-07-26	3	Forested wetland,Open wetland, not coastal nor rivershore (non-forested, wetland)
Red Maple Swamp						
	<null>	S5	G3G5	2007-06-05	17	Forested wetland
Salt-hay Saltmarsh						
	<null>	S3	G5	2010-10-14	12	Tidal wetland (non-forested, wetland)
Saltmarsh False-foxglove						
	SC	S3	G5	1982	12	Tidal wetland (non-forested, wetland)
	SC	S3	G5	1982	9	Tidal wetland (non-forested, wetland)
Schreber's Wood-aster						
	PE	SX	G4	1894-09	1	Rocky coastal (non-forested, upland)
Slender Blue Flag						
	T	S2	G4G5	1879-08	4	Tidal wetland (non-forested, wetland)
	T	S2	G4G5	1995-07-18	18	Tidal wetland (non-forested, wetland)
Small Reed Grass						
	SC	S3	G5	2006-08-08	14	Old field/roadside (non-forested, wetland or upland)
Smooth Winterberry Holly						
	SC	S3	G5	2012-10	44	Forested wetland
	SC	S3	G5	1979	13	Forested wetland
	SC	S3	G5	2018-09-15	24	Forested wetland
	SC	S3	G5	2009-07-05	39	Forested wetland
	SC	S3	G5	2004	36	Forested wetland

Rare and Exemplary Botanical Features within 4 miles of

Project: #3831, Mixed Residential Development, 321 Lincoln Street, Saco, Maine

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
Southern Slender Ladies'-tresses						
	PE	SH	G5T4T5	1918-08-27	1	Dry barrens (partly forested, upland)
Spongy-leaved Arrowhead						
	SC	S3	G5T4	2012-10-21	42	Tidal wetland (non-forested, wetland)
Stiff Arrowhead						
	SC	S2	G5	2006-06-16	15	Tidal wetland (non-forested, wetland)
Sweet Pepper-bush						
	SC	S2	G5	1917-09	9	Hardwood to mixed forest (forest, upland),Forested wetland
Tidal Marsh Estuary Ecosystem						
	<null>	S3	GNR	2010-10-14	4	Tidal wetland (non-forested, wetland)
Water Pimpernel						
	SC	S3	G5T5	2012-10-21	26	Tidal wetland (non-forested, wetland)
Yellow Wild Indigo						
	PE	SH	G5	1960-06-21	2	Dry barrens (partly forested, upland),Hardwood to mixed forest (forest, upland)

Conservation Status Ranks

State and Global Ranks: This ranking system facilitates a quick assessment of a species' or habitat type's rarity and is the primary tool used to develop conservation, protection, and restoration priorities for individual species and natural habitat types. Each species or habitat is assigned both a state (S) and global (G) rank on a scale of 1 to 5. Factors such as range extent, the number of occurrences, intensity of threats, etc., contribute to the assignment of state and global ranks. The definitions for state and global ranks are comparable but applied at different geographic scales; something that is state imperiled may be globally secure.

The information supporting these ranks is developed and maintained by the Maine Natural Areas Program (state ranks) and NatureServe (global ranks).

Rank	Definition
S1 **G1**	**Critically Imperiled** – At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
S2 **G2**	**Imperiled** – At high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3 **G3**	**Vulnerable** – At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4 **G4**	**Apparently Secure** – At fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5 **G5**	**Secure** – At very low risk or extinction or elimination due to a very extensive range, abundant populations or occurrences, and little to no concern from declines or threats.
SX **GX**	**Presumed Extinct** – Not located despite intensive searches and virtually no likelihood of rediscovery.
SH **GH**	**Possibly Extinct** – Known from only historical occurrences but still some hope of rediscovery.
S#S# **G#G#**	**Range Rank** – A numeric range rank (e.g., S2S3 or S1S3) is used to indicate any range of uncertainty about the status of the species or ecosystem.
SU **GU**	**Unrankable** – Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
GNR **SNR**	**Unranked** – Global or subnational conservation status not yet assessed.
SNA **GNA**	**Not Applicable** – A conservation status rank is not applicable because the species or ecosystem is not a suitable target for conservation activities (e.g., non-native species or ecosystems.
Qualifier	**Definition**
S#? **G#?**	**Inexact Numeric Rank** – Denotes inexact numeric rank.
Q	**Questionable taxonomy that may reduce conservation priority** – Distinctiveness of this entity as a taxon or ecosystem type at the current level is questionable. The "Q" modifier is only used at a global level.
T#	**Infraspecific Taxon (trinomial)** – The status of infraspecific taxa (subspecies or varieties) are indicated by a "T-rank" following the species' global rank.

State Status: Endangered and Threatened are legal status designations authorized by statute. Please refer to MRSA Title 12, §544 and §544-B.

Status	Definition
E	**Endangered** – Any native plant species in danger of extinction throughout all or a significant portion of its range within the State or Federally listed as Endangered.
T	**Threatened** – Any native plant species likely to become endangered within the foreseeable future throughout all or a significant portion of its range in the State or Federally listed as Threatened.
SC	**Special Concern** – A native plant species that is rare in the State, but not rare enough to be considered Threatened or Endangered.
PE	**Potentially Extirpated** – A native plant species that has not been documented in the State in over 20 years, or loss of the last known occurrence.

Element Occurrence (EO) Ranks: Quality assessments that designate viability of a population or integrity of habitat. These ranks are based on size, condition, and landscape context. Range ranks (e.g., AB, BC) and uncertainty ranks (e.g., B?) are allowed. The Maine Natural Areas Program tracks all occurrences of rare plants and natural communities/ecosystems (S1-S3) as well as exemplary common natural community types (S4-S5 with EO ranks A/B).

Rank	Definition
A	**Excellent** – Excellent estimated viability/ecological integrity.
B	**Good** – Good estimated viability/ecological integrity.
C	**Fair** – Fair estimated viability/ecological integrity.
D	**Poor** – Poor estimated viability/ecological integrity.
E	**Extant** – Verified extant, but viability/ecological integrity not assessed.
H	**Historical** – Lack of field information within past 20 years verifying continued existence of the occurrence, but not enough to document extirpation.
X	**Extirpated** – Documented loss of population/destruction of habitat.
U	**Unrankable** – Occurrence unable to be ranked due to lack of sufficient information (e.g., possible mistaken identification).
NR	**Not Ranked** – An occurrence rank has not been assigned.

Visit the Maine Natural Areas Program website for more information
http://www.maine.gov/dacf/mnap

ATTACHMENT 6

LETTER TO THE MAINE DEPARTMENT OF INLAND FISHERIES & WILDLIFE AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Mr. John Perry
Environmental Review Coordinator
Maine Dept. of Inland Fisheries & Wildlife
284 State Street
41 State House Station
Augusta, ME 04333-0041

Subject: Presence of Essential Habitat
Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Mr. Perry,

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from your department regarding any threatened, endangered, and special status wildlife or fisheries species and/or habitats, within the project area which might be impacted by this project.

Thank you for your consideration. If you have any questions regarding the proposed project, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

U:\3831_Helios_Mixed Residential Development - Lincoln & Bradley - Saco\L Environmental\Resource Letters\Maine Department of Inland Fisheries and Wildlife\Perry.doc

U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS-LocMap 3831.dwg	

GORRILL PALMER

Relationships. Responsiveness. Results.
www.gorrillpalmer.com
207.772.2515

Figure
1

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
353 WATER STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041

JANET T. MILLS
GOVERNOR

JUDITH CAMUSO
COMMISSIONER

December 7, 2021

Lauren Labbay
Gorrill-Palmer
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

RE: Information Request – 321 Lincoln Street Project, Saco

Dear Lauren:

Per your request received on September 20, 2021, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of Endangered, Threatened, and Special Concern species; designated Essential and Significant Wildlife Habitats; and inland fisheries habitat concerns within the vicinity of the *321 Lincoln Street* project in Saco.

Our Department has not mapped any Essential Habitats that would be directly affected by your project.

Endangered, Threatened, and Special Concern Species

Bat Species – Of the eight species of bats that occur in Maine, the three *Myotis* species are protected under Maine's Endangered Species Act (MESA) and are afforded special protection under 12 M.R.S §12801 - §12810. The three *Myotis* species include little brown bat (State Endangered), northern long-eared bat (State Endangered), and eastern small-footed bat (State Threatened). The five remaining bat species are listed as Special Concern: big brown bat, red bat, hoary bat, silver-haired bat, and tri-colored bat. While a comprehensive statewide inventory for bats has not been completed, based on historical evidence it is likely that several of these species occur within the project area during migration and/or the breeding season. However, our Agency does not anticipate significant impacts to any of the bat species as a result of this project.

Significant Wildlife Habitat

Significant Vernal Pools - At this time MDIFW Significant Wildlife Habitat (SWH) maps indicate no known presence of SWHs subject to protection under the Natural Resources Protection Act (NRPA) within the project area, which include Waterfowl and Wading Bird Habitats, Seabird Nesting Islands, Shorebird Areas, and Significant Vernal Pools. However, a comprehensive statewide inventory for Significant Vernal Pools has not been completed. Therefore, we recommend that surveys for vernal pools be conducted within the project boundary by qualified wetland scientists prior to final project design to determine whether there are Significant Vernal Pools present in the area. These surveys should extend up to 250 feet beyond the anticipated project footprint because of potential performance standard requirements for off-site Significant Vernal Pools, assuming such pools are located on land owned or controlled by the applicant. Once surveys are completed, survey forms should be submitted to our Agency for review well before the submission of any necessary permits. Our Department will need to review and verify any vernal pool data prior to final determination of significance.

Fisheries Habitat

We recommend that 100-foot undisturbed vegetated buffers be maintained along streams. Buffers should be measured from the edge of stream or associated fringe and floodplain wetlands. Maintaining and enhancing buffers along streams that support coldwater fisheries is critical to the protection of water temperatures, water quality, natural inputs of coarse woody debris, and various forms of aquatic life necessary to support conditions required by many fish species. Stream crossings should be avoided, but if a stream crossing is necessary, or an existing crossing needs to be modified, it should be designed to provide full fish passage. Small streams, including intermittent streams, can provide crucial rearing habitat, cold water for thermal refugia, and abundant food for juvenile salmonids on a seasonal basis and undersized crossings may inhibit these functions. Generally, MDIFW recommends that all new, modified, and replacement stream crossings be sized to span at least 1.2 times the bankfull width of the stream. In addition, we generally recommend that stream crossings be open bottomed (i.e. natural bottom), although embedded structures which are backfilled with representative streambed material have been shown to be effective in not only providing habitat connectivity for fish but also for other aquatic organisms. Construction Best Management Practices should be closely followed to avoid erosion, sedimentation, alteration of stream flow, and other impacts as eroding soils from construction activities can travel significant distances as well as transport other pollutants resulting in direct impacts to fish and fisheries habitat. In addition, we recommend that any necessary instream work occur between July 15 and October 1.

This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance we recommend additional consultation with the municipality, and other state resource agencies including the Maine Natural Areas Program, Maine Department of Marine Resources, and Maine Department of Environmental Protection in order to avoid unintended protected resource disturbance.

Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

Becca Settele
Wildlife Biologist

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JANET T. MILLS
GOVERNER

MELANIE LOYZIM
ACTING COMMISSIONER

February 2, 2022

Cole Peters
POWER Engineers
303 US Route One
Freeport, ME 04032

Re: Vernal Pool Significance Determination, Pool ID #s 4645, 4646–Saco

Dear Cole Peters:

Vernal pools are temporary to semi-permanent wetlands occurring in shallow depressions that typically fill during the spring and dry during the summer or in drought years. They provide important breeding and foraging habitat for a wide variety of specialized wildlife species including several rare, threatened, and endangered species.

Based on your field surveys, it has been determined that the vernal pools identified above on the property of Lucia Kimball Deering Tr. are NOT SIGNIFICANT because either: 1. the features do not meet the definition of a vernal pool under the Significant Wildlife Habitat rules, 06-096 CMR 335(9) or 2. the vernal pools do not meet the biological standards for exceptional wildlife use of the Significant Wildlife Habitat rules, 06-096 CMR 335(9)(B). Therefore, activities within 250 feet of the pools are not regulated under the Natural Resources Protection Act (NRPA) unless there are other protected natural resources nearby such as streams or freshwater wetlands. I have attached a copy of the database printout that verifies the State's findings with respect to your surveys.

I want to also advise you that the pool areas on the property can be considered freshwater wetlands and therefore direct pool alterations may require permitting under the NRPA.

The Department will notify the landowner of the pool status under separate cover. If you have any questions or need further clarification, please contact Mark Stebbins at 207-592-4810 or email at: Mark.N.Stebbins@maine.gov

Sincerely,

Nicholas D. Livesay, Director
Bureau of Land Resources

cc. town file

ATTACHMENT 6

RESPONSE FROM UNITED STATES DEPARTMENT OF THE INTERIOR FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588
http://www.fws.gov/mainefieldoffice/index.html

IPaC Record Locator: 355-105712839 September 16, 2021

Subject: Consistency letter for the 'Mixed Residential Development' project indicating that any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Dear Lauren Labbay:

The U.S. Fish and Wildlife Service (Service) received on September 16, 2021 your effects determination for the 'Mixed Residential Development' (the Action) using the northern long-eared bat (*Myotis septentrionalis*) key within the Information for Planning and Consultation (IPaC) system. You indicated that no Federal agencies are involved in funding or authorizing this Action. This IPaC key assists users in determining whether a non-Federal action may cause "take"[1] of the northern long-eared bat that is prohibited under the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 et seq.).

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o). Unless the Service advises you within 30 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Please report to our office any changes to the information about the Action that you entered into IPaC, the results of any bat surveys conducted in the Action area, and any dead, injured, or sick northern long-eared bats that are found during Action implementation.

If your Action proceeds as described and no additional information about the Action's effects on species protected under the ESA becomes available, no further coordination with the Service is required with respect to the northern long-eared bat.

The IPaC-assisted determination for the northern long-eared bat **does not** apply to the following ESA-protected species that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Candidate

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species listed above.

---

[1]Take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct [ESA Section 3(19)].

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Mixed Residential Development

2. Description

The following description was provided for the project 'Mixed Residential Development':

> Located between Lincoln & Bradley Street in Saco, Maine.

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.5056938,-70.46314152686595,14z

Determination Key Result

This non-Federal Action may affect the northern long-eared bat; however, any take of this species that may occur incidental to this Action is not prohibited under the final 4(d) rule at 50 CFR §17.40(o).

Determination Key Description: Northern Long-eared Bat 4(d) Rule
This key was last updated in IPaC on **May 15, 2017**. Keys are subject to periodic revision.

This key is intended for actions that may affect the threatened northern long-eared bat.

The purpose of the key for non-Federal actions is to assist determinations as to whether proposed actions are excepted from take prohibitions under the northern long-eared bat 4(d) rule.

If a non-Federal action may cause prohibited take of northern long-eared bats or other ESA-listed animal species, we recommend that you coordinate with the Service.

Determination Key Result

Based upon your IPaC submission, any take of the northern long-eared bat that may occur as a result of the Action is not prohibited under the ESA Section 4(d) rule adopted for this species at 50 CFR §17.40(o).

Qualification Interview

1. Is the action authorized, funded, or being carried out by a Federal agency?

   No

2. Will your activity purposefully **Take** northern long-eared bats?

   No

3. [Semantic] Is the project action area located wholly outside the White-nose Syndrome Zone?

   Automatically answered
   No

4. [Semantic] Is the project action area located within 0.25 miles of a known northern long-eared bat hibernaculum?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

   Automatically answered
   No

5. [Semantic] Is the project action area located within 150 feet of a known occupied northern long-eared bat maternity roost tree?

   Note: The map queried for this question contains proprietary information and cannot be displayed. If you need additional information, please contact your State wildlife agency

   Automatically answered
   No

Project Questionnaire

If the project includes forest conversion, report the appropriate acreages below. Otherwise, type '0' in questions 1-3.

1. Estimated total acres of forest conversion:

57

2. If known, estimated acres of forest conversion from April 1 to October 31

0

3. If known, estimated acres of forest conversion from June 1 to July 31

57

If the project includes timber harvest, report the appropriate acreages below. Otherwise, type '0' in questions 4-6.

4. Estimated total acres of timber harvest

57

5. If known, estimated acres of timber harvest from April 1 to October 31

0

6. If known, estimated acres of timber harvest from June 1 to July 31

57

If the project includes prescribed fire, report the appropriate acreages below. Otherwise, type '0' in questions 7-9.

7. Estimated total acres of prescribed fire

0

8. If known, estimated acres of prescribed fire from April 1 to October 31

0

9. If known, estimated acres of prescribed fire from June 1 to July 31

0

If the project includes new wind turbines, report the megawatts of wind capacity below. Otherwise, type '0' in question 10.

10. What is the estimated wind capacity (in megawatts) of the new turbine(s)?

0

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588
http://www.fws.gov/mainefieldoffice/index.html

In Reply Refer To: September 16, 2021
Consultation Code: 05E1ME00-2021-SLI-1763
Event Code: 05E1ME00-2021-E-05474
Project Name: Mixed Residential Development

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies the threatened, endangered, candidate, and proposed species and designated or proposed critical habitat that may occur within the boundary of your proposed project or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC Web site at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

This species list also identifies candidate species under review for listing and those species that the Service considers species of concern. Candidate species have no protection under the Act but are included for consideration because they could be listed prior to completion of your project. Species of concern are those taxa whose conservation status is of concern to the Service (i.e., species previously known as Category 2 candidates), but for which further information is needed.

If a proposed project may affect only candidate species or species of concern, you are not required to prepare a Biological Assessment or biological evaluation or to consult with the Service. However, the Service recommends minimizing effects to these species to prevent future conflicts. Therefore, if early evaluation indicates that a project will affect a candidate species or species of concern, you may wish to request technical assistance from this office to identify appropriate minimization measures.

Please be aware that bald and golden eagles are not protected under the Endangered Species Act but are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). Projects affecting these species may require development of an eagle conservation plan: http://www.fws.gov/windenergy/eagle_guidance.html Information on the location of bald eagle nests in Maine can be found on the Maine Field Office Web site: http://www.fws.gov/mainefieldoffice/Project%20review4.html

Additionally, wind energy projects should follow the wind energy guidelines: http://www.fws.gov/windenergy/ for minimizing impacts to migratory birds and bats. Projects may require development of an avian and bat protection plan.

Migratory birds are also a Service trust resource. Under the Migratory Bird Treaty Act, construction activities in grassland, wetland, stream, woodland, and other habitats that would result in the take of migratory birds, eggs, young, or active nests should be avoided. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm and at:

http://www.towerkill.com; and at:
http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

Project Summary

Consultation Code: 05E1ME00-2021-SLI-1763
Event Code: Some(05E1ME00-2021-E-05474)
Project Name: Mixed Residential Development
Project Type: DEVELOPMENT
Project Description: Located between Lincoln & Bradley Street in Saco, Maine.
Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.5056938,-70.46314152686595,14z

Counties: York County, Maine

Endangered Species Act Species

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Project information

NAME

Mixed Residential Development

LOCATION

York County, Maine

DESCRIPTION

Some(Located between Lincoln & Bradley Street in Saco, Maine.)

Local office

Maine Ecological Services Field Office

(207) 469-7300
(207) 902-1588

MAILING ADDRESS
P. O. Box A
East Orland, ME 04431

PHYSICAL ADDRESS
306 Hatchery Road
East Orland, ME 04431

http://www.fws.gov/mainefieldoffice/index.html

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Log in to IPaC.
2. Go to your My Projects list.
3. Click PROJECT HOME for this project.
4. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Northern Long-eared Bat *Myotis septentrionalis* | Threatened
Wherever found
No critical habitat has been designated for this species.
http://ecos.fws.gov/ecp/species/9045

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* Wherever found No critical habitat has been designated for this species. http://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
American Oystercatcher *Haematopus palliatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. http://ecos.fws.gov/ecp/species/8935	Breeds Apr 15 to Aug 31
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. http://ecos.fws.gov/ecp/species/1626	Breeds Oct 15 to Aug 31
Black Skimmer *Rynchops niger* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. http://ecos.fws.gov/ecp/species/5234	Breeds May 20 to Sep 15
Black-billed Cuckoo *Coccyzus erythropthalmus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. http://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10

Blue-winged Warbler Vermivora pinus | Breeds May 1 to Jun 30
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Bobolink Dolichonyx oryzivorus | Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Canada Warbler Cardellina canadensis | Breeds May 20 to Aug 10
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Eastern Whip-poor-will Antrostomus vociferus | Breeds May 1 to Aug 20
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Hudsonian Godwit Limosa haemastica | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Lesser Yellowlegs Tringa flavipes | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
http://ecos.fws.gov/ecp/species/9679

Prairie Warbler Dendroica discolor | Breeds May 1 to Jul 31
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Purple Sandpiper Calidris maritima | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Ruddy Turnstone Arenaria interpres morinella | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Rusty Blackbird Euphagus carolinus | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher Limnodromus griseus | Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
http://ecos.fws.gov/ecp/species/9480

Willet *Tringa semipalmata* Breeds Apr 20 to Aug 5

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Wood Thrush *Hylocichla mustelina* Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence ( )

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season ( )

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

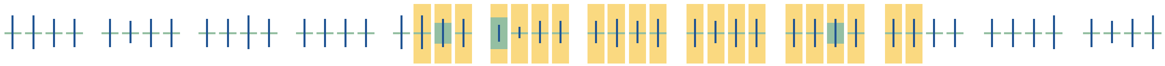
SPECIES

American Oystercatcher BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Bald Eagle Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

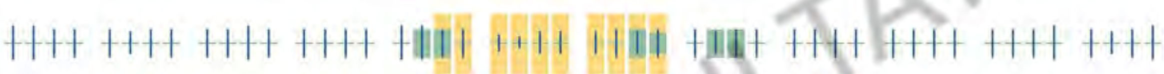
Black Skimmer BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Black-billed Cuckoo
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

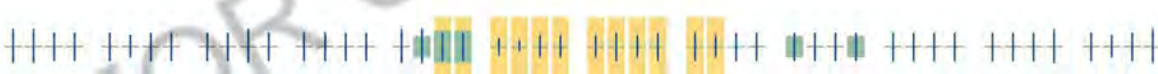


Blue-winged Warbler
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

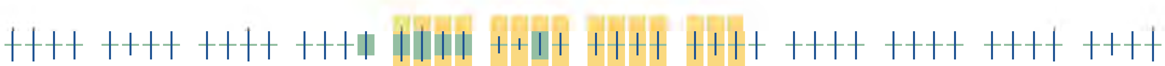
Bobolink
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Canada Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

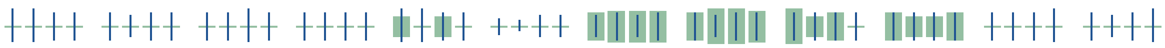


Eastern Whip-poor-will
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



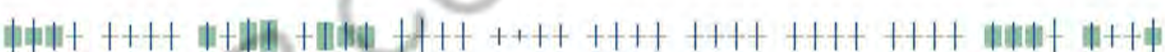
Hudsonian Godwit
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Lesser Yellowlegs
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Purple Sandpiper
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



SPECIES JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Ruddy Turnstone
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Rusty Blackbird
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Short-billed Dowitcher
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Willet
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Wood Thrush
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

FRESHWATER EMERGENT WETLAND

- PEM1C

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1C
- PSS1E

A full description for each wetland code can be found at the National Wetlands Inventory website

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

UPDATED IPAC CORRESPONDENCE FROM US FISH AND WILDLIFE SERVICE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588

In Reply Refer To: April 03, 2023
Project code: 2022-0079665
Project Name: Mixed Residential Development

Subject: Consistency letter for the 'Mixed Residential Development' project under the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (NLEB).

To whom it may concern:

The U.S. Fish and Wildlife Service (Service) has received your request dated April 03, 2023 to verify that the **Mixed Residential Development** (Proposed Action) may rely on the amended February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion Opinion (dated March 23, 2023) for Transportation Projects within the Range of the Indiana Bat and Northern Long-eared Bat (PBO) to satisfy requirements under section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat.884, as amended; 16 U.S.C. 1531 *et seq.*).

Based on the information you provided (Project Description shown below), you have determined that the Proposed Action will have <u>no effect</u> on the endangered Indiana bat (*Myotis sodalis*) or the endangered northern long-eared bat (*Myotis septentrionalis*). If the Proposed Action is not modified, **no consultation is required for these two species.** If the Proposed Action is modified, or new information reveals that it may affect the Indiana bat and/or northern long-eared bat in a manner or to an extent not considered in the PBO, further review to conclude the requirements of ESA section 7(a)(2) may be required.

For Proposed Actions that include bridge/culvert or structure removal, replacement, and/or maintenance activities: If your initial bridge/culvert or structure assessments failed to detect Indiana bats and/or NLEB use or occupancy, yet later detected prior to, or during construction, please submit the Post Assessment Discovery of Bats at Bridge/Culvert or Structure Form (User Guide Appendix E) to this Service Office within 2 working days of the incident. In these instances, potential incidental take of Indiana bats and/or NLEBs may be exempted provided that the take is reported to the Service.

If the Proposed Action may affect any other federally-listed or proposed species and/or designated critical habitat, additional consultation between the lead Federal action agency and this Service Office is required. If the proposed action has the potential to take bald or golden eagles, additional coordination with the Service under the Bald and Golden Eagle Protection Act may also be required. In either of these circumstances, please advise the lead Federal action agency accordingly.

The following species may occur in your project area and **are not** covered by this determination:

- Monarch Butterfly *Danaus plexippus* Candidate

PROJECT DESCRIPTION

The following project name and description was collected in IPaC as part of the endangered species review process.

NAME

Mixed Residential Development

DESCRIPTION

Located between Lincoln & Bradley Street in Saco, Maine.

DETERMINATION KEY RESULT

Based on the information you provided, you have determined that the Proposed Action will have no effect on the endangered Indiana bat and/or the endangered northern long-eared bat. Therefore, no consultation with the U.S. Fish and Wildlife Service pursuant to Section 7(a)(2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended 16 U.S.C. 1531 *et seq.*) is required for these two species.

QUALIFICATION INTERVIEW

1. Is the project within the range of the Indiana bat[1]?

   [1] See Indiana bat species profile

   Automatically answered
   No

2. Is the project within the range of the northern long-eared bat[1]?

   [1] See northern long-eared bat species profile

   Automatically answered
   Yes

3. [Semantic] Does your proposed action intersect an area where Indiana bats and northern long-eared bats are not likely to occur?

   Automatically answered
   Yes

DETERMINATION KEY DESCRIPTION: FHWA, FRA, FTA PROGRAMMATIC CONSULTATION FOR TRANSPORTATION PROJECTS AFFECTING NLEB OR INDIANA BAT

This key was last updated in IPaC on March 30, 2023. Keys are subject to periodic revision.

This decision key is intended for projects/activities funded or authorized by the Federal Highway Administration (FHWA), Federal Railroad Administration (FRA), and/or Federal Transit Administration (FTA), which may require consultation with the U.S. Fish and Wildlife Service (Service) under Section 7 of the Endangered Species Act (ESA) for the endangered **Indiana bat** (*Myotis sodalis*) and the endangered **northern long-eared bat** (NLEB) (*Myotis septentrionalis*).

This decision key should only be used to verify project applicability with the Service's February 5, 2018, FHWA, FRA, FTA Programmatic Biological Opinion for Transportation Projects. The programmatic biological opinion covers limited transportation activities that may affect either bat species, and addresses situations that are both likely and not likely to adversely affect either bat species. This decision key will assist in identifying the effect of a specific project/activity and applicability of the programmatic consultation. The programmatic biological opinion is not intended to cover all types of transportation actions. Activities outside the scope of the programmatic biological opinion, or that may affect ESA-listed species other than the Indiana bat or NLEB, or any designated critical habitat, may require additional ESA Section 7 consultation.

IPAC USER CONTACT INFORMATION

Agency: Gorrill Palmer
Name: Lauren Labbay
Address: 300 Southborough Drive, Suite 200
City: South Portland
State: ME
Zip: 04106
Email llabbay@gorrillpalmer.com
Phone: 2077722515

LEAD AGENCY CONTACT INFORMATION

Lead Agency: U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
Phone: (207) 469-7300 Fax: (207) 902-1588

In Reply Refer To: April 03, 2023
Project Code: 2022-0079665
Project Name: Mixed Residential Development

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Maine Ecological Services Field Office
P. O. Box A
East Orland, ME 04431
(207) 469-7300

PROJECT SUMMARY

Project Code: 2022-0079665
Project Name: Mixed Residential Development
Project Type: Residential Construction
Project Description: Located between Lincoln & Bradley Street in Saco, Maine.
Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@43.5059624,-70.46287398273907,14z

Counties: York County, Maine

ENDANGERED SPECIES ACT SPECIES

There is a total of 2 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Threatened

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPAC USER CONTACT INFORMATION

Agency: Gorrill Palmer
Name: Lauren Labbay
Address: 300 Southborough Drive, Suite 200
City: South Portland
State: ME
Zip: 04106
Email llabbay@gorrillpalmer.com
Phone: 2077722515

LEAD AGENCY CONTACT INFORMATION

Lead Agency: U.S. Fish and Wildlife Service

ATTACHMENT 6

LETTER TO THE PASSAMAQUODDY TRIBE OF INDIANS AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Mr. Donald Soctomah, THPO
Passamaquoddy Tribe of Indians
Pleasant Point & Indian Township Reservation
PO Box 343
Perry, ME 04667

Subject: Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Mr. Soctomah:

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from the Passamaquoddy Tribe of Indians relative to the presence of any nearby historic, archaeological, or tribal resources.

If you have any questions or require any further additional information, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

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U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS–LocMap 3831.dwg	

GORRILL PALMER

Relationships. Responsiveness. Results.
www.gorrillpalmer.com
207.772.2515

Figure

1

Tribal Historic Preservation Office
Passamaquoddy Tribe
PO Box 159 Princeton, Me. 04668
207-214-4051

September 20, 2021

Lauren Labbay | Design Engineer
Gorrill Palmer
707 Sable Oaks Drive, Suite 30 | South Portland, ME 04106

Re: Saco – 321 Lincoln Street project

Dear Lauren;

The Passamaquoddy THPO has reviewed the following application regarding the historic properties and significant religious and cultural properties in accordance with NHPA, NEPA, AIRFA, NAGPRA, ARPA, Executive Order 13007 Indian Sacred Sites, Executive Order 13175 Consultation and Coordination with Indian Tribal Governments, and Executive Order 12898 Environmental Justice.

The Project listed above will not have any impact on cultural and historical concerns of the Passamaquoddy Tribe. If archeological material is uncovered, please contact this office.

Sincerely;

Donald Soctomah
Soctomah@gmail.com
THPO
Passamaquoddy Tribe

ATTACHMENT 6

LETTER TO THE HOULTON BAND OF MALISEET INDIANS AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Environmental Planner
Houlton Band of Maliseet Indians
88 Bell Road
Littleton, ME 04730

Subject: Mixed Residential Development
321 Lincoln St.
Saco, Maine

To Environmental Planner:

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from the Houlton Band of Maliseet Indians relative to the presence of any nearby historic, archaeological, or tribal resources.

If you have any questions or require any further additional information, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

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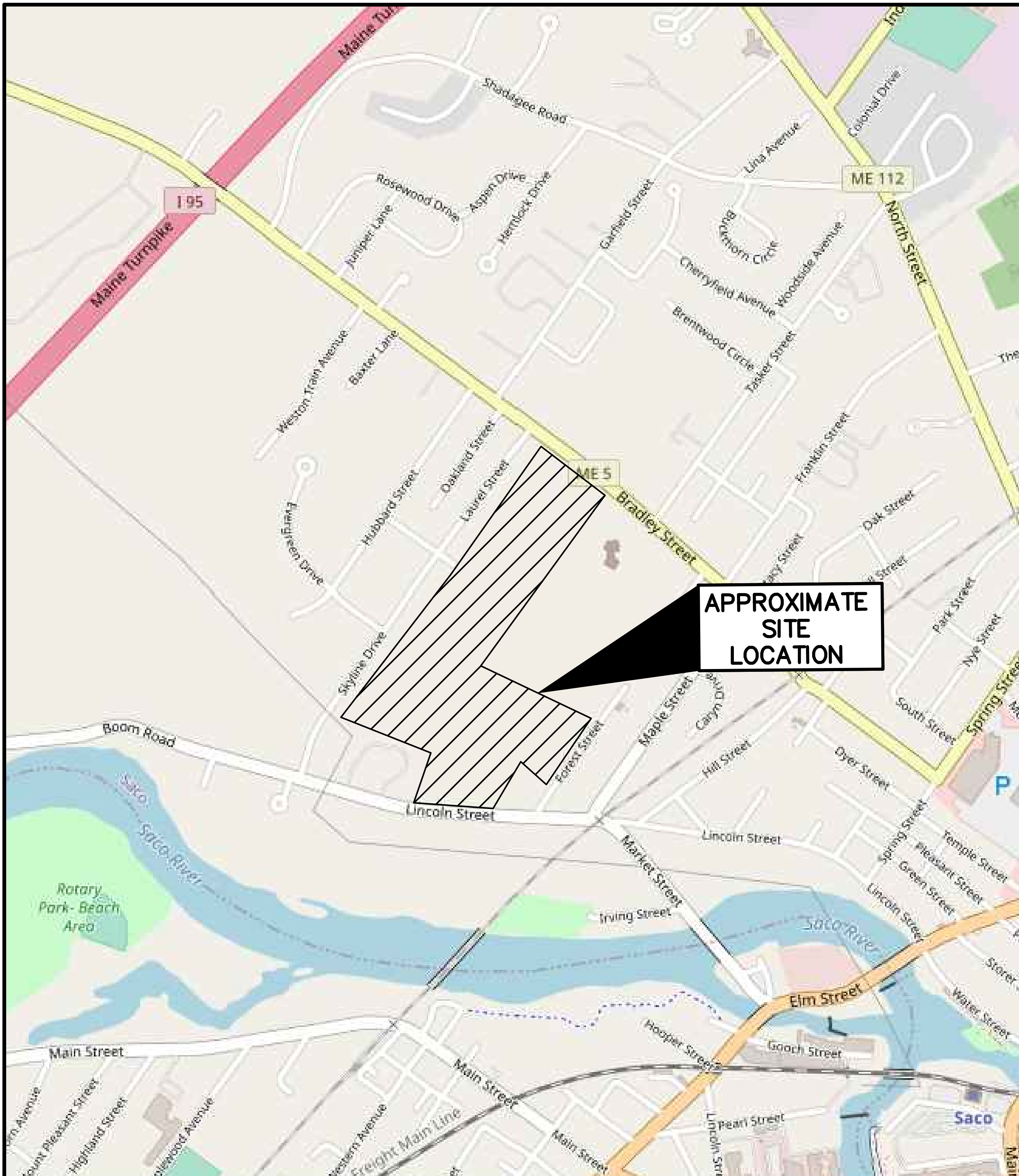

U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS-LocMap 3831.dwg	

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207.772.2515

Figure 1

From:	Lauren Labbay
To:	Drew Gagnon
Subject:	FW: 321 Lincoln Street, Saco - Mixed Residential Development
Date:	Thursday, October 7, 2021 1:24:00 PM
Attachments:	image002.png image001.png

Response from Houlton Band of Maliseet Indians below

Lauren Labbay | Design Engineer

GORRILL PALMER

707 Sable Oaks Drive, Suite 30 | South Portland, ME 04106

207.772.2515 x240 (office) | (207) 837-1324 (mobile)

www.gorrillpalmer.com

From: Isaac St. John <istjohn@maliseets.com>
Sent: Thursday, October 7, 2021 1:09 PM
To: Lauren Labbay <llabbay@gorrillpalmer.com>
Subject: RE: 321 Lincoln Street, Saco - Mixed Residential Development

Good afternoon,

We do not have an immediate concern with your project or project site, and do not currently have the resources to fully investigate same. Should any human remains, archaeological properties or other items of historical importance be unearthed while working on this project, we recommend that you stop your project and report your findings to the appropriate authorities including the Houlton Band of Maliseet Indians.

Thank you,

Isaac St. John
Tribal Historic Preservation Officer
Houlton Band of Maliseet Indians
88 Bell Road
Littleton, ME 04730

From: Lauren Labbay [mailto:llabbay@gorrillpalmer.com]
Sent: Monday, September 20, 2021 9:33 AM
To: Isaac St. John <istjohn@maliseets.com>
Cc: Drew Gagnon <dgagnon@gorrillpalmer.com>
Subject: 321 Lincoln Street, Saco - Mixed Residential Development

Good Morning,

Please see the attached file for our request for review. Our project is at Lincoln Street in Saco, ME.

Feel free to reach out with any questions.

Thank you,

Lauren Labbay | Design Engineer

GORRILL PALMER

707 Sable Oaks Drive, Suite 30 | South Portland, ME 04106
207.772.2515 x240 (office) | (207) 837-1324 (mobile)
www.gorrillpalmer.com

ATTACHMENT 6

LETTER TO THE PENOBSCOT NATION AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 20, 2021

Mr. Christopher Sockalexis, THPO
Cultural & Historic Preservation Department
Penobscot Nation
12 Wabanaki Way
Indian Island, ME 04468

Subject: Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Mr. Sockalexis:

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

Please confirm by return correspondence that there are no areas of the site with historical or archaeological significance of interest to the tribe as defined by the Natural Preservation Act of 1966.

If you have any questions or require any further additional information, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

u:\3831_helios_mixed residential development - lincoln & bradley - saco\l environmental\resource letters\tribes\ltr_penobscot_09.20.2021.docx

U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS-LocMap 3831.dwg	

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207.772.2515

Figure 1

PENOBSCOT NATION
CULTURAL & HISTORIC PRESERVATION
12 WABANAKI WAY, INDIAN ISLAND, ME 04468

CHRIS SOCKALEXIS – TRIBAL HISTORIC PRESERVATION OFFICER
E-MAIL: chris.sockalexis@penobscotnation.org

NAME	Lauren Labbay
ADDRESS	Gorrill Palmer 707 Sable Oaks Drive, Suite 30 South Portland, ME 04106
OWNER'S NAME	Land Owner - 321 Lincoln St.
TELEPHONE	(207) 772-2515
EMAIL	llabbay@gorrillpalmer.com
PROJECT NAME	Mixed Residential Development
PROJECT SITE	Saco, ME
DATE OF REQUEST	September 20, 2021
DATE REVIEWED	December 16, 2021

Thank you for the opportunity to comment on the above referenced project. This project appears to have no impact on a structure or site of historic, architectural or archaeological significance to the Penobscot Nation as defined by the National Historic Preservation Act of 1966, as amended.

If there is an inadvertent discovery of Native American cultural materials during the course of the project, please contact my office at (207) 817-7471. Thank you for consulting with the Penobscot Nation Tribal Historic Preservation Office with this project.

Chris Sockalexis, THPO
Penobscot Nation

ATTACHMENT 6

LETTER TO THE MI'KMAQ NATION AND THEIR RESPONSE

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

September 28, 2021

Kendyl Reis, THPO
Mi'kmaq Nation
7 Northern Road
Presque Isle, ME 04769

Subject: Mixed Residential Development
321 Lincoln St.
Saco, Maine

Dear Kendyl:

Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The project site is shown on the attached Location Map.

To aid in the design, and as part of the permit applications, Gorrill Palmer requests information from the Mi'kmaq Nation relative to the presence of any nearby historic, archaeological, or tribal resources.

If you have any questions or require any further additional information, please contact our office.

Sincerely,

Gorrill Palmer

Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure

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U.S.G.S. Location Map

321 Lincoln Street - Saco, Maine

Design: LEL	Date: SEPTEMBER 2021
Draft: LEL	Job No.: 3831
Checked: DJG	Scale: None
File Name: USGS-LocMap 3831.dwg	

GORRILL PALMER

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www.gorrillpalmer.com
207.772.2515

Figure

1

Tribal Historic Preservation Office
Mi'kmaq Nation (Formerly known as the Aroostook Band of Micmac)
Kendyl Reis
Tribal Historic Preservation Officer
7 Northern Road
Presque Isle, ME 04769
Phone: (207)764-1972 ext. 161
Fax: (207)764-7667
Email: kreis@micmac-nsn.gov

Mixed Residential Development Project
Saco, Maine
September 30, 2021

Thank you for the opportunity to review the above-referenced project for compliance with National Environmental Policy Act (NEPA) and National Historic Preservation Act (NHPA) requirements.

Based on the project description, we do not have knowledge of any specific sites or cultural features that exist at the proposed project location. However, this geographic area does constitute traditional areas that were historically utilized by members of the Mi'kmaq Nation and the other Wabanaki Tribes. Therefore, we respectfully request that if during the course of excavation/construction activities, human remains, artifacts, or any other evidence of Native American presence is discovered, that site activities in the vicinity of the discovery immediately cease, pending notification to us.

In addition, if this project results in wetland disturbances requiring mitigation, we are requesting that you utilize the black ash (Fraginus nigra) as the principal wetland species for wetland restoration activities. The black ash tree has special significance in the culture of the northeastern Tribes and is used extensively for weaving baskets and other Native American crafts. The black ash tree also provides valuable food and habitat for migratory waterfowl and other wildlife. Unfortunately, however, this species has been selected against by foresters and landowners who favor other tree species. As a result of this, and other environmental factors, the black ash tree is in serious decline in Maine. The Mi'kmaq Nation has completed several black ash wetland restoration projects and have a dependable source for highly-quality seedlings, and the experience and expertise to assist you with black ash wetland restoration projects.

On the subject of human remains, artifacts, or any other evidence of Native American presence is discovered. The human remains will be reburied with the appropriate respect for the remains that is required at a distinctive and respectable site. The artifacts and other evidence of Native American discovery will be documented with appropriate detail. The items will be analyzed for the precise period of the items' distinctive period and will be documented by the Tribal Historic Preservation Officer for the Mi'kmaq Nation.

If you have any questions or comments, please feel free to contact me.

Sincerely,

Kendyl Reis
Tribal Historic Preservation Officer

ATTACHMENT 7

STORMWATER MANAGEMENT REPORT

STORMWATER MANAGEMENT REPORT

LINCOLN VILLAGE
SACO, MAINE

Prepared for
321 Lincoln Street Development, LLC

Saco, ME 04072

Prepared by

Gorrill Palmer
707 Sable Oaks Drive – Suite 30
South Portland, Maine 04106
207.772.2515

07-20-23

AUGUST 2022
REVISED JULY 2023

STORMWATER MANAGEMENT REPORT

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
12.1	Overview	1
12.2	Development Description	1
12.3	Surface Water	2
12.4	General Topography	2
12.5	Flooding	2
12.6	Natural Drainage Ways	2
12.7	Alterations to Land Cover	2
12.8	Stormwater Management Control	2
12.9	Approach and Analysis for Water Quality	3
12.10	Stormwater Quantity	19
12.11	Construction BMPs	28
12.12	Maintenance of Facilities, Recertification and Housekeeping	28
12.13	Conclusion	28
12.14	Attachments	28

Figure

1 USGS Project Location Map
2 Soil Maps

Attachments

A Watershed Maps (Pre, Post, Water Quality)

B TR-20 Calculations

C Pipe Capacity Calculations

D Orifice Calculations

E FocalPoint Manufacturer Approval Letter

F Bradley Street Runoff Calculations

G Sediment Forebay Storage Calculations

MaineDEP SLDA Section 12

STORMWATER MANAGEMENT REPORT
LINCOLN VILLAGE

12.1 Overview

Located between Lincoln and Bradley Street in Saco, ME, the proposed development is approximately 56.7 ± acres in size and planned to home a new residential community. This project will include a variety of housing options, recreation-oriented land use, and natural areas. Proposed residential uses include single family homes, duplexes, and condominium/apartment units. Recreation land uses include parks, trails and an outdoor basketball court. Due to the size and scope of the project, it is anticipated that the project will be constructed in multiple phases. Natural resource conservation and environmental protection are primary design elements with a focus on conservation of large, contiguous natural areas, wildlife habitats, riparian corridors, buffers, and natural resource connectivity with the surrounding landscape.

Under the Site Location of Development Law (SLODA) (38 M.R.S.A §481-490) instituted by the Maine Department of Environmental Protection, a project creating more than 3 acres of impervious area or 20 acres of more of developed area, will require a Site Law permit from the Department. The City of Saco has been delegated the authority to review developments needing approval under Title 38 M.R.S.A. §§ 420 and 481 through 500 by the Maine Department of Environmental Protection. The new developed and impervious area proposed in this development will be reviewed by the City to ensure compliance with the requirements established by the statutes. The review would also ensure compliance with stormwater and erosion control management required under the City of Saco's Code of Ordinances.

As the proposed development will disturb greater than one acre of area and will result in more than 3 acres of new non-vegetated surface, the proposed development is required to meet the Basic Standard, General Standard, and Flooding Standard of the Stormwater Rules (Chapter 500). Portions of the site will include linear development and is required to meet with water quality standards set forth in Section 4.C.5(c) of Chapter 500. The remaining development is required to meet the water quality standards set forth in Section 4.C.2(a) of Chapter 500.

12.2 Development Description

Gorrill Palmer has been retained by 321 Lincoln Street Development, LLC to prepare a Stormwater Management Report for a proposed residential community development on a 56.7 ± acre parcel. The project includes a variety of housing options, recreation-oriented land uses, and natural areas. Areas determined suitable for development have been determined by avoiding large impacts to sensitive natural areas. The proposed development is in Saco, ME with access from the adjacent streets of Lincoln and Bradley (Route 5).

This development will create approximately 16.4 acres of new non-vegetated surface. The overall developed area is approximately 27.8 acres. The development of trails, sidewalks and access roads will provide interconnectivity within community.

The proposed development is located within the Saco River watershed. There are no streams listed on the 2020 Impaired Stream Priority List that encroach the property.

The above practices are described in depth under Section 12.9 Approach and Analysis for Water Quality.

As the proposed development will disturb greater than one acre of area and will result in more than 3 acres of new non-vegetated surface, the proposed development is required to meet the Basic Standard, General Standard, and Flooding Standard of the Stormwater Rules (Chapter 500). Portions of the site include linear development and is required to meet with water quality standards set forth in Section 4.C.5(c) of Chapter 500.

The MaineDEP Basic Standard will be met as presented in the Erosion and Sedimentation Control report for this project.

Under the General Standard, the project is required to meet the BMP standards identified in Chapter 500 and described in Volume III of the Stormwater BMP manual. The design of this development will include the use of two constructed gravel wetlands, nine grassed underdrain soil filters, four focal points with associated subsurface chambers and roof line drip edge systems.

12.3 Surface Water

The surface hydrology for the site is part of the Saco River Watershed. A series of delineated streams and natural swales convey surface flow to the Saco River. Appropriate buffers and setbacks are provided from the natural resource. There are no mapped significant groundwater aquifers present in this planned development.

12.4 General Topography

The topography and terrain for the planned development area varies in elevation from approximately 95 to 115 feet. For drainage purposes, the southern portion of the property drains to a series of streams and swales that drain south near Lincoln Street. The northern portion of the property generally drains to the central/eastern portion of the site to a tributary stream that conveys flow offsite and subsequently the Saco River. Most of the site contains slopes ranging from approximately 0.5% to 5%, and minimal area with steeper 30% slopes associated with the stream banks and existing quarry.

12.5 Flooding

The site is not located within a mapped FEMA 100-year floodplain.

12.6 Natural Drainage Ways

The project as currently proposed does not include alteration of any natural drainage ways.

12.7 Alterations to Land Cover

Changes in land cover will include the conversion of wooded area to new access roads, parking areas, residential buildings, recreational areas, stormwater facilities, and greenspace.

12.8 Stormwater Management Control

Based on the Stormwater Management Rules, Chapter 500, the proposed development is required to meet the Basic Standard, General Standard, and Flooding Standard, as the development results in greater than three acres of non-vegetated area. The project is not required to meet the urban impaired stream standard.

The Basic Standard is presented in the Erosion Control Report in MaineDEP SLDA Section 14 (Attachment 10 in this submission). The General Standard and Flooding Standard are presented as follows.

The development will be required to meet the MDEP's water quality and quantity standards. To meet the water quality standard, the project will utilize two constructed gravel wetlands, nine grassed underdrain soil filters, four focal points with associated chamber systems and roofline drip edge filters. The facilities will be utilized to control the post development runoff for the larger 2, 10, 25-year storm events where applicable. Due to City of Saco standards, the facilities will also be used to control the post development runoff for the 50-year storm event.

The Maine Department of Environmental Protection rules and regulations regarding stormwater concentrate on four stormwater management objectives:

- Effective Pollutant Removal
- Cooling
- Channel Protection
- Flood Control

These objectives may be met either directly by providing BMP's that manage and treat the runoff after it has been created, or indirectly by incorporating low impact development site planning concepts to minimize production and contamination of runoff by maximizing infiltration and evapotranspiration.

12.9 Approach and Analysis for Water Quality

The following narrative discusses the Basic Standard and General Standard of the MaineDEP Stormwater Law. The proposed development will be required to meet the Basic Standard, BMP Standard under the General Standard, and Flooding Standard for a MaineDEP Site Law. Based upon review of the five recommended and approved methods for mitigating the increased frequency and duration of channel erosive flows, as required by the BMP Standards, the applicant is proposing to construct two new gravel wetlands, nine grassed underdrain soil filters, four focal points with associated subsurface chambers and roofline drip edge filters. The applicant is also proposing to use the linear exception for the treatment of proposed access ways.

The proposed main access road through the project site connecting Lincoln and Bradley Street is considered linear development. The proposed treatment will treat no less than 75% of the linear portion's impervious area, and no less than 50% of the linear portion's developed area in accordance with the MaineDEP Chapter 500 Section 4.C.5(c). Water quality calculations for this portion of the site are presented in Section 12.9.1.

For the proposed single-family lots, an anticipated building footprint is shown for impervious and developed area purposes. These lots are located on the north end of the property (Bradley Street side) and portions will be treated by the four focal point systems. Remaining areas of the single-family development windows will be untreated. Table 2 and 3 below provide impervious and developed area calculations The proposed non-linear treatment will treat no less than 95% of the impervious area and no less than 80% of the developed area of these lots in accordance with the MaineDEP Chapter 500 Section 4.C.2(a). Water quality calculations for this portion of the site are presented in Section 12.9.2.

Water Quality assumptions for the non-linear development are presented in Section 12.9.5.

A trail system is proposed throughout the perimeter of the property. Minor tree and shrub clearing is expected to construct the proposed trail system. The trail is assumed at a 4-foot width. It is anticipated to be composed of the existing ground in the trail path. The trail will be maintained in the future, which will include the placement of common borrow material if necessary. For the purpose of stormwater quality, the construction of 4,100 linear feet of trail (16,400 sf) is considered developed area and will be included in the total developable area as untreated.

New Developed Linear Required Treatment

For this project, Linear Area is considered access ways, sidewalks, and on-street parking associated with the main access road connecting Lincoln and Bradley Street. These areas are outlined on the Water Quality Map, WQ, in Attachment A of this report. The Site Law allows linear portions of a project to be treated at a lower threshold than new construction. Table 1 below presents the required treatment for the linear area.

Table 1 – Proposed Linear Development Treatment Summary			
Type	**Total Area (sf)**	**Treatment Threshold**	**Area required to be treated (sf)**
Impervious	85,548	75%	64,161
Developed	89,114	50%	44,557

12.9.1 New Developed Non-Linear Required Treatment

In respect to the non-linear areas proposed in the project development, there will be no less than 95% of the impervious threshold area and no less than 80% of the developed threshold area treated in accordance with the MDEP Chapter 500 Section 4.C.2(a). Table 2 below outlines the required treatments for this area.

Table 2 – Proposed Non-Linear Development Treatment Summary			
Type	**Total Area (sf)**	**Treatment Threshold**	**Area required to be treated (sf)**
Impervious	625,485	95%	594,211
Developed	1,121,945	80%	897,556

12.9.2 Total Site Required Treatment

Table 3 below summarizes Tables 1-2 and presents the total required treatment for the proposed project site.

Table 3 – Total Required Site Treatment Summary			
Type	**Linear Development (sf)**	**Non-Linear Development (sf)**	**Total (sf)**
Impervious	64,161	594,211	658,372
Developed	44,557	897,556	942,113

12.9.3 Stormwater Quality Treatment

Attachment A contains the Water Quality maps for this project. Two constructed gravel wetlands, nine grassed underdrain soil filters, four focal points with associated subsurface chambers and roofline drip edge filters are proposed for stormwater quality treatment.

For the 12 single family development areas, each developable window has established impervious and developed area numbers based on anticipated house layouts and programming. Table 4 below shows individual single family developable window treatments and the proposed tributary stormwater facility.

Table 4 – Single Family Developable Area

Developable Window	Runoff Designation	Developable Area (sf)	Impervious Area (sf)	Pond Assignment
1	Treated	1412	1160	Drip Edges
	Untreated	4473	1464	N/A
2	Treated	1412	1160	Drip Edges
	Untreated	4800	1478	N/A
3	Treated	1412	1160	Drip Edges
	Untreated	3769	1178	N/A
4	Treated	1412	1160	Drip Edges
	Untreated	4362	1452	N/A
5	Treated	1412	1160	Drip Edges
	Untreated	4866	1454	N/A
6	Treated	1412	1160	Drip Edges
	Untreated	4702	1452	N/A
7	Treated	1412	1160	Drip Edges
	Untreated	4053	1354	N/A
8	Treated	1394	1160	Drip Edges
	Untreated	2757	872	N/A
9	Treated	7640	6308	Focal Point 3
10	Treated	6904	5327	Focal Point 3
11	Treated	5478	4383	Focal Point 1
12	Treated	5523	4418	Focal Point 1
TOTALS	**Treated**	**36,823**	**29,716**	**Drip Edge/Focalpoints**
	Untreated	**33,809**	**10,704**	**N/A**

Gravel Wetland

Consistent with the Maine Stormwater Best Practices Manual, specifically Volume III, BMP Technical Design Manual Chapter 7.4, Gravel Wetlands, the system has two separate pairs of horizontal flow-through treatment cells and forebays in series. The stormwater runoff passes through a saturated gravel substrate that acts as a natural microbial habitat capable of denitrification. The treatment cells contain 8" of wetland soils, 6" of pea gravels, and 24" of crushed stone. A permanent pool of water is maintained below the wetland soil layer at all times, with saturation being achieved up to 4" below the pond bottom through capillary action.

The channel protection volume will be stored up to 18" above the wetland surface and will be released through a perforated underdrain pipe at the bottom of the crushed stone layer A hole drilled in the cap of the underdrain will regulate the channel protection volume outflow to allow for a 24-48 hour release time. The holes shall be 2.4 inches and 2.2 inches for Gravel Wetland 1 and 2, respectively. The channel protection volume is based upon 1.0 inch times the subcatchment's impervious area and 0.4 inch times the subcatchment's developed landscaped area. The sediment forebays are sized based on the annual cubic feet of collected sediment which equates to 10 storms per year each depositing 500 lbs/acre-storm over the sanded area of the tributary watershed. The sediment forebays and upstream stormdrain network have the capacity to store 10% of the channel protection volume. An impermeable liner is proposed for Gravel Wetland 1 only, since the seasonal high groundwater elevation is estimated below the proposed permanent pool elevation. Gravel Wetland 2 is located in HSG D soils with the estimated seasonal high groundwater table above the permanent pool elevation of the facility.

The Water Quality Maps are included in Attachment A. The stage/storage tables for the ponds are included in Attachment B. Calculations for sediment forebay storage can be found in Attachment G. Tables 5 and 6 below present water quality information for Gravel Wetland 1 and 2, respectively.

Table 5
Proposed Gravel Wetland 1

	Required	Provided
Impervious Area		
Linear Development	-	8,670 sf
Non-Linear Development	-	183,298 sf
Total	-	191,968 sf
Landscaped Area (non-impervious)		
Linear Development	-	-
Non-Linear Development	-	126,102 sf
Total	-	126,102 sf
Developed Area		
Linear Development	-	8,670 sf
Non-Linear Development	-	309,400 sf
Total	-	318,070 sf
Channel Protection Volume (cf)	20,201	20,368
Elevation at Channel Protection Volume (ft)	-	99.41
Wetland Surface Elevation (ft)	-	97.93
Wetland Surface Area (5% imp area + 2% landscaped area) (sf)	12,120	12,121
Sediment Forebay Volume (cf)	2,024	2,811
Pond Outflow (cfs)	-	0.148
Release Time (Hours)	24-48	38

Table 6 Proposed Gravel Wetland 2		
	Required	**Provided**
Impervious Area		
Linear Development	-	23,466 sf
Non-Linear Development	-	83,387 sf
Total	-	106,853 sf
Landscaped Area (non-impervious)		
Linear Development	-	0
Non-Linear Development	-	60,241 sf
Total	-	60,241 sf
Developed Area		
Linear Development	-	23,466 sf
Non-Linear Development	-	143,628 sf
Total	-	167,094 sf
Channel Protection Volume (cf)	10,912	10,971
Elevation at Channel Protection Volume (ft)	-	99.67
Wetland Surface Elevation (ft)	-	98.31
Wetland Surface Area (5% imp area + 2% landscaped area) (sf)	6,547	6,646
Sediment Forebay Volume (cf)	1,101	1,561
Pond Outflow (cfs)	-	0.123
Release Time (Hours)	24-48	25

The storage tables and sizing calculations are included in Attachment B.

<u>Grassed Underdrained Soil Filters</u>

Grassed Underdrained Soil Filters are defined in Volume III, Section 7.1 of the Stormwater Best Management Practices Manual published by the Maine Department of Environmental Protection. The development will be required to provide the treatment volume for 1.0 inch times the subcatchment's impervious area plus 0.4 inch times the subcatchment's landscaped developed area. The surface area of the filters is required to be no less than the sum of 5% of the impervious area and 2% of the landscaped area draining to each filter. The filter surface area of proposed GUSF 1 & 9 are 3,110 and 3,783 square feet respectfully. The pond bottoms are greater than the recommended 3,000 sf limit as specified in Section 7 of the BMP Manual. Gorrill Palmer is of the opinion that constructing an additional pond adjacent to the proposed pond, in order to reduce the pond surface area to 3,000 square feet or less each, would not achieve the goal of reducing the construction complexity, reducing maintenance difficulties or disturb less area adjacent to sensitive environmental areas. The difference in the construction and maintenance effort between a 3,000 square foot pond and a 3,110 or 3,783 square foot pond is negligible. Given the construction techniques of the anticipated contracting companies, building a slightly larger and flat pond bottom is feasible.

The sediment forebay is sized based on the annual cubic feet of collected sediment which equates to 10 storms per year each depositing 500 lbs/acre-storm over the sanded area of the tributary watershed. The channel protection volume can pond up to 18" deep within each soil filter. Runoff from storms producing the water quality volume will be conveyed from the pond through the soil media and underdrain system. A valve will be placed on the soil filter's underdrains to regulate the outflow through the soil media. The valve will be field adjusted to maintain the outflow time between 24 and 48 hours.

Yearly maintenance of the soil filters will include the monitoring the outflow after a rainfall event to ensure the outflow time is within the required parameters. There are two options for the construction of the filter media. The first shall be a soil mixture combing sand, sandy loam, and either fine shredded bark or wood fiber mulch. The resulting mixture should contain 8-12% passing the No. 200 sieve and a clay content of less than 2%. The second option will be a layered system consisting of 12" of loamy coarse sand and 6" of loamy topsoil with a transition layer of 2" of the topsoil rototilled into to the sand layer.

Runoff from larger storms will be conveyed from the filters through an overflow pipe to an orifice with its invert set at the channel protection elevation. Overflow spillways have been designed to independently convey the 100-year storm. See Attachment B.

Tables 7 through 15 below present water quality information for the grassed underdrain soil filters associated with the proposed development.

Table 7 Proposed Grassed Underdrain Soil Filter 1		
	Required	**Provided**
Impervious Area	-	-
Linear Development	-	0
Non-Linear Development	-	49,677 sf
Total	-	49,677 sf
Landscaped Area (non-impervious)	-	-
Linear Development	-	0
Non-Linear Development	-	24,256 sf
Total	-	24,256 sf
Developed Area	-	-
Linear Development	-	-
Non-Linear Development	-	73,933 sf
Total	-	73,933 sf
Treatment Volume (cf)	4,948	4,977
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	2,969	3,110
Sediment Forebay Volume (cf)	32	228
Pond Base Elevation (ft)	-	100.6
WQV Elevation (ft)	-	101.94
Pond Outflow (cfs)	-	0.058
Release Time (Hours)	24-48	24

Table 8 Proposed Grassed Underdrain Soil Filter 2		
	Required	**Provided**
Impervious Area		
Linear Development	-	0
Non-Linear Development	-	38,830 sf
Total	-	38,830 sf
Landscaped Area (non-impervious)		
Linear Development	-	0
Non-Linear Development	-	43,715 sf
Total	-	43,715 sf
Developed Area		
Linear Development	-	0
Non-Linear Development	-	82,545 sf
Total	-	82,545 sf
Treatment Volume (cf)	4,693	4,696
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	2,816	2,848
Sediment Forebay Volume (cf)	20	262
Pond Base Elevation (ft)	-	101.50
WQV Elevation (ft)	-	102.88
Pond Outflow (cfs)	-	0.054
Release Time (Hours)	24-48	24

Table 9 Proposed Grassed Underdrain Soil Filter 3		
	Required	**Provided**
Impervious Area		
Linear Development	-	7,984 sf
Non-Linear Development	-	24,260 sf
Total	-	32,243 sf
Landscaped Area (non-impervious)		
Linear Development	-	1,508 sf
Non-Linear Development	-	11,086 sf
Total	-	12,594 sf
Developed Area		
Linear Development	-	9,492 sf
Non-Linear Development	-	35,345 sf
Total	-	44,837 sf
Treatment Volume (cf)	3,107	3,107
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	1,864	2,466
Sediment Forebay Volume (cf)	24	331
Pond Base Elevation (ft)	-	100.4
WQV Elevation (ft)	-	101.54
Pond Outflow (cfs)	-	0.036
Release Time (Hours)	24-48	24

Table 10 Proposed Grassed Underdrain Soil Filter 4		
	Required	**Provided**
Impervious Area		
Linear Development	-	6,609 sf
Non-Linear Development	-	22,910 sf
Total	-	29,518 sf
Landscaped Area (non-impervious)		
Linear Development	-	92 sf
Non-Linear Development	-	14,625 sf
Total	-	14,717 sf
Developed Area		
Linear Development	-	6,700 sf
Non-Linear Development	-	37,535 sf
Total	-	44,235 sf
Treatment Volume (cf)	2,950	2,957
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	1,770	1,869
Sediment Forebay Volume (cf)	21	240
Pond Base Elevation (ft)	-	99.90
WQV Elevation (ft)	-	101.22
Pond Outflow (cfs)	-	0.034
Release Time (Hours)	24-48	24

Table 11 Proposed Grassed Underdrain Soil Filter 5		
	Required	**Provided**
Impervious Area		
Linear Development	-	0
Non-Linear Development	-	26,921 sf
Total	-	26,921 sf
Landscaped Area (non-impervious)		
Linear Development	-	0
Non-Linear Development	-	12,699 sf
Total	-	12,699 sf
Developed Area		
Linear Development	-	-
Non-Linear Development	-	39,620 sf
Total	-	39,620 sf
Treatment Volume (cf)	2,667	2,670
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	1,600	1,763
Sediment Forebay Volume (cf)	15	246
Pond Base Elevation (ft)	-	101.43
WQV Elevation (ft)	-	102.6
Pond Outflow (cfs)	-	0.031
Release Time (Hours)	24-48	24

Table 12 Proposed Grassed Underdrain Soil Filter 6		
	Required	**Provided**
Impervious Area		
Linear Development	-	0
Non-Linear Development	-	18,778 sf
Total	-	18,778 sf
Landscaped Area (non-impervious)		
Linear Development	-	0
Non-Linear Development	-	60,858 sf
Total	-	60,858 sf
Developed Area		
Linear Development	-	0
Non-Linear Development	-	79,636 sf
Total	-	79,636 sf
Treatment Volume (cf)	3,593	3,610
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	2,156	2,296
Sediment Forebay Volume (cf)	13	258
Pond Base Elevation (ft)	-	99.2
WQV Elevation (ft)	-	100.42
Pond Outflow (cfs)	-	0.042
Release Time (Hours)	24-48	24

Table 13 Proposed Grassed Underdrain Soil Filter 7		
	Required	**Provided**
Impervious Area		
Linear Development	-	0
Non-Linear Development	-	23,580 sf
Total	-	23,580 sf
Landscaped Area (non-impervious)		
Linear Development	-	0
Non-Linear Development	-	13,385 sf
Total	-	13,385 sf
Developed Area		
Linear Development	-	-
Non-Linear Development	-	36,965 sf
Total	-	36,965 sf
Treatment Volume (cf)	2,411	2,436
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	1,447	1,728
Sediment Forebay Volume (cf)	13	339
Pond Base Elevation (ft)	-	99.2
WQV Elevation (ft)	-	100.28
Pond Outflow (cfs)	-	0.028
Release Time (Hours)	24-48	24

Table 14 Proposed Grassed Underdrain Soil Filter 8		
	Required	**Provided**
Impervious Area	-	-
Linear Development	-	0
Non-Linear Development	-	36,998 sf
Total	-	36,998 sf
Landscaped Area (non-impervious)	-	-
Linear Development	-	0
Non-Linear Development	-	23,889 sf
Total	-	23,889 sf
Developed Area	-	-
Linear Development	-	0
Non-Linear Development	-	60,887 sf
Total	-	60,887 sf
Treatment Volume (cf)	3,879	3,911
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	2,328	2,918
Sediment Forebay Volume (cf)	24	282
Pond Base Elevation (ft)	-	100.36
WQV Elevation (ft)	-	101.57
Pond Outflow (cfs)	-	0.045
Release Time (Hours)	24-48	24

Table 15 Proposed Grassed Underdrain Soil Filter 9		
	Required	**Provided**
Impervious Area	-	-
Linear Development	-	0
Non-Linear Development	-	64,781 sf
Total	-	64,781 sf
Landscaped Area (non-impervious)	-	-
Linear Development	-	0
Non-Linear Development	-	27,034 sf
Total	-	27,034 sf
Developed Area	-	-
Linear Development	-	-
Non-Linear Development	-	91,815 sf
Total	-	91,815 sf
Treatment Volume (cf)	6,300	6,316
Filter Surface Area 5% Imp. Area + 2% Landscaped Area (sf)	3,780	3,783
Sediment Forebay Volume (cf)	41	415
Pond Base Elevation (ft)	-	96.66
WQV Elevation (ft)	-	98.07
Pond Outflow (cfs)	-	0.073
Release Time (Hours)	24-48	24

FocalPoints

FocalPoint's are defined in Volume III Appendix B (Proprietary Systems). Proprietary systems are defined as a system or practice designed for stormwater runoff treatment from a development that has to meet all the stormwater requirements of Maine's Stormwater Law, and the Chapter 500 Stormwater Management Rule to be considered equivalent to any of the suggested structures found in the BMP Manual. A proprietary system must be live-tested for a variety of storm lengths and intensities. The system must remove at least 60% total phosphorus, with at least similar removals metals (zinc and copper), and hydrocarbons; it must provide temperature reduction and channel protection storage detention either independently or in combination with another measure; and it must also be maintainable.

Filtration systems that store and treat a volume of water must be sized to store and treat 1.0 inch of runoff from the contributing impervious area and 0.4 inches of runoff from contributing landscaped areas. If channel protection storage and cooling are required, they must be provided independently, and the stored volume must be released slowly over a 24 to 48-hour period and cooled. Flow-through or hybrid systems that do not store the water quality volume prior to treatment must be sized so that they treat the entire volume of the 0.95-inch Type III 24-hour storm without bypass. Sizing of proposed systems that do not fit these two categories will be determined on a case-by-case basis with the goal of providing treatment for at least 90% of the annual runoff volume.

The FocalPoint system received approval by the MDEP in February 2017. The proposed system was designed in accordance with the MDEP approval letter dated February 2, 2017. The FocalPoint's are designed to treat 1 inch times the subcatchments impervious area plus 0.4 inch times the subcatchments landscaped area. The elevation of the bypass overflow such that the water quality volume of a 0.95 inch type III 24 hour storm is treated prior to activation was determined using a HydroCAD model. The filter media has an exfiltration rate of 100 inches/hour. The surface media must be 174 sq. ft./acre of impervious plus 174 sq. ft./acre of vegetated area multiplied by 0.4. The filter media depth shall be 1.5 feet. The ratio of the media to the runoff volume stored above it is no less than 1 to 5. The runoff from the FocalPoint will enter a subsurface chamber storage system.

Runoff will enter the subsurface chamber storage system through an Isolator Row. The Isolator Row is required to convey the peak runoff from the 1 year type III 24 hour storm, without overflowing, at a rate of 0.227 cfs per chamber. The chamber system will provide storage for the water quality volume and release the flow over a 24-48 hour period. The subsurface chambers will be installed within a stone bed assumed to have 40% porosity. The storage provided by a Cultec Recharger 330XL HD is 11.32 CF/FT per design unit. A 30 mil linear low density polyethylene liner is also to be installed per manufacturers specifications below the system to aid in the prevention of infiltration. The seasonal high groundwater elevation is +/- 104.5.

Runoff from storms producing the water quality volume will be conveyed from the subsurface chambers through the underdrain system. A valve will be placed on the underdrain to regulate the outflow through the underdrain. The valve will be field adjusted to maintain the outflow time between 24 and 48 hours. Yearly maintenance of the FocalPoint system will include monitoring the outflow after a rainfall event to ensure the outflow time is within the required parameters and inspecting the system for accumulation of sediment within the Isolator Row. Prior to construction, the applicant will enter into an inspection and maintenance contract that will cover a five-year time period. Larger storms will be conveyed from the subsurface system though an Outlet Control Structure with a weir set at the water quality elevation.

The following tables present information for the FocalPoints in the proposed development.

Table 16		
FocalPoint 1		
	REQUIRED	**PROVIDED**
Impervious Area (SF)	-	13,730
Vegetated Developed Area (SF)	-	3,322
Water Quality Treatment Volume (CF)	1,255	-
Runoff 0.95 inch Type III Storm (CFS)	0.2	-
FocalPoint mulch bed elevation (FT)	-	108.2
Max. stage over filter for 0.95" storm (FT)	-	108.65
Rim of overflow structure (FT)	-	108.7
Filter surface area (SF)	60	64
Temporary Volume stored over filter (0.95" storm)	-	47 CF
Filter media ratio	> 1 to 5	> 1 to 5
1-Year Storm Peak Flow (CFS)	-	0.82
Cultec Recharger 330XLHD Isolator Row Chambers required	4	4
Cultec Recharger 330XLHD required for Water Quality Volume		18
Total Cultec Recharger 330XLHD Chambers	-	18
Storage Base Elevation (FT)	-	104.1
Water Quality Volume Elevation (FT)	-	106.72

Table 17		
FocalPoint 2		
	REQUIRED	**PROVIDED**
Impervious Area (SF)	-	5,225
Vegetated Developed Area (SF)	-	257
Water Quality Treatment Volume (CF)	444	-
Runoff 0.95 inch Type III Storm (CFS)	0.09	-
FocalPoint mulch bed elevation (FT)	-	108.2
Max. stage over filter for 0.95" storm (FT)	-	106.01
Rim of overflow structure (FT)	-	108.7
Filter surface area (SF)	21	24
Temporary Volume stored over filter (0.95" storm)	-	0 CF
Filter media ratio	> 1 to 5	> 1 to 5
1-Year Storm Peak Flow (CFS)	-	0.29
Cultec Recharger 330XLHD Isolator Row Chambers required	2	2
Cultec Recharger 330XLHD required for Water Quality Volume		6
Total Cultec Recharger 330XLHD Chambers	-	6
Storage Base Elevation (FT)	-	104.1
Water Quality Volume Elevation (FT)	-	106.72

Table 18		
FocalPoint 3		
	REQUIRED	**PROVIDED**
Impervious Area (SF)	-	16,742
Vegetated Developed Area (SF)	-	3,261
Water Quality Treatment Volume (CF)	1,504	-
Runoff 0.95 inch Type III Storm (CFS)	0.26	-
FocalPoint mulch bed elevation (FT)	-	108.2
Max. stage over filter for 0.95" storm (FT)	-	108.51
Rim of overflow structure (FT)	-	108.7
Filter surface area (SF)	72	76
Temporary Volume stored over filter (0.95" storm)	-	32 CF
Filter media ratio	> 1 to 5	> 1 to 5
1-Year Storm Peak Flow (CFS)	-	0.99
Cultec Recharger 330XLHD Isolator Row Chambers required	5	5
Cultec Recharger 330XLHD required for Water Quality Volume		22
Total Cultec Recharger 330XLHD Chambers	-	22
Storage Base Elevation (FT)	-	104.1
Water Quality Volume Elevation (FT)	-	106.56

Table 19		
FocalPoint 4		
	REQUIRED	**PROVIDED**
Impervious Area (SF)	-	5,684
Vegetated Developed Area (SF)	-	236
Water Quality Treatment Volume (CF)	482	-
Runoff 0.95 inch Type III Storm (CFS)	0.1	-
FocalPoint mulch bed elevation (FT)	-	108.2
Max. stage over filter for 0.95" storm (FT)	-	108.59
Rim of overflow structure (FT)	-	108.7
Filter surface area (SF)	23	32
Temporary Volume stored over filter (0.95" storm)	-	27 CF
Filter media ratio	> 1 to 5	> 1 to 5
1-Year Storm Peak Flow (CFS)	-	0.31
Cultec Recharger 330XLHD Isolator Row Chambers required	1	1
Cultec Recharger 330XLHD required for Water Quality Volume		8
Total Cultec Recharger 330XLHD Chambers	-	8
Storage Base Elevation (FT)	-	104.1
Water Quality Volume Elevation (FT)	-	106.56

An approval letter for the proposed development from the manufacturer is provided is Attachment E.

Roof Dripline Filters

Roof dripline filtration will be utilized for a portion of the roof area of single-family Lots 1-8 and Duplex units 1 and 2. For the single-family houses, the dimensions for the reservoir layer of the drip edge filter are all 4 feet wide by 1 foot deep. This provides 1.6 cubic feet of treatment per linear foot of roof. For the duplex, the drip edge on the backside of the building is 6 feet wide by 1 foot deep, providing 2.40 cubic feet of treatment per linear foot of roof. Lastly, the sides and front of the duplex utilize drip edge filters with dimensions of 3 feet wide by 1 foot deep. This assumes a 40% void ratio in the reservoir area. Table 20 below shows the Drip Edge Filter Calculations (for each home) as described above.

Table 20		
Proposed Roof Drip Edge Filter System – Single Family		
	Required	**Provided**
Impervious Roof Area		1,160 sq. ft
Landscaped Area (non-impervious)		0 sq. ft
Treatment Volume	97 cu. ft.	106 cu. ft.
Average Roof Width		17.5 ft
Treatment per linear foot of roof edge	1.46 sq. ft	1.6 sq. ft
Reservoir Layer Dimensions		
Depth		1 ft
Width		4 ft
Release Time	24-48 Hours	24 Hours
Proposed Roof Drip Edge Filter System – Duplex - Back		
	Required	**Provided**
Impervious Roof Area		1,892 sq. ft
Landscaped Area (non-impervious)		0 sq. ft
Treatment Volume	158 cu. ft.	168 cu. ft.
Average Roof Width		27 ft
Treatment per linear foot of roof edge	2.25 sq. ft	2.4 sq. ft
Reservoir Layer Dimensions		
Depth		1 ft
Width		6 ft
Release Time	24-48 Hours	24 Hours
Proposed Roof Drip Edge Filter System – Duplex – Sides & Front		
	Required	**Provided**
Impervious Roof Area		720 sq. ft
Landscaped Area (non-impervious)		0 sq. ft
Treatment Volume	60 cu. ft.	42 cu. ft.
Average Roof Width		12 ft
Treatment per linear foot of roof edge	1.0 sq. ft	1.2 sq. ft
Reservoir Layer Dimensions		
Depth		1 ft
Width		3 ft
Release Time	24-48 Hours	24 Hours

12.9.4 Conclusion – Water Quality

Table 21 below summarizes the proposed treatment for the linear portion of the project.

Table 21 – Overall Treatment for Linear Development		
	IMPERVIOUS	DEVELOPED (Impervious + Landscaped)
Gravel Wetland 1 (sf)	8,670	8,670
Gravel Wetland 2 (sf)	23,466	23,466
Grassed Underdrain Soil Filter 3 (sf)	7,984	9,492
Grassed Underdrain Soil Filter 4 (sf)	6,609	6,700
Focal Point 1 (sf)	4,929	6,051
Focal Point 2 (sf)	5,225	5,482
Focal Point 3 (sf)	5,107	5,459
Focal Point 4 (sf)	5,684	5,920
Total Area Treated (sf)	67,673	71,239
Area Untreated (sf)	17,875	17,875
Total Area of Project (sf)	85,548	89,114
Percent Treated	79%	80%
Percent Required	75%	50%

This portion of the project is required to treat 75% of the impervious area and 50% of the developed linear areas. As shown in the above table, the applicant proposes to utilize the proposed; Gravel Wetland 1 & 2, Grassed Underdrain Soil Filters 1 & 2, and Focal Points 1-4, to exceed the required treatment. Table 22 below summarizes the proposed treatment for the non-linear portion of the project.

Table 22 - Overall Treatment for Non-Linear Development		
	IMPERVIOUS	**DEVELOPED (Impervious + Landscaped)**
Gravel Wetland 1 (sf)	183,298	309,400
Gravel Wetland 2 (sf)	83,387	143,628
Grassed Underdrain Soil Filter 1 (sf)	49,677	73,933
Grassed Underdrain Soil Filter 2 (sf)	38,830	82,545
Grassed Underdrain Soil Filter 3 (sf)	24,260	35,345
Grassed Underdrain Soil Filter 4 (sf)	22,910	37,535
Grassed Underdrain Soil Filter 5 (sf)	26,921	39,620
Grassed Underdrain Soil Filter 6 (sf)	18,778	79,636
Grassed Underdrain Soil Filter 7 (sf)	23,580	36,965
Grassed Underdrain Soil Filter 8 (sf)	36,998	60,887
Grassed Underdrain Soil Filter 9 (sf)	64,781	91,815
Focal Point 1 (sf)	8,801	11,001
Focal Point 2 (sf)	0	0
Focal Point 3 (sf)	11,635	14,544
Focal Point 4 (sf)	0	0
Single Family Lot Drip Edge	9,276	11,292
Duplex Drip Edge	2,612	2,612
Total Area Treated (sf)	605,743	1,030,758
Area Untreated (sf)	19,742	91,187
Total Area of Project (sf)	625,485	1,121,945
Percent Treated	96.8%	91.9%
Percent Required	95%	80%

The non-linear, developed areas in the site are required to treat 95% of the impervious area along with 80% of the developed area. As can be seen in Table 22 above, the project meets the required treatment levels.

Table 23 below summarizes the proposed total treatment for the proposed project.

Table 23 – Total New Development Treatment Summary		
	Required Treatment (sf)	**Proposed Treatment (sf)**
Linear Development		
Impervious	64,161	67,673
Developed	44,557	71,239
Non-Linear Development		
Impervious	594,211	605,743
Developed	897,556	1,030,758
Total		
Impervious	658,372	673,416
Developed	942,113	1,101,997

The project provides stormwater quality treatment to meet the General Standards for Chapter 500 and will not cause degradation of the receiving waters due to the stormwater runoff from the site.

12.10 Stormwater Quantity

The stormwater management study provides an analysis of predevelopment and post development stormwater runoff rates.

A Class B High Intensity Soil Survey was conducted by Flycather, LLC and used to identify onsite and offsite soils. A Soil Map and full report can be found in HISS Report section of this application. The proposed developed area is comprised of Hydrologic Soil Type A, B, C and D.

The SCS TR-20 methodology, using the HydroCAD program, was employed by Gorrill Palmer to analyze predevelopment and post-development conditions. A 24-hour, SCS Type III storm distribution for the two, ten, twenty-five, and fifty year storm frequencies was used. The corresponding rainfall amounts for these storms are 3.3", 4.9", 6.2", and 7.3" respectively.

Land use cover, delineations of watershed hydraulic flow paths, and hydrologic soils data were obtained using the following data:

- Prouts Neck 7.5 Minute Quadrangle Maps prepared by the U.S.G.S.
- High Intensity Soil Survey, with 1' contour intervals, performed within the property lines by Owen Haskell, Inc.
- Medium Intensity survey with 2' contour intervals from Maine Office of GIS.
- Aerial photography of the project site, obtained from the Maine Office of GIS.
- Field Reconnaissance

12.10.1 Predevelopment Conditions

The drainage study analyzes the watersheds in the predevelopment condition as depicted on the Predevelopment Watershed Map W1.

Subcatchment 1S is expected to consist of soil types A, B, C, and D. There are approximately 23.65 acres of woods.To the southwest and outside of the proposed property lines is an existing business which accounts for approximately 0.56 acres of impervious area in the subcatchment due to the pavement and roofing drainage path. In addition to this, there is runoff from approximately 2.27 acres of housing lots bordering the property that is conveyed to POI 1. These total to approximately 1.60 acres of impervious and 24.89 acres of pervious area.

Subcatchment 2S is approximately 6.56 acres of mostly woods with existing soil type D. There are also approximately 1.1 acres of ¼ acre housing lots conveyed to POI 2. These total to approximately 0.42 acres of impervious and 7.24 acres of pervious area.

Subcatchment 3S includes approximately 37.68 acres of wooded property, with existing soil types A and D. Housing lots totaling approximately 20.89 acres of varying sizes are also tributary to POI #3. These total to approximately 5.58 acres of impervious and 52.99 acres of pervious area.

A watershed map for the predevelopment conditions is attached to this section as drawing number W1 in Attachment A.

Table 24 presents the peak flow rates at the point of interest in the predevelopment condition.

Table 24 – Predevelopment Peak Flow Rates (Type III 24-hr)					
Point of Interest	Peak Flow (CFS)				
	2 Year	10 Year	25 Year	50 Year	100 Year
POI 1	10.25	21.81	32.04	40.99	52.59
POI 2	5.40	10.75	15.35	19.34	24.45
POI 3	33.44	70.94	104.02	132.89	170.27

Copies of the calculations for the predevelopment conditions are included in Attachment B.

12.10.2 Post development Conditions

Analysis for the post development condition consists of determining post development peak flows and limiting the post development flows to predevelopment levels.

The post development condition has been modeled as six subcatchments tributary to POI 1, four subcatchments tributary to POI 2, and eight subcatchment tributary to POI 3.

Subcatchment 1S consists of approximately 1.14 acres of impervious and 0.56 acres of pervious. Runoff from these areas are treated by Grassed Underdrain Soil Filter 1 and is tributary to POI 1.

Subcatchment 2S consists of approximately 0.89 acres of impervious and approximately 1 acre of pervious areas. Runoff from these areas are treated by Grassed Underdrain Soil Filter 2 and is tributary to POI 1.

Subcatchment 3S consists of approximately 0.74 acres of impervious and approximately 0.29 pervious acres. Runoff from these areas are treated by Grassed Underdrain Soil Filter 3 and is tributary to POI 1.

Subcatchment 4S consists of approximately 0.62 acres of impervious area and 0.29 acres of pervious. Runoff from these areas are treated by Grassed Underdrain Soil Filter 5 and is tributary to POI 1.

Subcatchment 5S consists of approximately 2.45 acres of impervious area and1.38 acres of pervious. Runoff from these areas are treated by Gravel Wetland 2 and is tributary to POI 1.

Subcatchment 6S consists of approximately 0.68 acres of impervious area and 0.34 acres of pervious area. Runoff from these areas are treated by Grassed Underdrain Soil Filter 4 and is tributary to POI 2.

Subcatchment 7S is approximately 4.41 acres of impervious area and 2.89 acres of pervious. The runoff from this area is treated by Gravel Wetland 1 and istributary to POI 2.

Subcatchment 8S is approximately .43 acres of impervious area and 1.40 acres of pervious. The runoff from this area is treated by Grassed Underdrain Soil Filter 6 and is tributary to POI 3.

Subcatchment 9S is approximately 0.54 acres of impervious area and 0.31 acres of pervious. The runoff from this area is treated by Grassed Underdrain Soil Filter 7and is tributary to POI 3.

Subcatchment 10S consists of approximately 0.85 acre of impervious area and 0.55 acres of pervious land. This subcatchment is treated by Grassed Underdrain Soil Filter 8 and is tributary to POI 3.

Subcatchment 11S consists of approximately 1.49 acres of impervious area and 0.62 acres of pervious. This subcatchment is treated by Grassed Underdrain Soil Filter 9 and is tributary to POI 3.

Subcatchment 12S consists of approximately 13.16 acres of pervious area, 1.83acres of impervious from a local business and different sized house lots.

Subcatchment 13S consists of approximately 3.52 acres of pervious from wooded, grassed, and ¼ acre housing lots. There is approximately 0.43 acres of impervious from surrounding areas as well. This area is tributary to POI 2 at the southern end of the property.

Subcatchment 14S consists of approximately 42.27 acres of pervious area and 6.29 acres of impervious.

Subcatchment 15S consists of approximately 0.44 acres of impervious area and 0.08 acres of pervious. . The runoff from these areas is treated by the chambers from Focal Points 1 & 2 and is tributary to POI 3

Subcatchment 16S consists of approximately 0.51 acres of impervious area and 0.08 acres of pervious. The runoff from these areas are treated by the chambers from Focal Points 3 & 4.

Subcatchment 17S consists of the drip edge system in the single family lots development area, treating approximately 0.21 acres of impervious and 0.05 acres of pervious area. The runoff is subsequently conveyed to POI 3.

Subcatchment 18S consists of approximately 0.2 acres of impervious area and 0.12 acres of pervious area tributary to Bradley Street drainage infrastructure.

Subcatchment 19S consists of the drip edge system associated with Duplex Units 1 and 2. Approximately 0.06 acres of impervious area are treated by the drip edges. The runoff is tributary to POI 2.

A comparison of pre and post development flow without detention is presented in the following table.

Table 25 – Peak Flow Comparison without detention

Point of Interest	Peak Flow (CFS)			
	2 Year	10 Year	25 Year	50 Year
POI 1				
Pre	10.25	21.81	32.04	40.99
Post	24.35	39.94	52.76	63.64
POI 2				
Pre	5.40	10.75	15.35	19.34
Post	21.92	36.22	47.85	57.66
POI 3				
Pre	33.44	70.94	104.02	132.89
Post	30.93	63.60	92.26	117.22

As can be seen from Table 25, detention is required to reduce the peak flows at POI 1, POI 2, and POI 3 to be at or below predevelopment levels.

Pond 1P – Grassed Underdrain Soil Filter 1

Pond 1P is a grassed underdrain soil filter located on the southwestern portion of the project site. The stormwater runoff from Subcatchment 1S will enter the grassed underdrain soil filter's sediment forebay through the storm drain system. The underdrain outflow has been modeled with a constant exfiltration of 0.06 CFS, which provides a 24-48 hour release time. The outflow from larger storms is controlled by an orifice and weir within the outlet control structure, the pond outflow is tributary to POI 1.

The soil filter has been analyzed to determine its performance for the 2-, 10-, 25-, and 50-year storms. Storms smaller than a two-year event will generate a runoff volume equal to or less than the channel protection volume, 4,806 CF, and will be conveyed through the soil filter and underdrain system. Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 26 below presents the pond performance.

Table 26 – Grassed Underdrain Soil Filter 1				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	4.44	7.04	9.13	10.89
Peak Outflow (CFS)	0.87	2.26	2.94	3.36
Stage (Max. Elevation)	102.44	103.06	103.56	103.93
Detention Storage (cf)	7,256	10,577	13,556	15,981
Depth above base (ft)	1.84	2.46	2.96	3.33

Pond 2P – Grassed Underdrain Soil Filter 2

Pond 2P is a grassed underdrain soil filter located in the southwestern portion of the project site. When looking at the Post Watershed Map in Attachment A, it can be found slightly below and to the right of 1P. The outflow is tributary to Reach 2 and POI 1. The stormwater runoff from Subcatchment 2S will enter the grassed underdrain soil filter's sediment forebay through the storm drain system. The underdrain outflow has been modeled with a constant exfiltration of 0.05 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure.

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 27 presents the pond performance.

Table 27 – Grassed Underdrain Soil Filter 2				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	4.34	7.26	9.64	11.63
Peak Outflow (CFS)	0.88	2.91	3.97	4.61
Stage (Max. Elevation)	103.34	103.95	104.45	104.84
Detention Storage (cf)	6,731	9,679	12,345	14,545
Depth above base (ft)	1.84	2.45	2.95	3.34

Pond 3P – Grassed Underdrain Soil Filter 3

Pond 3P is a grassed underdrain soil filter located in the southwestern part of the property. When examining Attachment A – Post Watershed Map, the pond will be found to the right of 2P. Runoff from subcatchment 3S is collected here and is tributary to reach 2 and POI 1. The underdrain outflow has been modeled at a constant exfiltration rate of 0.04 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure.

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 28 presents the pond performance.

Table 28 – Grassed Underdrain Soil Filter 3				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	2.77	4.34	5.6	6.66
Peak Outflow (CFS)	0.61	1.77	2.36	2.73
Stage (Max. Elevation)	101.94	102.39	102.74	103
Detention Storage (cf)	4,496	6,212	7,664	8,824
Depth above base (ft)	1.54	1.99	2.34	2.6

Pond 4P – Grassed Underdrain Soil Filter 5

Pond 4P is a grassed underdrain soil filter located in the southeast section of the land. The runoff from subcatchment 4S is tributary to pond4P. The underdrain outflow has been modeled at a constant exfiltration rate of 0.04 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure.

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 29 presents the pond performance.

Table 29 – Grassed Underdrain Soil Filter 5				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	2.38	3.77	4.89	5.84
Peak Outflow (CFS)	0.5	1.71	2.62	3.08
Stage (Max. Elevation)	102.94	103.3	103.56	103.74
Detention Storage (cf)	3,764	5,111	6,153	6,955
Depth above base (ft)	1.51	1.87	2.13	2.31

Pond 5P – Gravel Wetland 2

Pond 5P is the gravel wetland on the west side of the property, near the duplex style development. The pond has been analyzed to determine its performance for the 2-, 10-, 25-, and 50-year storms. The stormwater runoff from Subcatchment 5S, will enter the wetland sediment forebay through a stormdrain inlet pipe connected to the catch basins located in the drive areas. The channel protection volume will be conveyed through the gravel underdrain system to an outlet control structure and subsequently conveyed to Reach 2and POI 1.

The outflow from larger storms will be controlled by an orifice within an outlet control structures. Two outlet control structures are used to provide adequate drainage through orifices and weirs. A hole drilled in the cap of the underdrain will regulate the channel protection volume outflow to allow for a 24-48 hour release time. The holes shall be 2.2 inches for Gravel Wetland 2. The following table presents the wetland performance.

Calculations are provided in Attachment B showing the spillway conveying a 100-year storm with 1 ft of freeboard. Due to the large watershed tributary to Gravel Wetland 2, ponding above 3 ft from the pond surface is anticipated for the 25-, and 50-year storms. MDEP recommends a maximum ponding depth of 3 feet for storms up to the 25-year storm. The maximum depth of ponding for this pond at the 25-year storm is approximately ¾ inch greater than 3 feet. Given the minimal additional ponding depth, Gorrill Palmer believes this is insignificant to the health of the pond or plantings.

Table 30 – Gravel Wetland 2				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	10.02	15.91	20.64	24.62
Peak Outflow (CFS)	1.49	4.93	7.33	8.73
Stage (Max. Elevation)	100.27	100.91	101.38	101.74
Detention Storage (cf)	17,579	25,398	31,438	36,517
Depth above base (ft)	1.96	2.6	3.07	3.43

Pond 6P – Grassed Underdrain Soil Filter 4

Pond 6P is a grassed underdrain soil filter located in the south portion of the site. Runoff from subcatchment 6S is directed to Pond 6P which is tributary to POI 2. This pond has been modeled with a constant exfiltration of 0.04 CFS, which provides a 24–48-hour release time. Larger storms will be controlled by an orifice within the outlet control structure

Storms smaller than a two-year event will generate a runoff volume equal to or less than the channel protection volume, 3,099 CF, and will be conveyed through the soil filter and underdrain system.
Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 28 presents the pond performance.

Table 31 – Grassed Underdrain Soil Filter 4				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	2.65	4.21	5.46	6.52
Peak Outflow (CFS)	0.42	0.79	0.97	1.09
Stage (Max. Elevation)	101.7	102.46	103.04	103.48
Detention Storage (cf)	4,378	7,074	9,428	11,374
Depth above base (ft)	1.8	2.56	3.14	3.58

Pond 7P – Gravel Wetland 1

Pond 7P is Gravel Wetland 1, proposed in the south side of the property. The pond has been analyzed to determine its performance for the 2-, 10-, 25-, and 50-year storms. The stormwater runoff from Subcatchment 7S will enter the wetland sediment forebay through a stormdrain inlet pipe. The channel protection volume, 20,234 CF, will be conveyed through the gravel underdrain system to an outlet control structure and subsequently to POI 2. The outflow from larger storms will be controlled by an orifice within an outlet control structure. Two outlet control structures are used to provide adequate drainage through orifices and weirs. A hole drilled in the cap of the underdrain will regulate the channel protection volume outflow to allow for a 24-48 hour release time. The holes shall be 2.4 inches for Gravel Wetland 1. The following table presents the wetland performance.

A spillway analysis is presented in Attachment B showing the spillway conveying a 100-year storm with 1 ft of freeboard. Due to the large watershed tributary to Gravel Wetland 1, ponding above 3 ft from the pond surface is proposed for the 25 and 50 year storms. Additionally, a 10-year storm is also very close to a 3 ft ponding elevation. Given the minimal additional ponding depth, Gorrill Palmer believes this is insignificant to the health of the pond or plantings. Table 32 below presents the wetland performance.

Table 32 – Gravel Wetland 1				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	17.92	29.19	38.28	45.91
Peak Outflow (CFS)	1.02	1.76	2.16	2.44
Stage (Max. Elevation)	100.29	101.50	102.48	103.26
Detention Storage (cf)	36,350	61,368	83,823	103,357
Depth above base (ft)	2.36	3.57	4.55	5.33

Pond 8P & 9P – Grassed Underdrain Soil Filter 6 & 7

Pond 8P and 9P are the grassed underdrain soil filters located on the east portion of the project. The ponds have been modeled together because they are directly adjacent to each other and share an outflow pipe. Runoff from subcatchment 8S is directed to Pond 8P while runoff from subcatchment 9S is directed to Pond 9P, both of which are tributary to POI 3. The ponds have been modeled with a constant exfiltration of 0.14 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 33 presents the pond performance.

Table 33 – Grassed Underdrain Soil Filter 6 & 7				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	1.22	3.62	6.07	8.34
Peak Outflow (CFS)	0.14	0.21	0.6	0.9
Stage (Max. Elevation)	99.61	100.58	100.91	101.32
Detention Storage (cf)	1,793	6,943	9,195	12,312
Depth above base (ft)	0.41	1.38	1.71	2.12

Pond 10P – Grassed Underdrain Soil Filter 8

Pond 10P is the grassed underdrain soil filter also located near the east side of the site. The runoff from subcatchment 10S is directed to grassed underdrain soil filter 8 which is tributary to POI 3. The pond was modeled with a constant exfiltration of 0.05 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 34 presents the pond performance.

Table 34 – Grassed Underdrain Soil Filter 8				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	2.17	4.2	5.92	7.4
Peak Outflow (CFS)	0.11	0.94	1.91	2.51
Stage (Max. Elevation)	101.69	102.09	102.49	102.87
Detention Storage (cf)	4,357	6,024	7,792	9,579
Depth above base (ft)	1.33	1.73	2.13	2.51

Pond 11P – Grassed Underdrain Soil Filter 9

Pond 11P is the grassed underdrain soil filter located the furthest to the east on site. Runoff from subcatchment 11S is directed to grassed underdrain soil filter 9 which is also tributary to POI 3. This pond was modeled with a constant exfiltration of 0.07 CFS, which provides a 24-48 hour release time. Larger storms will be controlled by an orifice within the outlet control structure

Larger storms will be conveyed through the soil filter underdrain and through the outlet control structure and emergency spillway. The emergency spillway has been designed to contain the 100-year storm without overtopping the berm. A spillway analysis is included in Attachment B. Table 35 presents the pond performance.

Table 35 – Grassed Underdrain Soil Filter 9				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	4.82	8.08	10.72	12.94
Peak Outflow (CFS)	0.5	2.06	2.86	3.36
Stage (Max. Elevation)	98.42	99.06	99.62	100.06
Detention Storage (cf)	8,218	12,318	16,342	19,825
Depth above base (ft)	1.76	2.4	2.96	3.4

Pond 12P – Chamber 1

Pond 12P is the subsurface storage system for Focal Points 1 and 2 on the main access road. The subsurface storage chamber has been analyzed to determine its performance for the 2-, 10-,25- and 50-year storms. The stormwater runoff from subcatchment 15S will enter the subsurface storage chamber isolator row through a stormdrain outlet pipe from Focal Points 1 and 2. The smaller storms which generate runoff volume equal to or less than the channel protection volume will be conveyed through the crushed stone pad and underdrain system. Larger storms will be conveyed to the outlet control structure and through the overflow weir. The weir has been modeled as a broad crested weir. The following table presents the pond performance.

Table 36 – Chamber System 1				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	1.46	2.24	2.87	3.4
Peak Outflow (CFS)	0.73	2.2	2.81	3.33
Stage (Max. Elevation)	107.07	107.21	107.25	107.29
Detention Storage (cf)	1,830	1,917	1,917	1,917
Depth above base (ft)	2.97	3.11	3.15	3.19

Pond 13P – Chamber 2

Pond 13P is the subsurface storage system for Focal Points 3 and 4 on the main access road. The subsurface storage chamber has been analyzed to determine its performance for the 2-, 10-,25- and 50-year storms. The stormwater runoff from subcatchment 16S will enter the subsurface storage chamber isolator row through a stormdrain outlet pipe from Focal Points 3 and 4. The smaller storms which generate runoff volume equal to or less than the channel protection volume will be conveyed through the crushed stone pad and underdrain system. Larger storms will be conveyed to the outlet control structure and through the overflow weir. The weir has been modeled as a broad crested weir. The following table presents the pond performance.

Table 37 – Chamber System 2				
	Storm Event			
	2-Year	10-Year	25-Year	50-Year
Peak Inflow (CFS)	1.72	2.61	3.33	3.93
Peak Outflow (CFS)	1.28	2.53	3.24	3.83
Stage (Max. Elevation)	106.87	106.98	107.03	107.07
Detention Storage (cf)	2,178	2,265	2,309	2,309
Depth above base (ft)	2.77	2.88	2.93	2.97

A watershed map for the post development conditions is attached to this section as drawing number W2 in Attachment A. Attachment B includes the TR-20 pond calculations.

As presented in Table 25 previously, detention of tributary runoff to POI's 1, 2 and 3 are required. The following table presents a comparison of peak flow with detention.

Table 38 – Peak Flow Comparison with detention					
Point of Interest	Peak Flow (CFS)				
	2 Year	10 Year	25 Year	50 Year	100 Year
POI 1					
Pre	10.25	21.81	32.04	40.99	52.59
Post	8.89	20.13	30.13	38.50	46.29
POI 2					
Pre	5.40	10.75	15.35	19.34	24.45
Post	4.88	9.34	12.74	15.53	20.01
POI 3					
Pre	33.44	70.94	104.02	132.89	170.27
Post	31.08	64.68	93.55	118.50	150.25

As can be seen from Table 38 above, the peak post development flow is at or below predevelopment levels.

12.10.3 Conclusion – Water Quantity

The peak flow at the Point of Interest have been reduced to be at or below predevelopment peak levels. The project is not likely to have an adverse impact on abutting or downstream properties due to stormwater runoff.

12.11 Construction BMPs

Additional water quality treatment will be provided during construction by best management practices (BMP). Standard BMPs to be employed include siltation fencing around the downslope construction perimeter, siltation fence around the constructed wetland and level lip spreader, sedimentation basins, rip rap, pipe stabilized construction entrances and erosion control fabrics applied to slopes prior to revegetation.

12.12 Maintenance of Facilities, Recertification and Housekeeping

See Maintenance of Facilities, Recertification and Housekeeping sections of the Erosion and Sedimentation Control Report, which can be found in Section 14 of the Site Location of Development application for this project.

12.13 Conclusion

Gorrill Palmer has been retained by 321 Lincoln Street Development, LLC to prepare plans and permit applications for the development of Lincoln Village on the proposed parcel in Saco, Maine. Based upon the attached calculations, the proposed project meets or exceeds the water quality and water quantity regulations of the City of Saco and Chapter 500 of the MDEP and will not cause degradation of the receiving waters from the site or likely have an adverse impact on abutting or downstream properties due to the stormwater runoff.

Therefore, the proposed development meets the Site Law Application requirements under the MDEP.

12.14 Attachments

Attached to this section are the following items:

Attachment A – Watershed Maps (Pre, Post, Water Quality)
Attachment B – TR-20 Calculations
Attachment C – Pipe Capacity Calculations
Attachment D – Orifice Sizing Calculations
Attachment E – FocalPoint Manufacturer Approval Letter
Attachment F – Bradley Street Runoff Calculations
Attachment G – Sediment Forebay Storage Calculation

ATTACHMENT A

WATERSHED MAPS (PRE, POST, WATER QUALITY)

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Rev.	Date	Revision

Issued For	Date	By
RESPONSE TO COMMENTS	4/11/23	DJG
SITE & SUBDIVISION RESPONSE	2/15/23	DJG
SITE & SUBDIVISION RESUBMISSION	11/03/22	DJG
UTILITY ABILITY TO SERVE REQUESTS	8/30/22	DJG
NRPA TIER II SUBMISSION	8/24/22	DJG
CITY OF SACO SITE PLAN/SUBDIVISION REVIEW	8/15/22	DJG

Design: TPG | Draft: CEH | Date: SEPT 2021
Checked: DJG | Scale: 1"=125' | Job No.: 3831
File Name: 3831–WS–PRE.dwg

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Drawing Name: **Pre Development Watershed Map**
Project: **Lincoln Village**, Saco, Maine
Client: **321 Lincoln Street Development, LLC**, 40 Farm Gate Road, Falmouth, Maine 04105

Drawing No. *W1*

LEGEND

1	SUBCATCHMENT AREA
A	TIME OF CONCENTRATION FLOW PATH
	WATERSHED BOUNDARY
	WETLAND BOUNDARY
SF	SHEET FLOW
PF	PIPE FLOW
SCF	SHALLOW CONCENTRATED FLOW
CF	CHANNEL FLOW
POI	POINT OF INTEREST
1	REACH
1P	POND

NOTES

1. WETLAND DELINEATION FROM FLYCATCHER, LLC DATA PROVIDED TO GORRILL PALMER ON SEPTEMBER 14, 2021.
2. VERNAL POOL DELINEATION FROM SITE INVENTORY PLAN PREPARED BY FIELDSTONE LAND CONSULTANTS, PLCC OF MILFORD, NH DATED JUNE 3, 2020.
3. SITE BOUNDARY FROM SACO, MAINE AVAILABLE GIS LINE WORK. BOUNDARY SHALL BE APPROXIMATE.
4. SITE TOPOGRAPHY FROM MAINE GIS AVAILABLE LIDAR LINE WORK.
5. SOIL INFORMATION FROM MAINE GIS.
6. EXISTING ZONING INFORMATION – SEE SPACE AND BULK TABLE

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.

STATE OF MAINE 4/11/23 DREW J. GAGNON No. 16111 LICENSED PROFESSIONAL ENGINEER

Rev.	Date	Revision

Issued For	Date	By
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File Name: 3831-WS-POST.dwg

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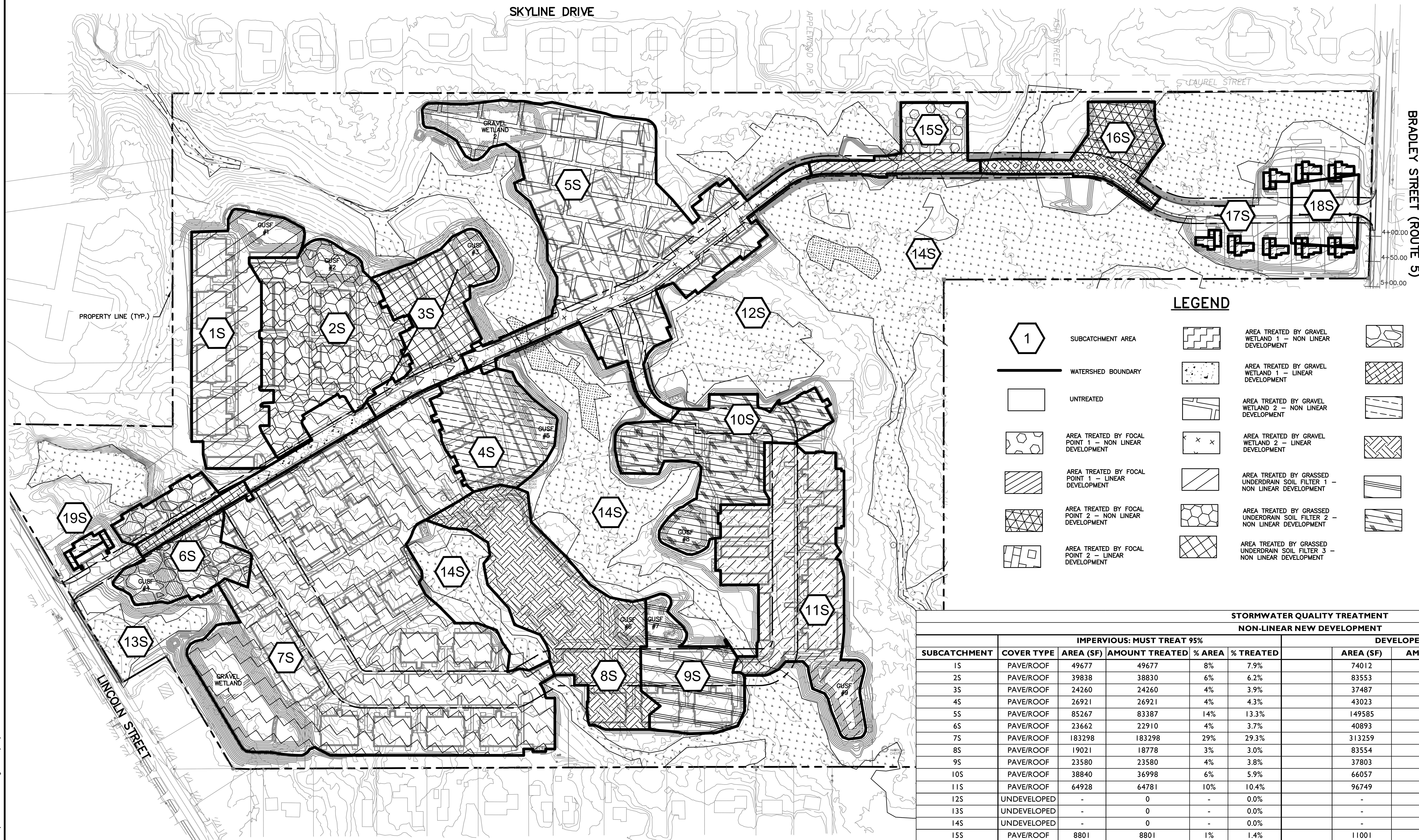
Drawing Name: **Post Development Watershed Map**
Project: **Lincoln Village**
Saco, Maine
Client: **321 Lincoln Street Development, LLC**
40 Farm Gate Road, Falmouth, Maine 04105

Drawing No. W2



FOREST STREET

STORMWATER QUALITY TREATMENT

NON-LINEAR NEW DEVELOPMENT

	IMPERVIOUS: MUST TREAT 95%					DEVELOPED: MUST TREAT 80%					TREATMENT
SUBCATCHMENT	COVER TYPE	AREA (SF)	AMOUNT TREATED	% AREA	% TREATED		AREA (SF)	AMOUNT TREATED	% AREA	% TREATED	
1S	PAVE/ROOF	49677	49677	8%	7.9%		74012	73933	6.6%	6.6%	GUSF 1
2S	PAVE/ROOF	39838	38830	6%	6.2%		83553	82545	7.4%	7.4%	GUSF 2
3S	PAVE/ROOF	24260	24260	4%	3.9%		37487	35345	3.3%	3.2%	GUSF 3
4S	PAVE/ROOF	26921	26921	4%	4.3%		43023	39620	3.8%	3.5%	GUSF 5
5S	PAVE/ROOF	85267	83387	14%	13.3%		149585	143628	13.3%	12.8%	GW 2
6S	PAVE/ROOF	23662	22910	4%	3.7%		40893	37535	3.6%	3.3%	GUSF 4
7S	PAVE/ROOF	183298	183298	29%	29.3%		313259	309400	27.9%	27.6%	GW 1
8S	PAVE/ROOF	19021	18778	3%	3.0%		83554	79636	7.4%	7.1%	GUSF 6
9S	PAVE/ROOF	23580	23580	4%	3.8%		37803	36965	3.4%	3.3%	GUSF 7
10S	PAVE/ROOF	38840	36998	6%	5.9%		66057	60887	5.9%	5.4%	GUSF 8
11S	PAVE/ROOF	64928	64781	10%	10.4%		96749	91815	8.6%	8.2%	GUSF 9
12S	UNDEVELOPED	-	0	-	0.0%		-	0	-	0.0%	UNDEVELOPED / UNTREATED
13S	UNDEVELOPED	-	0	-	0.0%		-	0	-	0.0%	UNDEVELOPED / UNTREATED
14S	UNDEVELOPED	-	0	-	0.0%		-	0	-	0.0%	UNDEVELOPED / UNTREATED
15S	PAVE/ROOF	8801	8801	1%	1.4%		11001	11001	1.0%	1.0%	FOCAL POINTS 1 & 2
16S	PAVE/ROOF	11635	11635	2%	1.9%		14544	14544	1.3%	1.3%	FOCAL POINTS 3 & 4
17S & 18S	PAVE/ROOF	21851	9276	3%	1.5%		50992	11292	4.5%	1.0%	SF DRIPEDGES
19S	ROOF	3908	2612	1%	0.4%		4885	2612	0.4%	0.2%	DUPLEX DRIP EDGES
Trail Areas							14548	0	1.3%	0.0%	UNTREATED TRAILS
	TOTAL AREA	625485	605744	100.0%		TOTAL AREA	1121945	1030759	100.0%		
			TOTAL % TREATMENT		96.8%		TOTAL % TREATMENT			91.9%	

*ADDITIONAL FUTURE DEVELOPMENT

STORMWATER QUALITY TREATMENT

LINEAR NEW DEVELOPMENT

	IMPERVIOUS: MUST TREAT 75%					DEVELOPED: MUST TREAT 50%					TREATMENT
SUBCATCHMENT	COVER TYPE	AREA (SF)	AMOUNT TREATED	% AREA	% TREATED		AREA (SF)	AMOUNT TREATED	% AREA	% TREATED	
3S	PAVEMENT	7984	7984	9.3%	9.3%		9492	9492	10.7%	10.7%	GUSF 3
5S	PAVEMENT	23466	23466	27.4%	27.4%		23466	23466	26.3%	26.3%	GW 2
6S	PAVEMENT	6609	6609	7.7%	7.7%		6700	6700	7.5%	7.5%	GUSF 4
7S	PAVEMENT	8670	8670	10.1%	10.1%		8670	8670	9.7%	9.7%	GW 1
15S	PAVEMENT	10154	10154	11.9%	11.9%		11532	11532	12.9%	12.9%	FOCAL POINTS 1 & 2
16S	PAVEMENT	10791	10791	12.6%	12.6%		11379	11379	12.8%	12.8%	FOCAL POINTS 3 & 4
17S & 18S	PAVEMENT	12052	0	14.1%	0.0%		12052	0	13.5%	0.0%	SF DRIPEDGES
19S		5823	0	6.8%	0.0%		5823	0	6.5%	0.0%	DUPLEX DRIP EDGES
	TOTAL AREA	85548	67674	100%		TOTAL AREA	89114	71240	100%		
			TOTAL % TREATMENT		79%		TOTAL % TREATMENT			80%	

100 0 50 100 200
1 inch = 100 ft.

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.

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4/11/23
DREW J. GAGNON
No. 16111
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Drawing Name: Water Quality Plan

Project: Lincoln Village
Saco, Maine

Client: 321 Lincoln Street Development, LLC
40 Farm Gate Road, Falmouth, Maine 04105

Drawing No. WQ

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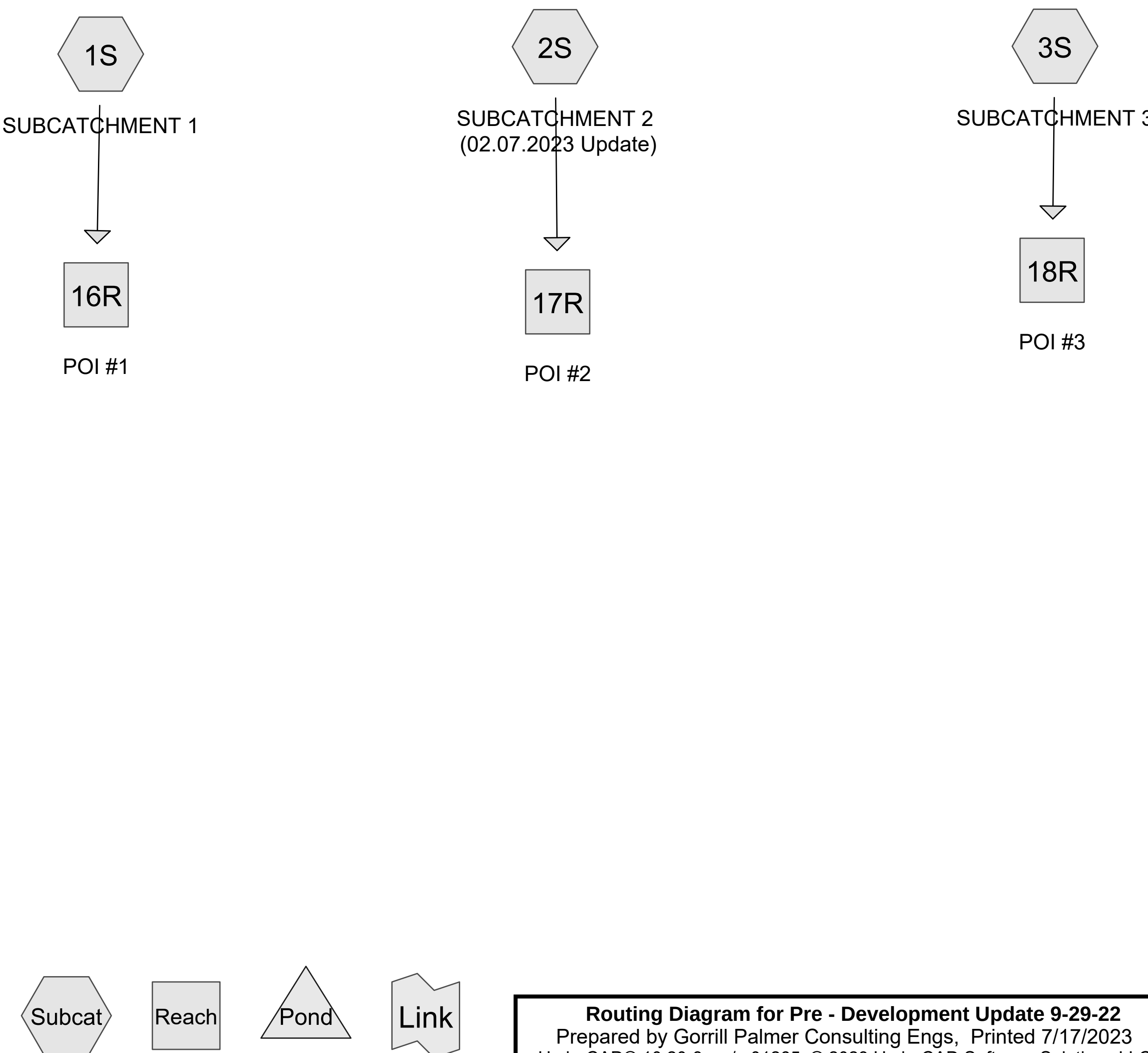
ATTACHMENT B

TR-20 CALCULATIONS

PRE DEVELOPMENT



Routing Diagram for Pre - Development Update 9-29-22
Prepared by Gorrill Palmer Consulting Engs, Printed 7/17/2023
HydroCAD® 10.20-3c s/n 01265 © 2023 HydroCAD Software Solutions LLC

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=26.484 ac 6.04% Impervious Runoff Depth=1.16"
Flow Length=1,826' Tc=92.7 min CN=75 Runoff=10.25 cfs 2.565 af

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=1.35"
Flow Length=583' Tc=46.5 min CN=78 Runoff=5.40 cfs 0.860 af

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=58.564 ac 9.52% Impervious Runoff Depth=1.16"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=33.44 cfs 5.672 af

Reach 16R: POI #1 Inflow=10.25 cfs 2.565 af
Outflow=10.25 cfs 2.565 af

Reach 17R: POI #2 Inflow=5.40 cfs 0.860 af
Outflow=5.40 cfs 0.860 af

Reach 18R: POI #3 Inflow=33.44 cfs 5.672 af
Outflow=33.44 cfs 5.672 af

Total Runoff Area = 92.709 ac Runoff Volume = 9.097 af Average Runoff Depth = 1.18"
91.81% Pervious = 85.115 ac 8.19% Impervious = 7.594 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT 1 Runoff Area=26.484 ac 6.04% Impervious Runoff Depth=2.37"
Flow Length=1,826' Tc=92.7 min CN=75 Runoff=21.81 cfs 5.227 af

Subcatchment 2S: SUBCATCHMENT 2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=2.63"
Flow Length=583' Tc=46.5 min CN=78 Runoff=10.75 cfs 1.677 af

Subcatchment 3S: SUBCATCHMENT 3 Runoff Area=58.564 ac 9.52% Impervious Runoff Depth=2.37"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=70.94 cfs 11.559 af

Reach 16R: POI #1 Inflow=21.81 cfs 5.227 af
Outflow=21.81 cfs 5.227 af

Reach 17R: POI #2 Inflow=10.75 cfs 1.677 af
Outflow=10.75 cfs 1.677 af

Reach 18R: POI #3 Inflow=70.94 cfs 11.559 af
Outflow=70.94 cfs 11.559 af

Total Runoff Area = 92.709 ac Runoff Volume = 18.463 af Average Runoff Depth = 2.39"
91.81% Pervious = 85.115 ac 8.19% Impervious = 7.594 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=26.484 ac 6.04% Impervious Runoff Depth=3.45"
Flow Length=1,826' Tc=92.7 min CN=75 Runoff=32.04 cfs 7.621 af

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=3.76"
Flow Length=583' Tc=46.5 min CN=78 Runoff=15.35 cfs 2.398 af

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=58.564 ac 9.52% Impervious Runoff Depth=3.45"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=104.02 cfs 16.852 af

Reach 16R: POI #1 Inflow=32.04 cfs 7.621 af
Outflow=32.04 cfs 7.621 af

Reach 17R: POI #2 Inflow=15.35 cfs 2.398 af
Outflow=15.35 cfs 2.398 af

Reach 18R: POI #3 Inflow=104.02 cfs 16.852 af
Outflow=104.02 cfs 16.852 af

Total Runoff Area = 92.709 ac Runoff Volume = 26.871 af Average Runoff Depth = 3.48"
91.81% Pervious = 85.115 ac 8.19% Impervious = 7.594 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=26.484 ac 6.04% Impervious Runoff Depth=4.41"
Flow Length=1,826' Tc=92.7 min CN=75 Runoff=40.99 cfs 9.744 af

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=4.75"
Flow Length=583' Tc=46.5 min CN=78 Runoff=19.34 cfs 3.031 af

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=58.564 ac 9.52% Impervious Runoff Depth=4.41"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=132.89 cfs 21.546 af

Reach 16R: POI #1 Inflow=40.99 cfs 9.744 af
Outflow=40.99 cfs 9.744 af

Reach 17R: POI #2 Inflow=19.34 cfs 3.031 af
Outflow=19.34 cfs 3.031 af

Reach 18R: POI #3 Inflow=132.89 cfs 21.546 af
Outflow=132.89 cfs 21.546 af

Total Runoff Area = 92.709 ac Runoff Volume = 34.320 af Average Runoff Depth = 4.44"
91.81% Pervious = 85.115 ac 8.19% Impervious = 7.594 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=26.484 ac 6.04% Impervious Runoff Depth=5.68"
Flow Length=1,826' Tc=92.7 min CN=75 Runoff=52.59 cfs 12.530 af

Subcatchment 2S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=6.04"
Flow Length=583' Tc=46.5 min CN=78 Runoff=24.45 cfs 3.857 af

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=58.564 ac 9.52% Impervious Runoff Depth=5.68"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=170.27 cfs 27.708 af

Reach 16R: POI #1 Inflow=52.59 cfs 12.530 af
Outflow=52.59 cfs 12.530 af

Reach 17R: POI #2 Inflow=24.45 cfs 3.857 af
Outflow=24.45 cfs 3.857 af

Reach 18R: POI #3 Inflow=170.27 cfs 27.708 af
Outflow=170.27 cfs 27.708 af

Total Runoff Area = 92.709 ac Runoff Volume = 44.095 af Average Runoff Depth = 5.71"
91.81% Pervious = 85.115 ac 8.19% Impervious = 7.594 ac

Summary for Subcatchment 1S: SUBCATCHMENT 1

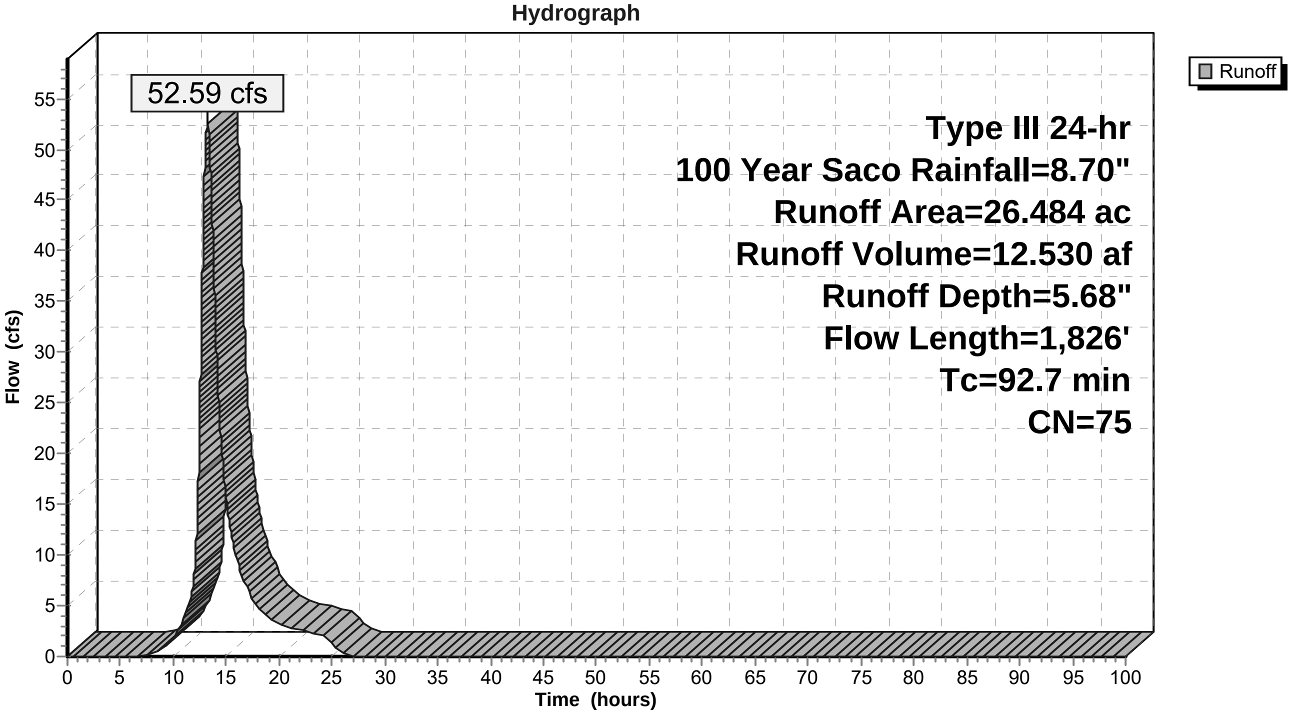
Runoff = 52.59 cfs @ 13.28 hrs, Volume= 12.530 af, Depth= 5.68"
Routed to Reach 16R : POI #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
1.765	30	Woods, Good, HSG A
21.887	77	Woods, Good, HSG D
0.113	98	Roofs, HSG D
0.446	98	Paved parking, HSG D
0.841	85	1/8 acre lots, 65% imp, HSG B
0.129	81	1/3 acre lots, 30% imp, HSG C
1.120	86	1/3 acre lots, 30% imp, HSG D
0.183	92	1/8 acre lots, 65% imp, HSG D
26.484	75	Weighted Average
24.885		93.96% Pervious Area
1.599		6.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	145	0.0173	0.08		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
20.6	424	0.0047	0.34		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
11.6	292	0.0070	0.42		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
28.4	408	0.0023	0.24		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
1.9	557	0.0083	4.89	29.32	**Channel Flow, E - F** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.025 Earth, clean & winding
92.7	1,826	Total			

Subcatchment 1S: SUBCATCHMENT 1



Summary for Subcatchment 2S: SUBCATCHMENT 2 (02.07.2023 Update)

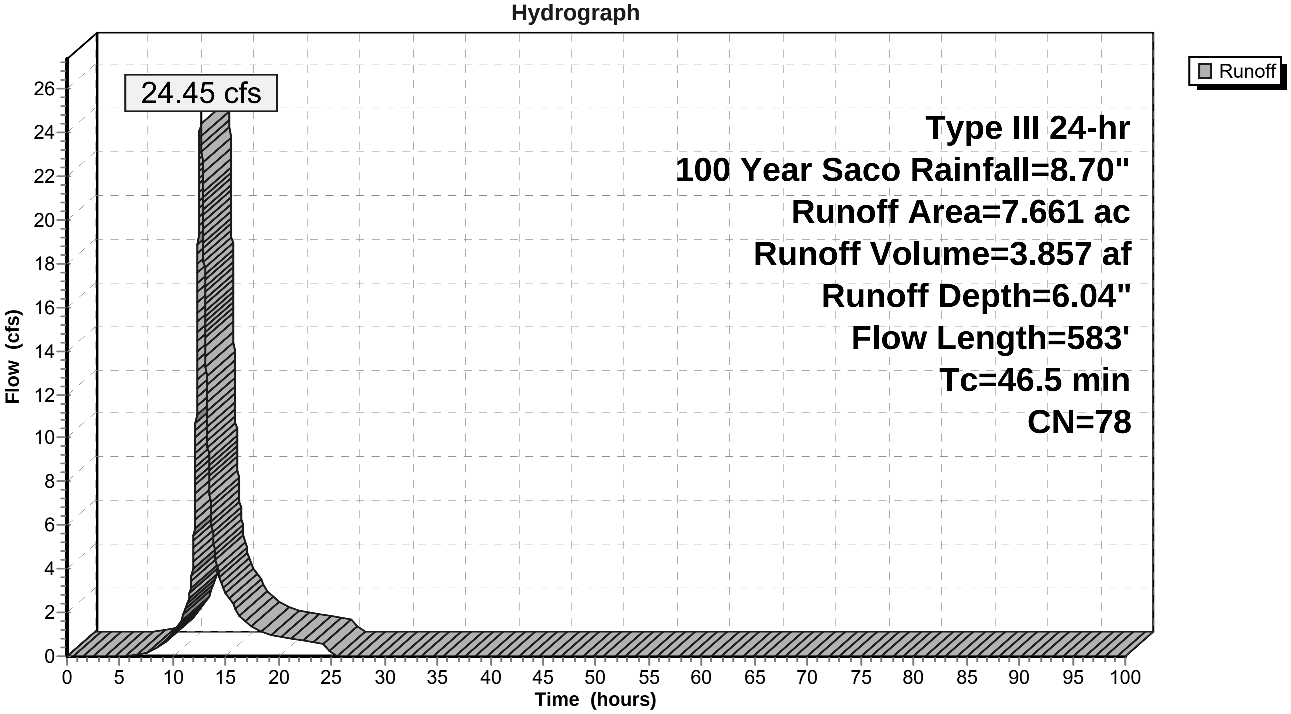
Runoff = 24.45 cfs @ 12.65 hrs, Volume= 3.857 af, Depth= 6.04"
Routed to Reach 17R : POI #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
6.562	77	Woods, Good, HSG D
1.099	87	1/4 acre lots, 38% imp, HSG D
7.661	78	Weighted Average
7.243		94.55% Pervious Area
0.418		5.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	125	0.0280	0.05		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.30"
1.8	126	0.0556	1.18		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
1.2	93	0.0645	1.27		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
3.3	157	0.0255	0.80		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
1.7	82	0.0244	0.78		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
46.5	583	Total			

Subcatchment 2S: SUBCATCHMENT 2 (02.07.2023 Update)



Summary for Subcatchment 3S: SUBCATCHMENT 3

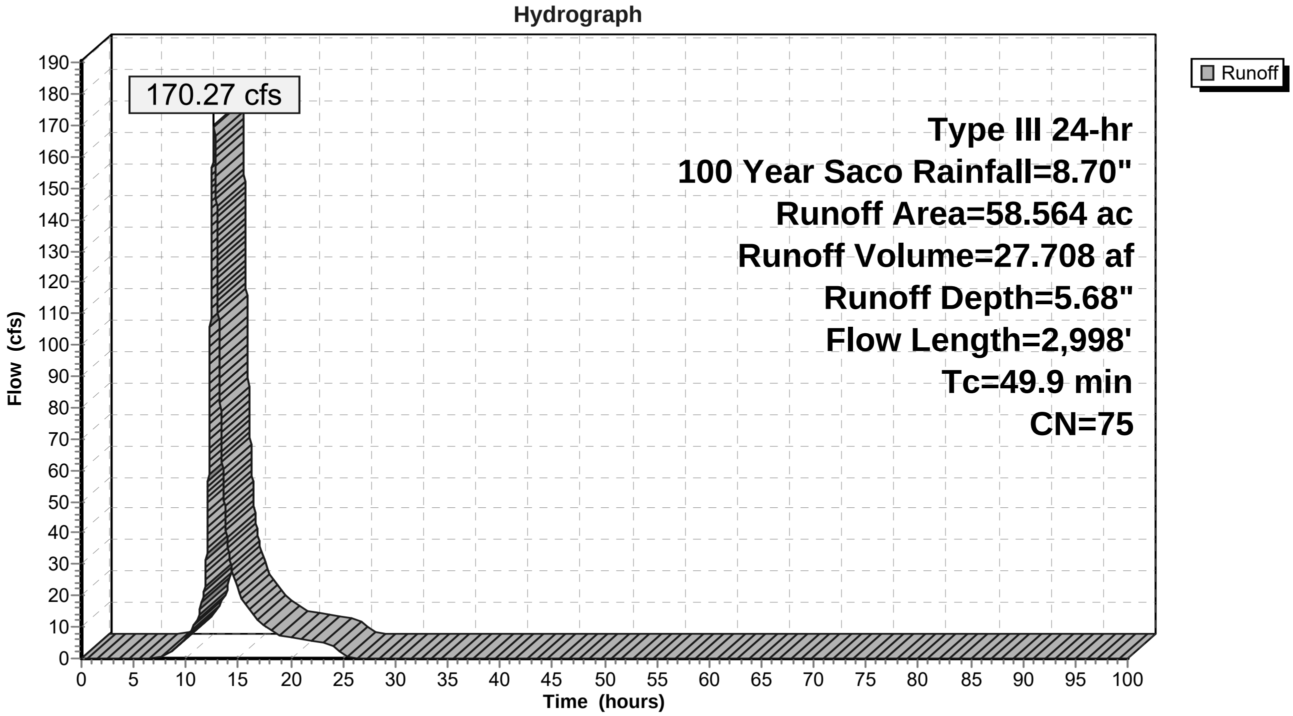
Runoff = 170.27 cfs @ 12.69 hrs, Volume= 27.708 af, Depth= 5.68"
Routed to Reach 18R : POI #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
3.238	30	Woods, Good, HSG A
34.441	77	Woods, Good, HSG D
2.735	87	1/4 acre lots, 38% imp, HSG D
4.813	54	1/2 acre lots, 25% imp, HSG A
13.337	85	1/2 acre lots, 25% imp, HSG D
58.564	75	Weighted Average
52.987		90.48% Pervious Area
5.577		9.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	125	0.0161	0.17		**Sheet Flow, A - B** Grass: Short n= 0.150 P2= 3.30"
3.2	380	0.0172	1.97		**Shallow Concentrated Flow, B - C** Grassed Waterway Kv= 15.0 fps
0.1	40	0.0373	11.48	20.29	**Pipe Channel, C - D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
24.8	721	0.0094	0.48		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
3.3	584	0.0062	2.93	23.40	**Channel Flow, E - F** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
2.5	540	0.0095	3.62	28.97	**Channel Flow, F - G** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
3.4	608	0.0066	3.02	24.14	**Channel Flow, G - H** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
49.9	2,998	Total			

Subcatchment 3S: SUBCATCHMENT 3

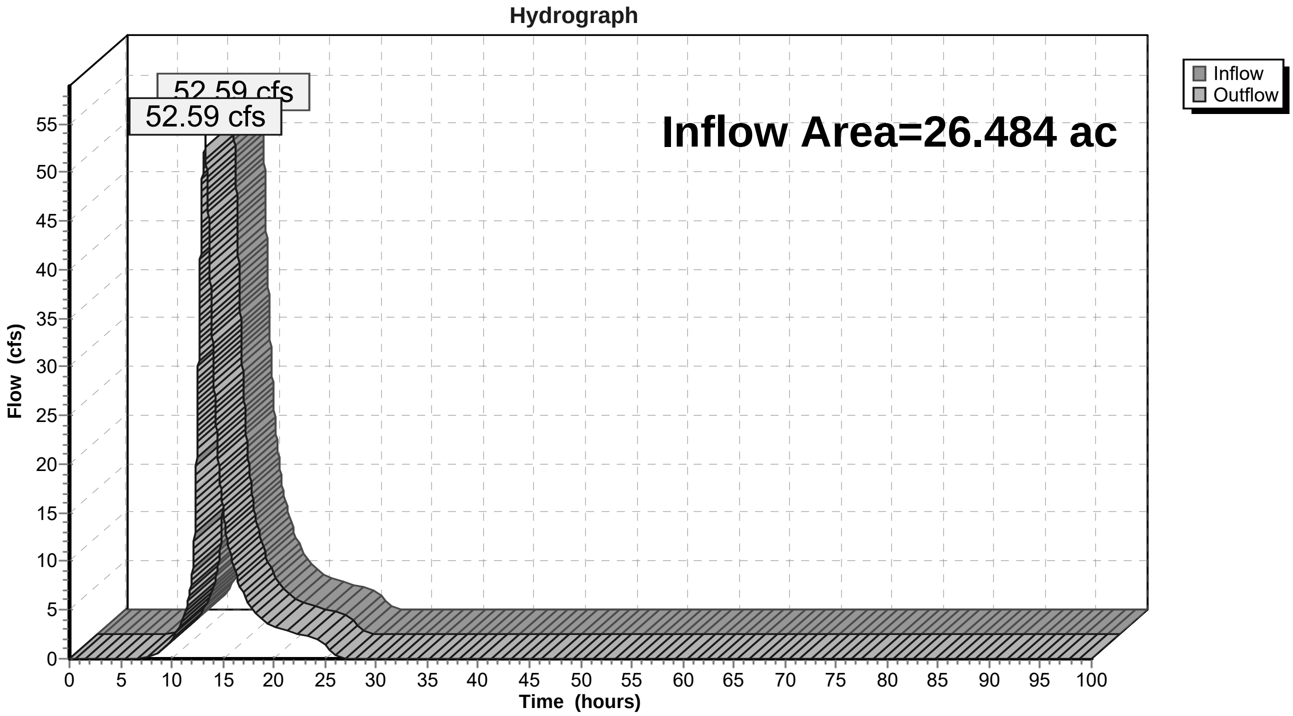


Summary for Reach 16R: POI #1

Inflow Area =	26.484 ac,	6.04% Impervious, Inflow Depth = 5.68"	for 100 Year Saco event	
Inflow =	52.59 cfs @	13.28 hrs, Volume=	12.530 af	
Outflow =	52.59 cfs @	13.28 hrs, Volume=	12.530 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 16R: POI #1

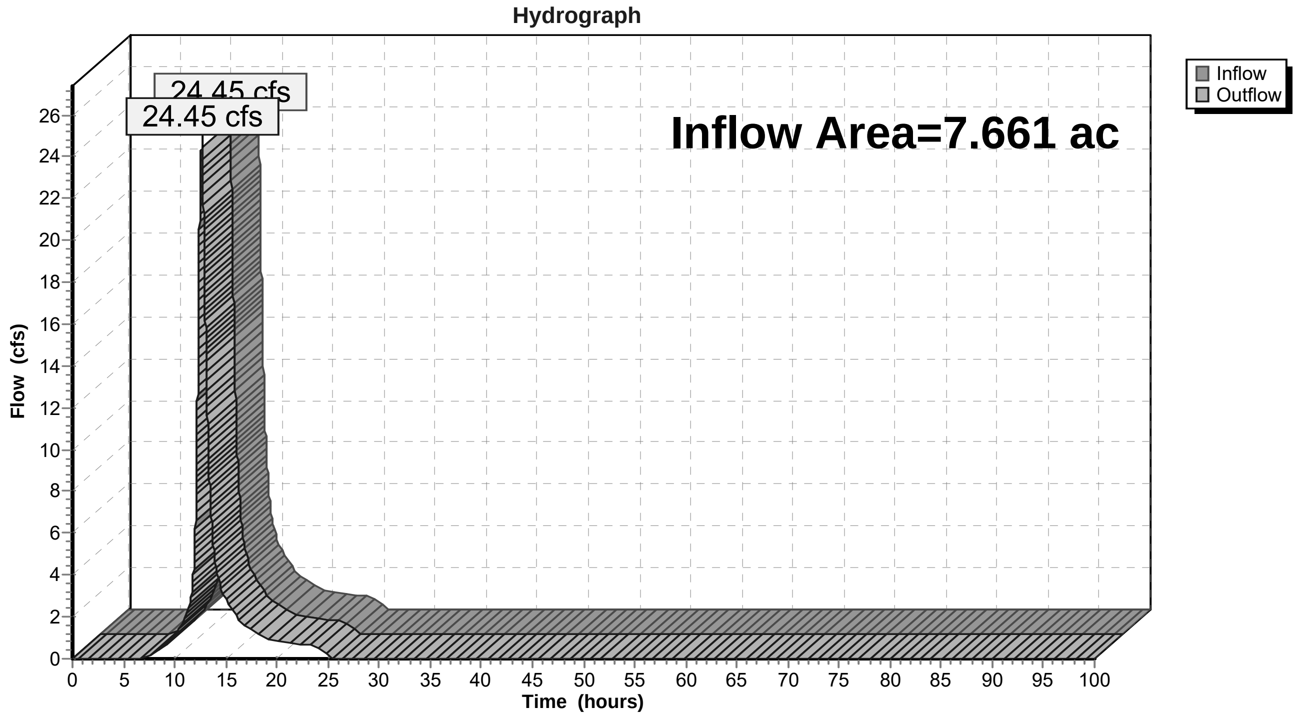


Summary for Reach 17R: POI #2

Inflow Area = 7.661 ac, 5.45% Impervious, Inflow Depth = 6.04" for 100 Year Saco event
Inflow = 24.45 cfs @ 12.65 hrs, Volume= 3.857 af
Outflow = 24.45 cfs @ 12.65 hrs, Volume= 3.857 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 17R: POI #2

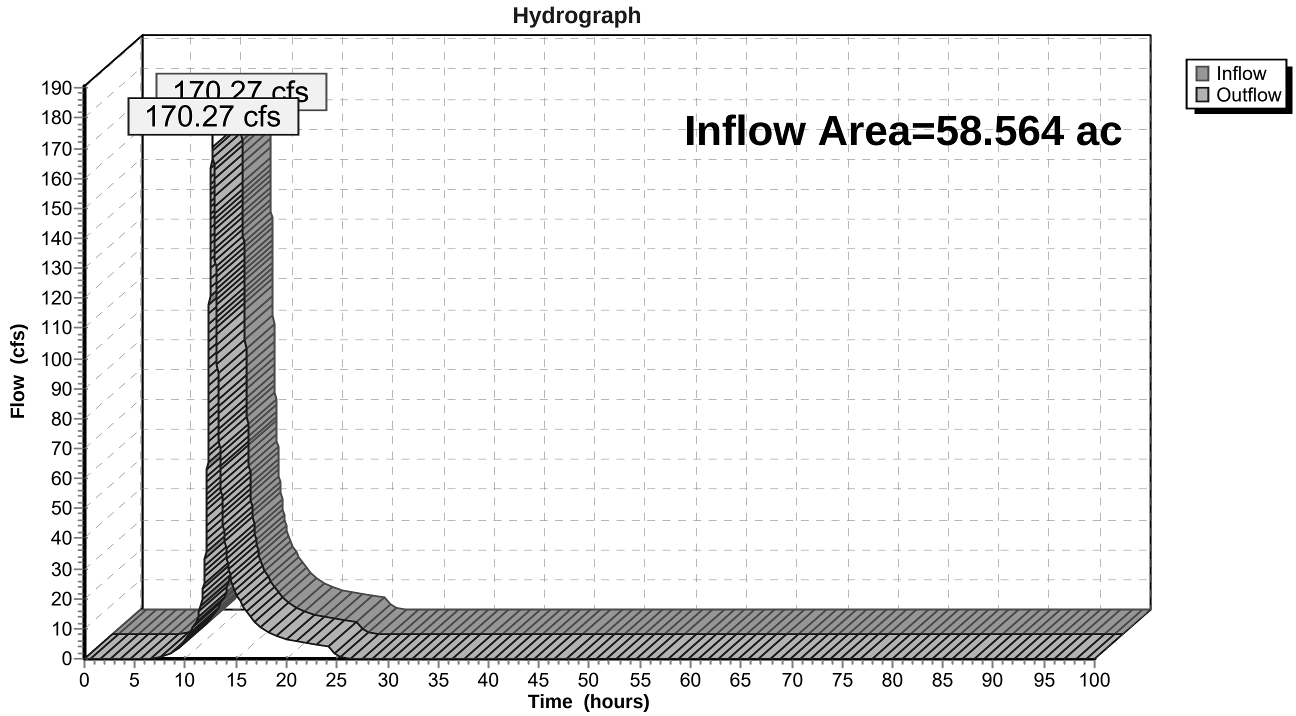


Summary for Reach 18R: POI #3

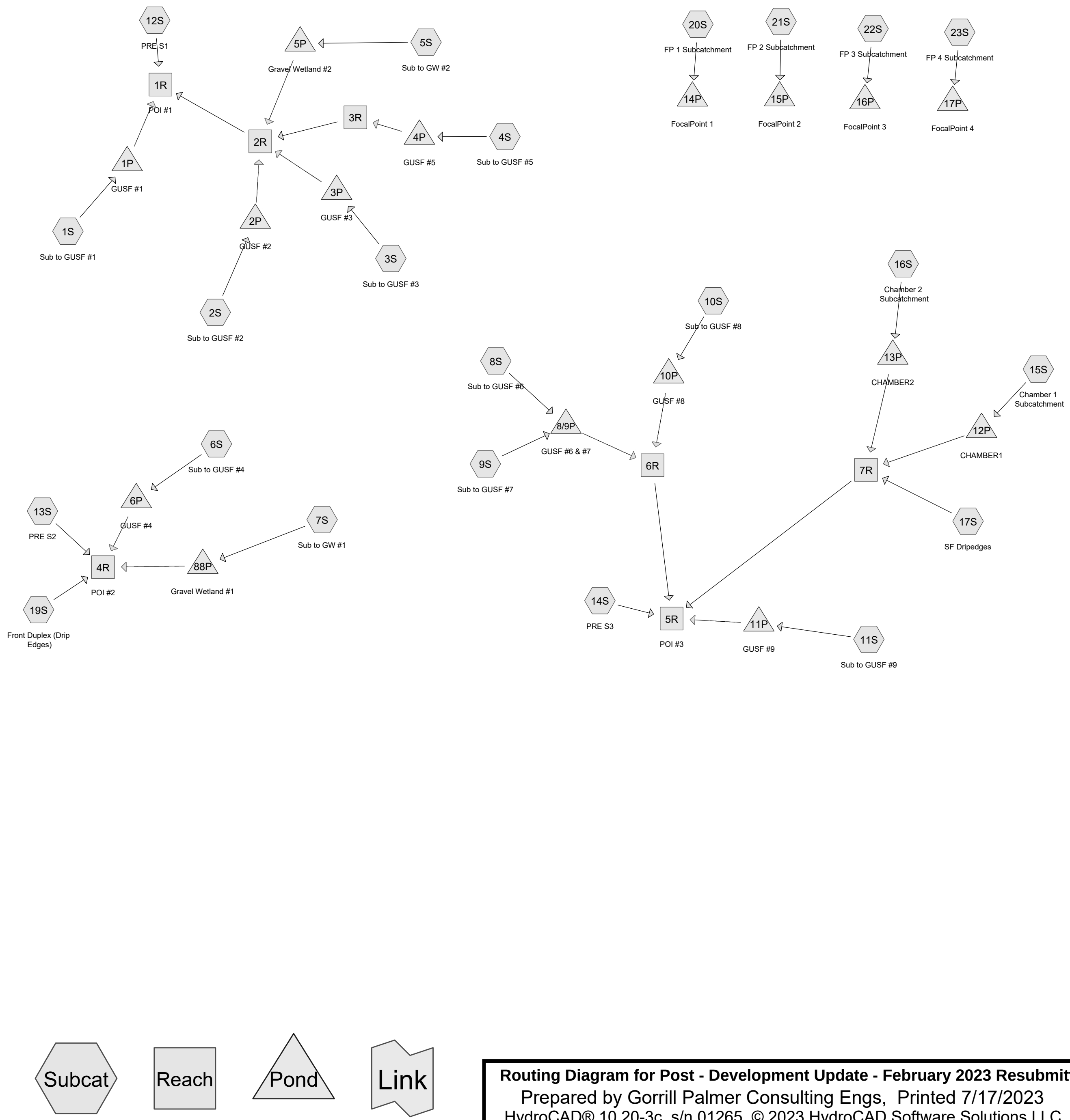
Inflow Area =	58.564 ac,	9.52% Impervious,	Inflow Depth = 5.68"	for 100 Year Saco event	
Inflow =	170.27 cfs @	12.69 hrs,	Volume=	27.708 af	
Outflow =	170.27 cfs @	12.69 hrs,	Volume=	27.708 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 18R: POI #3



POST DEVELOPMENT



Routing Diagram for Post - Development Update - February 2023 Resubmittal
Prepared by Gorrill Palmer Consulting Engs, Printed 7/17/2023

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=4.44 cfs 0.346 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=2.09"
Tc=5.0 min CN=88 Runoff=4.34 cfs 0.330 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=93 Runoff=2.77 cfs 0.218 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=2.38 cfs 0.185 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=10.02 cfs 0.782 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=2.65 cfs 0.207 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=2.26"
Tc=5.0 min CN=90 Runoff=17.92 cfs 1.376 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=53 Runoff=0.15 cfs 0.034 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=1.28"
Tc=5.0 min CN=77 Runoff=1.19 cfs 0.091 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=1.41"
Tc=5.0 min CN=79 Runoff=2.17 cfs 0.165 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=2.09"
Tc=5.0 min CN=88 Runoff=4.82 cfs 0.367 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=1.16"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=5.85 cfs 1.452 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=1.48"
Flow Length=740' Tc=34.4 min CN=80 Runoff=3.58 cfs 0.487 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=1.22"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=29.25 cfs 4.936 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=1.46 cfs 0.118 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=2.85"
Tc=5.0 min CN=96 Runoff=1.72 cfs 0.141 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=0.73 cfs 0.059 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=98 Runoff=0.18 cfs 0.015 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=2.64"
Tc=5.0 min CN=94 Runoff=1.08 cfs 0.086 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=2.96"
Tc=5.0 min CN=97 Runoff=0.37 cfs 0.031 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=1.30 cfs 0.105 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=2.96"
Tc=5.0 min CN=97 Runoff=0.40 cfs 0.033 af

Reach 1R: POI #1 Inflow=8.89 cfs 3.313 af
Outflow=8.89 cfs 3.313 af

Reach 2R: Avg. Flow Depth=0.39' Max Vel=2.11 fps Inflow=2.98 cfs 1.515 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=2.95 cfs 1.515 af

Reach 3R: Avg. Flow Depth=0.02' Max Vel=0.29 fps Inflow=0.50 cfs 0.185 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=0.33 cfs 0.185 af

Reach 4R: POI #2 Inflow=4.88 cfs 2.086 af
Outflow=4.88 cfs 2.086 af

Reach 5R: POI #3 Inflow=31.08 cfs 5.900 af
Outflow=31.08 cfs 5.900 af

Reach 6R: Avg. Flow Depth=0.23' Max Vel=0.05 fps Inflow=0.25 cfs 0.284 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=0.21 cfs 0.284 af

Reach 7R: Avg. Flow Depth=0.23' Max Vel=1.76 fps Inflow=2.20 cfs 0.314 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=1.55 cfs 0.314 af

Pond 1P: GUSF #1 Peak Elev=102.44' Storage=7,256 cf Inflow=4.44 cfs 0.346 af
Primary=0.06 cfs 0.202 af Secondary=0.81 cfs 0.144 af Tertiary=0.00 cfs 0.000 af Outflow=0.87 cfs 0.346 af

Pond 2P: GUSF #2 Peak Elev=103.34' Storage=6,731 cf Inflow=4.34 cfs 0.330 af
Primary=0.05 cfs 0.178 af Secondary=0.83 cfs 0.151 af Tertiary=0.00 cfs 0.000 af Outflow=0.88 cfs 0.330 af

Pond 3P: GUSF #3 Peak Elev=101.94' Storage=4,496 cf Inflow=2.77 cfs 0.218 af
Primary=0.04 cfs 0.129 af Secondary=0.57 cfs 0.089 af Tertiary=0.00 cfs 0.000 af Outflow=0.61 cfs 0.218 af

Pond 4P: GUSF #5 Peak Elev=102.94' Storage=3,764 cf Inflow=2.38 cfs 0.185 af
Primary=0.04 cfs 0.116 af Secondary=0.46 cfs 0.070 af Tertiary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.185 af

Pond 5P: Gravel Wetland #2 Peak Elev=100.27' Storage=17,579 cf Inflow=10.02 cfs 0.782 af
Primary=0.19 cfs 0.476 af Secondary=1.29 cfs 0.306 af Tertiary=0.00 cfs 0.000 af Outflow=1.49 cfs 0.782 af

Pond 6P: GUSF #4 Peak Elev=101.70' Storage=4,378 cf Inflow=2.65 cfs 0.207 af
Primary=0.04 cfs 0.124 af Secondary=0.38 cfs 0.083 af Tertiary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.207 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=99.61' Storage=1,793 cf Inflow=1.22 cfs 0.125 af
Primary=0.14 cfs 0.119 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.119 af

Pond 10P: GUSF #8 Peak Elev=101.69' Storage=4,357 cf Inflow=2.17 cfs 0.165 af
Primary=0.05 cfs 0.145 af Secondary=0.06 cfs 0.019 af Tertiary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.165 af

Pond 11P: GUSF #9 Peak Elev=98.42' Storage=8,218 cf Inflow=4.82 cfs 0.367 af
Primary=0.07 cfs 0.241 af Secondary=0.43 cfs 0.126 af Tertiary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.367 af

Pond 12P: CHAMBER1 Peak Elev=107.07' Storage=0.042 af Inflow=1.46 cfs 0.118 af
Primary=0.02 cfs 0.071 af Secondary=0.71 cfs 0.042 af Outflow=0.73 cfs 0.113 af

Pond 13P: CHAMBER2 Peak Elev=106.87' Storage=0.050 af Inflow=1.72 cfs 0.141 af
Primary=0.02 cfs 0.079 af Secondary=1.26 cfs 0.063 af Outflow=1.28 cfs 0.142 af

Pond 14P: FocalPoint 1 Peak Elev=108.83' Storage=74 cf Inflow=1.08 cfs 0.086 af
Primary=0.15 cfs 0.061 af Secondary=0.99 cfs 0.026 af Outflow=1.13 cfs 0.086 af

Pond 15P: FocalPoint 2 Peak Elev=108.75' Storage=31 cf Inflow=0.37 cfs 0.031 af
Primary=0.15 cfs 0.039 af Secondary=0.16 cfs 0.002 af Outflow=0.31 cfs 0.040 af

Pond 16P: FocalPoint 3 Peak Elev=108.84' Storage=80 cf Inflow=1.30 cfs 0.105 af
Primary=0.18 cfs 0.066 af Secondary=1.12 cfs 0.033 af Outflow=1.30 cfs 0.098 af

Pond 17P: FocalPoint 4 Peak Elev=108.76' Storage=44 cf Inflow=0.40 cfs 0.033 af
Primary=0.07 cfs 0.016 af Secondary=0.32 cfs 0.008 af Outflow=0.39 cfs 0.024 af

Pond 88P: Gravel Wetland #1 Peak Elev=100.29' Storage=36,350 cf Inflow=17.92 cfs 1.376 af
Primary=1.00 cfs 1.372 af Secondary=0.02 cfs 0.004 af Tertiary=0.00 cfs 0.000 af Outflow=1.02 cfs 1.376 af

Total Runoff Area = 93.822 ac Runoff Volume = 11.565 af Average Runoff Depth = 1.48"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=7.04 cfs 0.565 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=88 Runoff=7.26 cfs 0.564 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=4.10"
Tc=5.0 min CN=93 Runoff=4.34 cfs 0.352 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=3.77 cfs 0.303 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=15.91 cfs 1.276 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=4.21 cfs 0.338 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=3.78"
Tc=5.0 min CN=90 Runoff=29.19 cfs 2.300 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=0.81"
Tc=5.0 min CN=53 Runoff=1.25 cfs 0.124 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=77 Runoff=2.39 cfs 0.180 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=2.72"
Tc=5.0 min CN=79 Runoff=4.20 cfs 0.316 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=88 Runoff=8.08 cfs 0.628 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=2.37"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=12.44 cfs 2.959 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=2.81"
Flow Length=740' Tc=34.4 min CN=80 Runoff=6.86 cfs 0.924 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=2.45"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=60.61 cfs 9.908 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=2.24 cfs 0.186 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=4.43"
Tc=5.0 min CN=96 Runoff=2.61 cfs 0.220 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=1.12 cfs 0.093 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=98 Runoff=0.27 cfs 0.023 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=4.21"
Tc=5.0 min CN=94 Runoff=1.68 cfs 0.137 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=4.55"
Tc=5.0 min CN=97 Runoff=0.56 cfs 0.048 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=1.99 cfs 0.165 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=4.55"
Tc=5.0 min CN=97 Runoff=0.60 cfs 0.052 af

Reach 1R: POI #1 Inflow=20.13 cfs 6.019 af
Outflow=20.13 cfs 6.019 af

Reach 2R: Avg. Flow Depth=0.68' Max Vel=3.01 fps Inflow=9.67 cfs 2.495 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=9.60 cfs 2.495 af

Reach 3R: Avg. Flow Depth=0.05' Max Vel=0.46 fps Inflow=1.71 cfs 0.303 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=1.25 cfs 0.303 af

Reach 4R: POI #2 Inflow=9.34 cfs 3.586 af
Outflow=9.34 cfs 3.586 af

Reach 5R: POI #3 Inflow=64.68 cfs 11.657 af
Outflow=64.68 cfs 11.657 af

Reach 6R: Avg. Flow Depth=0.37' Max Vel=0.07 fps Inflow=1.08 cfs 0.620 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=0.48 cfs 0.620 af

Reach 7R: Avg. Flow Depth=0.39' Max Vel=2.37 fps Inflow=5.85 cfs 0.501 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=4.13 cfs 0.501 af

Pond 1P: GUSF #1 Peak Elev=103.06' Storage=10,577 cf Inflow=7.04 cfs 0.565 af
Primary=0.06 cfs 0.214 af Secondary=2.20 cfs 0.350 af Tertiary=0.00 cfs 0.000 af Outflow=2.26 cfs 0.565 af

Pond 2P: GUSF #2 Peak Elev=103.95' Storage=9,679 cf Inflow=7.26 cfs 0.564 af
Primary=0.05 cfs 0.188 af Secondary=2.86 cfs 0.376 af Tertiary=0.00 cfs 0.000 af Outflow=2.91 cfs 0.565 af

Pond 3P: GUSF #3 Peak Elev=102.39' Storage=6,212 cf Inflow=4.34 cfs 0.352 af
Primary=0.04 cfs 0.138 af Secondary=1.73 cfs 0.214 af Tertiary=0.00 cfs 0.000 af Outflow=1.77 cfs 0.352 af

Pond 4P: GUSF #5 Peak Elev=103.30' Storage=5,111 cf Inflow=3.77 cfs 0.303 af
Primary=0.04 cfs 0.125 af Secondary=1.67 cfs 0.178 af Tertiary=0.00 cfs 0.000 af Outflow=1.71 cfs 0.303 af

Pond 5P: Gravel Wetland #2 Peak Elev=100.91' Storage=25,398 cf Inflow=15.91 cfs 1.276 af
Primary=0.22 cfs 0.515 af Secondary=4.71 cfs 0.761 af Tertiary=0.00 cfs 0.000 af Outflow=4.93 cfs 1.276 af

Pond 6P: GUSF #4 Peak Elev=102.46' Storage=7,074 cf Inflow=4.21 cfs 0.338 af
Primary=0.04 cfs 0.133 af Secondary=0.75 cfs 0.205 af Tertiary=0.00 cfs 0.000 af Outflow=0.79 cfs 0.338 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=100.58' Storage=6,943 cf Inflow=3.62 cfs 0.304 af
Primary=0.14 cfs 0.280 af Secondary=0.07 cfs 0.023 af Tertiary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.303 af

Pond 10P: GUSF #8 Peak Elev=102.09' Storage=6,024 cf Inflow=4.20 cfs 0.316 af
Primary=0.05 cfs 0.157 af Secondary=0.89 cfs 0.160 af Tertiary=0.00 cfs 0.000 af Outflow=0.94 cfs 0.316 af

Pond 11P: GUSF #9 Peak Elev=99.06' Storage=12,318 cf Inflow=8.08 cfs 0.628 af
Primary=0.07 cfs 0.255 af Secondary=1.99 cfs 0.373 af Tertiary=0.00 cfs 0.000 af Outflow=2.06 cfs 0.628 af

Pond 12P: CHAMBER1 Peak Elev=107.21' Storage=0.044 af Inflow=2.24 cfs 0.186 af
Primary=0.02 cfs 0.074 af Secondary=2.18 cfs 0.114 af Outflow=2.20 cfs 0.188 af

Pond 13P: CHAMBER2 Peak Elev=106.98' Storage=0.052 af Inflow=2.61 cfs 0.220 af
Primary=0.02 cfs 0.082 af Secondary=2.51 cfs 0.138 af Outflow=2.53 cfs 0.220 af

Pond 14P: FocalPoint 1 Peak Elev=108.88' Storage=81 cf Inflow=1.68 cfs 0.137 af
Primary=0.15 cfs 0.088 af Secondary=1.54 cfs 0.050 af Outflow=1.69 cfs 0.137 af

Pond 15P: FocalPoint 2 Peak Elev=108.79' Storage=34 cf Inflow=0.56 cfs 0.048 af
Primary=0.15 cfs 0.050 af Secondary=0.39 cfs 0.008 af Outflow=0.54 cfs 0.057 af

Pond 16P: FocalPoint 3 Peak Elev=108.90' Storage=88 cf Inflow=1.99 cfs 0.165 af
Primary=0.18 cfs 0.080 af Secondary=1.80 cfs 0.059 af Outflow=1.97 cfs 0.139 af

Pond 17P: FocalPoint 4 Peak Elev=108.79' Storage=47 cf Inflow=0.60 cfs 0.052 af
Primary=0.07 cfs 0.034 af Secondary=0.53 cfs 0.016 af Outflow=0.60 cfs 0.050 af

Pond 88P: Gravel Wetland #1 Peak Elev=101.50' Storage=61,368 cf Inflow=29.19 cfs 2.300 af
Primary=1.58 cfs 2.178 af Secondary=0.18 cfs 0.122 af Tertiary=0.00 cfs 0.000 af Outflow=1.76 cfs 2.300 af

Total Runoff Area = 93.822 ac Runoff Volume = 21.661 af Average Runoff Depth = 2.77"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=5.27"
Tc=5.0 min CN=92 Runoff=9.13 cfs 0.745 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=4.82"
Tc=5.0 min CN=88 Runoff=9.64 cfs 0.761 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=5.38"
Tc=5.0 min CN=93 Runoff=5.60 cfs 0.461 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=5.27"
Tc=5.0 min CN=92 Runoff=4.89 cfs 0.399 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=5.27"
Tc=5.0 min CN=92 Runoff=20.64 cfs 1.683 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=5.27"
Tc=5.0 min CN=92 Runoff=5.46 cfs 0.446 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=5.04"
Tc=5.0 min CN=90 Runoff=38.28 cfs 3.067 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=1.47"
Tc=5.0 min CN=53 Runoff=2.67 cfs 0.225 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=3.65"
Tc=5.0 min CN=77 Runoff=3.42 cfs 0.258 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=3.86"
Tc=5.0 min CN=79 Runoff=5.92 cfs 0.449 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=4.82"
Tc=5.0 min CN=88 Runoff=10.72 cfs 0.846 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=3.45"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=18.30 cfs 4.315 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=3.96"
Flow Length=740' Tc=34.4 min CN=80 Runoff=9.65 cfs 1.305 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=3.55"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=88.15 cfs 14.351 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=5.61"
Tc=5.0 min CN=95 Runoff=2.87 cfs 0.242 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=5.73"
Tc=5.0 min CN=96 Runoff=3.33 cfs 0.284 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=5.61"
Tc=5.0 min CN=95 Runoff=1.44 cfs 0.121 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=5.96"
Tc=5.0 min CN=98 Runoff=0.34 cfs 0.030 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=5.49"
Tc=5.0 min CN=94 Runoff=2.15 cfs 0.179 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=97 Runoff=0.71 cfs 0.061 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=5.61"
Tc=5.0 min CN=95 Runoff=2.55 cfs 0.215 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=97 Runoff=0.76 cfs 0.066 af

Reach 1R: POI #1 Inflow=30.13 cfs 8.365 af
Outflow=30.13 cfs 8.365 af

Reach 2R: Avg. Flow Depth=0.81' Max Vel=3.40 fps Inflow=14.42 cfs 3.305 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=14.35 cfs 3.305 af

Reach 3R: Avg. Flow Depth=0.07' Max Vel=0.57 fps Inflow=2.62 cfs 0.399 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=2.11 cfs 0.399 af

Reach 4R: POI #2 Inflow=12.74 cfs 4.848 af
Outflow=12.74 cfs 4.848 af

Reach 5R: POI #3 Inflow=93.55 cfs 16.777 af
Outflow=93.55 cfs 16.777 af

Reach 6R: Avg. Flow Depth=0.58' Max Vel=0.09 fps Inflow=2.33 cfs 0.933 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=1.11 cfs 0.933 af

Reach 7R: Avg. Flow Depth=0.46' Max Vel=2.57 fps Inflow=7.49 cfs 0.647 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=5.51 cfs 0.647 af

Pond 1P: GUSF #1 Peak Elev=103.56' Storage=13,556 cf Inflow=9.13 cfs 0.745 af
Primary=0.06 cfs 0.221 af Secondary=2.88 cfs 0.524 af Tertiary=0.00 cfs 0.000 af Outflow=2.94 cfs 0.745 af

Pond 2P: GUSF #2 Peak Elev=104.45' Storage=12,345 cf Inflow=9.64 cfs 0.761 af
Primary=0.05 cfs 0.194 af Secondary=3.92 cfs 0.567 af Tertiary=0.00 cfs 0.000 af Outflow=3.97 cfs 0.761 af

Pond 3P: GUSF #3 Peak Elev=102.74' Storage=7,664 cf Inflow=5.60 cfs 0.461 af
Primary=0.04 cfs 0.142 af Secondary=2.32 cfs 0.319 af Tertiary=0.00 cfs 0.000 af Outflow=2.36 cfs 0.462 af

Pond 4P: GUSF #5 Peak Elev=103.56' Storage=6,153 cf Inflow=4.89 cfs 0.399 af
Primary=0.04 cfs 0.129 af Secondary=2.58 cfs 0.270 af Tertiary=0.00 cfs 0.000 af Outflow=2.62 cfs 0.399 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.38' Storage=31,438 cf Inflow=20.64 cfs 1.683 af
Primary=0.23 cfs 0.539 af Secondary=7.09 cfs 1.145 af Tertiary=0.00 cfs 0.000 af Outflow=7.33 cfs 1.683 af

Pond 6P: GUSF #4 Peak Elev=103.04' Storage=9,428 cf Inflow=5.46 cfs 0.446 af
Primary=0.04 cfs 0.138 af Secondary=0.93 cfs 0.308 af Tertiary=0.00 cfs 0.000 af Outflow=0.97 cfs 0.446 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=100.91' Storage=9,195 cf Inflow=6.07 cfs 0.483 af
Primary=0.14 cfs 0.307 af Secondary=0.46 cfs 0.176 af Tertiary=0.00 cfs 0.000 af Outflow=0.60 cfs 0.483 af

Pond 10P: GUSF #8 Peak Elev=102.49' Storage=7,792 cf Inflow=5.92 cfs 0.449 af
Primary=0.05 cfs 0.163 af Secondary=1.86 cfs 0.287 af Tertiary=0.00 cfs 0.000 af Outflow=1.91 cfs 0.450 af

Pond 11P: GUSF #9 Peak Elev=99.62' Storage=16,342 cf Inflow=10.72 cfs 0.846 af
Primary=0.07 cfs 0.264 af Secondary=2.79 cfs 0.583 af Tertiary=0.00 cfs 0.000 af Outflow=2.86 cfs 0.846 af

Pond 12P: CHAMBER1 Peak Elev=107.25' Storage=0.044 af Inflow=2.87 cfs 0.242 af
Primary=0.02 cfs 0.076 af Secondary=2.79 cfs 0.166 af Outflow=2.81 cfs 0.242 af

Pond 13P: CHAMBER2 Peak Elev=107.03' Storage=0.053 af Inflow=3.33 cfs 0.284 af
Primary=0.02 cfs 0.083 af Secondary=3.22 cfs 0.200 af Outflow=3.24 cfs 0.284 af

Pond 14P: FocalPoint 1 Peak Elev=108.91' Storage=86 cf Inflow=2.15 cfs 0.179 af
Primary=0.15 cfs 0.107 af Secondary=2.01 cfs 0.072 af Outflow=2.16 cfs 0.179 af

Pond 15P: FocalPoint 2 Peak Elev=108.81' Storage=36 cf Inflow=0.71 cfs 0.061 af
Primary=0.15 cfs 0.063 af Secondary=0.55 cfs 0.013 af Outflow=0.70 cfs 0.076 af

Pond 16P: FocalPoint 3 Peak Elev=108.94' Storage=95 cf Inflow=2.55 cfs 0.215 af
Primary=0.18 cfs 0.109 af Secondary=2.36 cfs 0.086 af Outflow=2.53 cfs 0.196 af

Pond 17P: FocalPoint 4 Peak Elev=108.80' Storage=49 cf Inflow=0.76 cfs 0.066 af
Primary=0.07 cfs 0.053 af Secondary=0.69 cfs 0.022 af Outflow=0.76 cfs 0.075 af

Pond 88P: Gravel Wetland #1 Peak Elev=102.48' Storage=83,823 cf Inflow=38.28 cfs 3.067 af
Primary=1.92 cfs 2.850 af Secondary=0.24 cfs 0.217 af Tertiary=0.00 cfs 0.000 af Outflow=2.16 cfs 3.067 af

Total Runoff Area = 93.822 ac Runoff Volume = 30.510 af Average Runoff Depth = 3.90"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=10.89 cfs 0.898 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=5.89"
Tc=5.0 min CN=88 Runoff=11.63 cfs 0.929 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=6.47"
Tc=5.0 min CN=93 Runoff=6.66 cfs 0.555 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=5.84 cfs 0.481 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=24.62 cfs 2.030 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=6.52 cfs 0.537 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=6.12"
Tc=5.0 min CN=90 Runoff=45.91 cfs 3.722 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=53 Runoff=4.05 cfs 0.323 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=4.64"
Tc=5.0 min CN=77 Runoff=4.31 cfs 0.328 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=4.86"
Tc=5.0 min CN=79 Runoff=7.40 cfs 0.566 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=5.89"
Tc=5.0 min CN=88 Runoff=12.94 cfs 1.034 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=4.41"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=23.43 cfs 5.516 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=4.97"
Flow Length=740' Tc=34.4 min CN=80 Runoff=12.05 cfs 1.638 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=4.53"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=112.15 cfs 18.277 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=3.40 cfs 0.289 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=6.82"
Tc=5.0 min CN=96 Runoff=3.93 cfs 0.338 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=1.70 cfs 0.145 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=7.06"
Tc=5.0 min CN=98 Runoff=0.40 cfs 0.035 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=6.59"
Tc=5.0 min CN=94 Runoff=2.55 cfs 0.215 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=6.94"
Tc=5.0 min CN=97 Runoff=0.84 cfs 0.073 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=3.02 cfs 0.257 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=6.94"
Tc=5.0 min CN=97 Runoff=0.90 cfs 0.079 af

Reach 1R: POI #1 Inflow=38.50 cfs 10.411 af
Outflow=38.50 cfs 10.411 af

Reach 2R: Avg. Flow Depth=0.89' Max Vel=3.62 fps Inflow=17.69 cfs 3.996 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=17.60 cfs 3.996 af

Reach 3R: Avg. Flow Depth=0.08' Max Vel=0.62 fps Inflow=3.08 cfs 0.482 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=2.68 cfs 0.482 af

Reach 4R: POI #2 Inflow=15.53 cfs 5.933 af
Outflow=15.53 cfs 5.933 af

Reach 5R: POI #3 Inflow=118.50 cfs 21.300 af
Outflow=118.50 cfs 21.300 af

Reach 6R: Avg. Flow Depth=0.73' Max Vel=0.10 fps Inflow=3.31 cfs 1.217 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=1.71 cfs 1.217 af

Reach 7R: Avg. Flow Depth=0.50' Max Vel=2.71 fps Inflow=8.87 cfs 0.772 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=6.61 cfs 0.772 af

Pond 1P: GUSF #1 Peak Elev=103.93' Storage=15,980 cf Inflow=10.89 cfs 0.898 af
Primary=0.06 cfs 0.225 af Secondary=3.30 cfs 0.673 af Tertiary=0.01 cfs 0.000 af Outflow=3.36 cfs 0.898 af

Pond 2P: GUSF #2 Peak Elev=104.84' Storage=14,545 cf Inflow=11.63 cfs 0.929 af
Primary=0.05 cfs 0.197 af Secondary=4.56 cfs 0.732 af Tertiary=0.00 cfs 0.000 af Outflow=4.61 cfs 0.929 af

Pond 3P: GUSF #3 Peak Elev=103.00' Storage=8,821 cf Inflow=6.66 cfs 0.555 af
Primary=0.04 cfs 0.145 af Secondary=2.69 cfs 0.410 af Tertiary=0.02 cfs 0.000 af Outflow=2.74 cfs 0.555 af

Pond 4P: GUSF #5 Peak Elev=103.74' Storage=6,955 cf Inflow=5.84 cfs 0.481 af
Primary=0.04 cfs 0.132 af Secondary=3.04 cfs 0.349 af Tertiary=0.00 cfs 0.000 af Outflow=3.08 cfs 0.482 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.74' Storage=36,517 cf Inflow=24.62 cfs 2.030 af
Primary=0.25 cfs 0.555 af Secondary=8.48 cfs 1.475 af Tertiary=0.00 cfs 0.000 af Outflow=8.73 cfs 2.030 af

Pond 6P: GUSF #4 Peak Elev=103.48' Storage=11,374 cf Inflow=6.52 cfs 0.537 af
Primary=0.04 cfs 0.141 af Secondary=1.05 cfs 0.397 af Tertiary=0.00 cfs 0.000 af Outflow=1.09 cfs 0.538 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=101.32' Storage=12,310 cf Inflow=8.34 cfs 0.651 af
Primary=0.14 cfs 0.321 af Secondary=0.76 cfs 0.330 af Tertiary=0.01 cfs 0.000 af Outflow=0.91 cfs 0.651 af

Pond 10P: GUSF #8 Peak Elev=102.87' Storage=9,579 cf Inflow=7.40 cfs 0.566 af
Primary=0.05 cfs 0.166 af Secondary=2.46 cfs 0.400 af Tertiary=0.00 cfs 0.000 af Outflow=2.51 cfs 0.566 af

Pond 11P: GUSF #9 Peak Elev=100.06' Storage=19,825 cf Inflow=12.94 cfs 1.034 af
Primary=0.07 cfs 0.269 af Secondary=3.29 cfs 0.765 af Tertiary=0.00 cfs 0.000 af Outflow=3.36 cfs 1.034 af

Pond 12P: CHAMBER1 Peak Elev=107.29' Storage=0.044 af Inflow=3.40 cfs 0.289 af
Primary=0.02 cfs 0.077 af Secondary=3.31 cfs 0.212 af Outflow=3.33 cfs 0.289 af

Pond 13P: CHAMBER2 Peak Elev=107.07' Storage=0.053 af Inflow=3.93 cfs 0.338 af
Primary=0.02 cfs 0.084 af Secondary=3.81 cfs 0.255 af Outflow=3.83 cfs 0.339 af

Pond 14P: FocalPoint 1 Peak Elev=108.94' Storage=90 cf Inflow=2.55 cfs 0.215 af
Primary=0.15 cfs 0.122 af Secondary=2.40 cfs 0.093 af Outflow=2.55 cfs 0.215 af

Pond 15P: FocalPoint 2 Peak Elev=108.83' Storage=37 cf Inflow=0.84 cfs 0.073 af
Primary=0.15 cfs 0.035 af Secondary=0.69 cfs 0.018 af Outflow=0.83 cfs 0.053 af

Pond 16P: FocalPoint 3 Peak Elev=108.97' Storage=97 cf Inflow=3.02 cfs 0.257 af
Primary=0.18 cfs 0.149 af Secondary=2.85 cfs 0.111 af Outflow=3.02 cfs 0.261 af

Pond 17P: FocalPoint 4 Peak Elev=108.82' Storage=50 cf Inflow=0.90 cfs 0.079 af
Primary=0.07 cfs 0.041 af Secondary=0.82 cfs 0.028 af Outflow=0.90 cfs 0.069 af

Pond 88P: Gravel Wetland #1 Peak Elev=103.26' Storage=103,357 cf Inflow=45.91 cfs 3.722 af
Primary=2.15 cfs 3.428 af Secondary=0.28 cfs 0.295 af Tertiary=0.00 cfs 0.000 af Outflow=2.44 cfs 3.723 af

Total Runoff Area = 93.822 ac Runoff Volume = 38.266 af Average Runoff Depth = 4.89"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=13.12 cfs 1.094 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=14.16 cfs 1.145 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=7.86"
Tc=5.0 min CN=93 Runoff=8.01 cfs 0.674 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=7.03 cfs 0.586 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=29.65 cfs 2.473 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=7.85 cfs 0.655 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=90 Runoff=55.56 cfs 4.561 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=3.04"
Tc=5.0 min CN=53 Runoff=5.98 cfs 0.463 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=5.92"
Tc=5.0 min CN=77 Runoff=5.46 cfs 0.419 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=6.16"
Tc=5.0 min CN=79 Runoff=9.29 cfs 0.718 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=15.75 cfs 1.274 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=5.68"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=30.09 cfs 7.094 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=6.28"
Flow Length=740' Tc=34.4 min CN=80 Runoff=15.12 cfs 2.070 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=5.80"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=143.14 cfs 23.420 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=4.07 cfs 0.349 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=8.22"
Tc=5.0 min CN=96 Runoff=4.70 cfs 0.408 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=2.04 cfs 0.175 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=8.46"
Tc=5.0 min CN=98 Runoff=0.48 cfs 0.042 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=7.98"
Tc=5.0 min CN=94 Runoff=3.06 cfs 0.260 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=8.34"
Tc=5.0 min CN=97 Runoff=1.00 cfs 0.087 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=3.61 cfs 0.310 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=8.34"
Tc=5.0 min CN=97 Runoff=1.08 cfs 0.094 af

Reach 1R: POI #1 Inflow=46.29 cfs 13.068 af
Outflow=46.29 cfs 13.068 af

Reach 2R: Avg. Flow Depth=1.17' Max Vel=4.28 fps Inflow=32.82 cfs 4.880 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=29.95 cfs 4.880 af

Reach 3R: Avg. Flow Depth=0.10' Max Vel=0.70 fps Inflow=5.02 cfs 0.587 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=3.56 cfs 0.587 af

Reach 4R: POI #2 Inflow=20.01 cfs 7.328 af
Outflow=20.01 cfs 7.328 af

Reach 5R: POI #3 Inflow=150.25 cfs 27.224 af
Outflow=150.25 cfs 27.224 af

Reach 6R: Avg. Flow Depth=0.98' Max Vel=0.12 fps Inflow=9.04 cfs 1.598 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=2.98 cfs 1.598 af

Reach 7R: Avg. Flow Depth=0.56' Max Vel=2.85 fps Inflow=10.64 cfs 0.932 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=8.01 cfs 0.932 af

Pond 1P: GUSF #1 Peak Elev=104.12' Storage=17,224 cf Inflow=13.12 cfs 1.094 af
Primary=0.06 cfs 0.229 af Secondary=3.48 cfs 0.802 af Tertiary=2.89 cfs 0.063 af Outflow=6.43 cfs 1.094 af

Pond 2P: GUSF #2 Peak Elev=105.08' Storage=15,994 cf Inflow=14.16 cfs 1.145 af
Primary=0.05 cfs 0.201 af Secondary=4.93 cfs 0.886 af Tertiary=3.98 cfs 0.058 af Outflow=8.96 cfs 1.146 af

Pond 3P: GUSF #3 Peak Elev=103.17' Storage=9,563 cf Inflow=8.01 cfs 0.674 af
Primary=0.04 cfs 0.148 af Secondary=2.89 cfs 0.495 af Tertiary=2.34 cfs 0.032 af Outflow=5.27 cfs 0.674 af

Pond 4P: GUSF #5 Peak Elev=103.87' Storage=7,514 cf Inflow=7.03 cfs 0.586 af
Primary=0.04 cfs 0.135 af Secondary=3.32 cfs 0.432 af Tertiary=1.66 cfs 0.019 af Outflow=5.02 cfs 0.587 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.98' Storage=39,896 cf Inflow=29.65 cfs 2.473 af
Primary=0.25 cfs 0.572 af Secondary=9.26 cfs 1.767 af Tertiary=7.83 cfs 0.134 af Outflow=17.34 cfs 2.473 af

Pond 6P: GUSF #4 Peak Elev=103.85' Storage=13,153 cf Inflow=7.85 cfs 0.655 af
Primary=0.04 cfs 0.143 af Secondary=1.15 cfs 0.488 af Tertiary=1.17 cfs 0.024 af Outflow=2.35 cfs 0.655 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=101.49' Storage=13,680 cf Inflow=11.43 cfs 0.881 af
Primary=0.14 cfs 0.334 af Secondary=0.86 cfs 0.411 af Tertiary=3.53 cfs 0.134 af Outflow=4.52 cfs 0.880 af

Pond 10P: GUSF #8 Peak Elev=103.09' Storage=10,711 cf Inflow=9.29 cfs 0.718 af
Primary=0.05 cfs 0.171 af Secondary=2.76 cfs 0.490 af Tertiary=3.58 cfs 0.057 af Outflow=6.39 cfs 0.718 af

Pond 11P: GUSF #9 Peak Elev=100.28' Storage=21,683 cf Inflow=15.75 cfs 1.274 af
Primary=0.07 cfs 0.275 af Secondary=3.52 cfs 0.907 af Tertiary=3.77 cfs 0.092 af Outflow=7.36 cfs 1.274 af

Pond 12P: CHAMBER1 Peak Elev=107.33' Storage=0.045 af Inflow=4.07 cfs 0.349 af
Primary=0.02 cfs 0.077 af Secondary=3.98 cfs 0.272 af Outflow=4.00 cfs 0.350 af

Pond 13P: CHAMBER2 Peak Elev=107.12' Storage=0.053 af Inflow=4.70 cfs 0.408 af
Primary=0.02 cfs 0.085 af Secondary=4.58 cfs 0.323 af Outflow=4.60 cfs 0.408 af

Pond 14P: FocalPoint 1 Peak Elev=108.97' Storage=96 cf Inflow=3.06 cfs 0.260 af
Primary=0.15 cfs 0.138 af Secondary=2.91 cfs 0.122 af Outflow=3.06 cfs 0.260 af

Pond 15P: FocalPoint 2 Peak Elev=108.84' Storage=39 cf Inflow=1.00 cfs 0.087 af
Primary=0.15 cfs 0.042 af Secondary=0.84 cfs 0.023 af Outflow=0.99 cfs 0.066 af

Pond 16P: FocalPoint 3 Peak Elev=109.00' Storage=97 cf Inflow=3.61 cfs 0.310 af
Primary=0.18 cfs 0.148 af Secondary=3.41 cfs 0.146 af Outflow=3.59 cfs 0.294 af

Pond 17P: FocalPoint 4 Peak Elev=108.83' Storage=52 cf Inflow=1.08 cfs 0.094 af
Primary=0.07 cfs 0.066 af Secondary=1.00 cfs 0.036 af Outflow=1.07 cfs 0.102 af

Pond 88P: Gravel Wetland #1 Peak Elev=104.19' Storage=128,663 cf Inflow=55.56 cfs 4.561 af
Primary=2.40 cfs 4.166 af Secondary=0.32 cfs 0.395 af Tertiary=0.00 cfs 0.000 af Outflow=2.73 cfs 4.561 af

Total Runoff Area = 93.822 ac Runoff Volume = 48.372 af Average Runoff Depth = 6.19"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Summary for Subcatchment 1S: Sub to GUSF #1

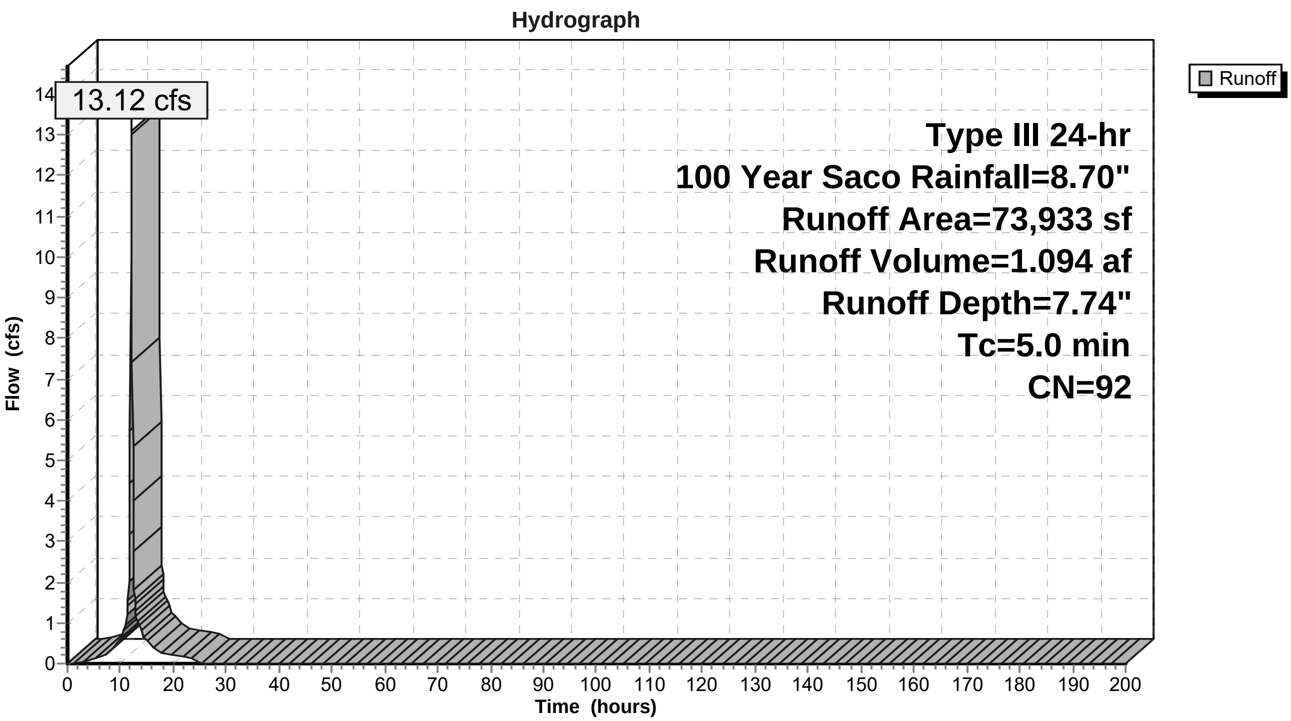
Runoff = 13.12 cfs @ 12.08 hrs, Volume= 1.094 af, Depth= 7.74"
Routed to Pond 1P : GUSF #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
49,677	98	Paved parking, HSG D
24,256	80	>75% Grass cover, Good, HSG D
73,933	92	Weighted Average
24,256		32.81% Pervious Area
49,677		67.19% Impervious Area

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

Subcatchment 1S: Sub to GUSF #1



Summary for Subcatchment 2S: Sub to GUSF #2

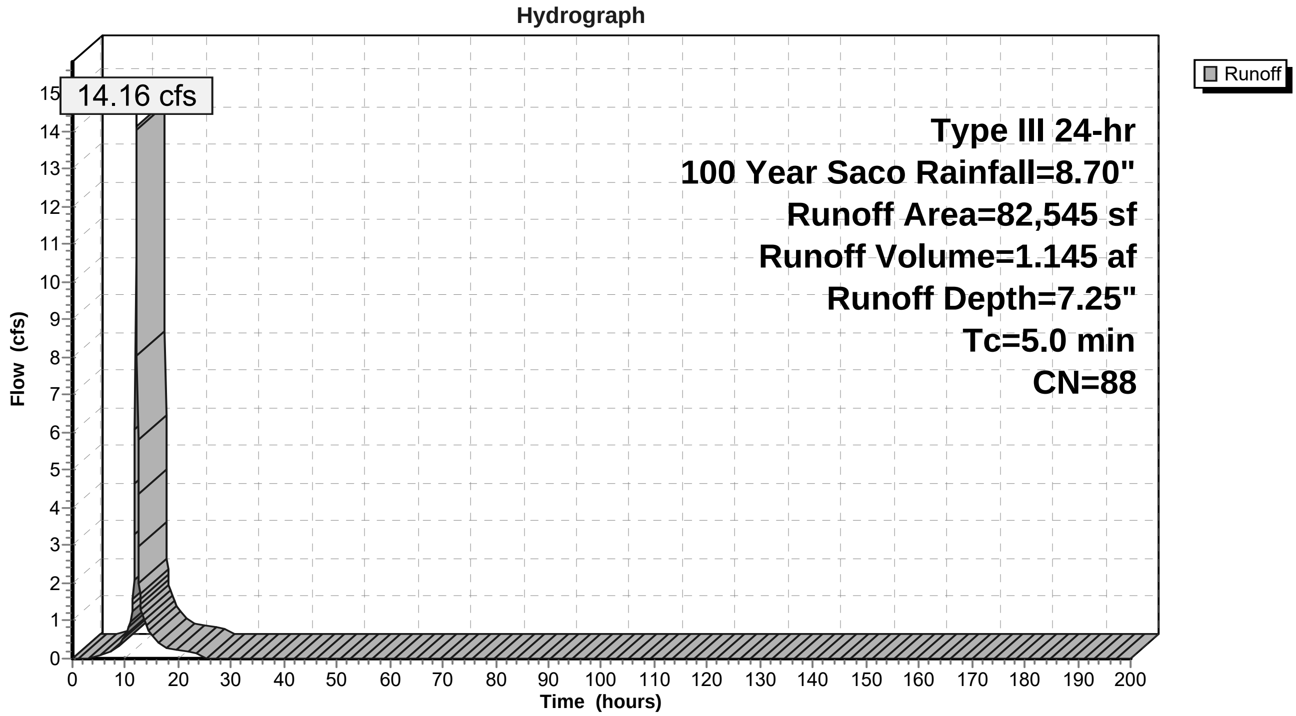
Runoff = 14.16 cfs @ 12.09 hrs, Volume= 1.145 af, Depth= 7.25"
Routed to Pond 2P : GUSF #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
38,830	98	Paved parking, HSG D
43,715	80	>75% Grass cover, Good, HSG D
82,545	88	Weighted Average
43,715		52.96% Pervious Area
38,830		47.04% Impervious Area

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

Subcatchment 2S: Sub to GUSF #2



Summary for Subcatchment 3S: Sub to GUSF #3

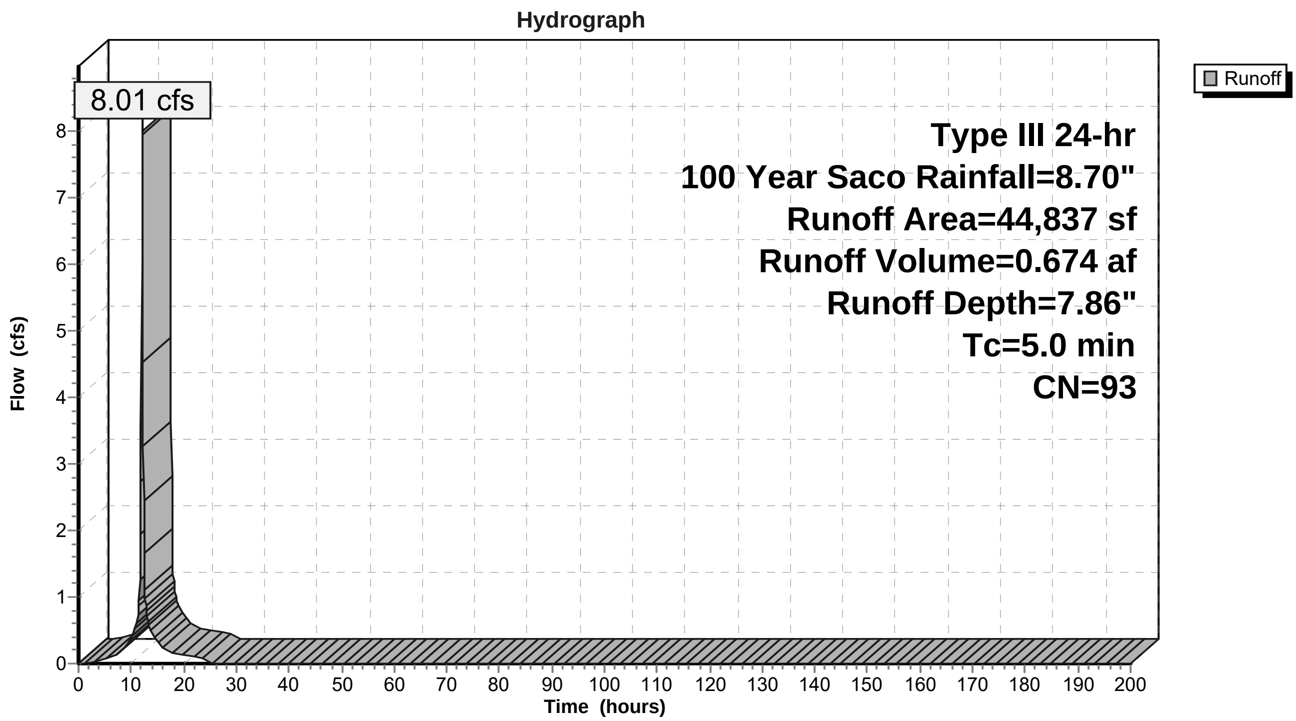
Runoff = 8.01 cfs @ 12.08 hrs, Volume= 0.674 af, Depth= 7.86"
Routed to Pond 3P : GUSF #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
32,243	98	Paved parking, HSG D
12,594	80	>75% Grass cover, Good, HSG D
44,837	93	Weighted Average
12,594		28.09% Pervious Area
32,243		71.91% Impervious Area

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

Subcatchment 3S: Sub to GUSF #3



Summary for Subcatchment 4S: Sub to GUSF #5

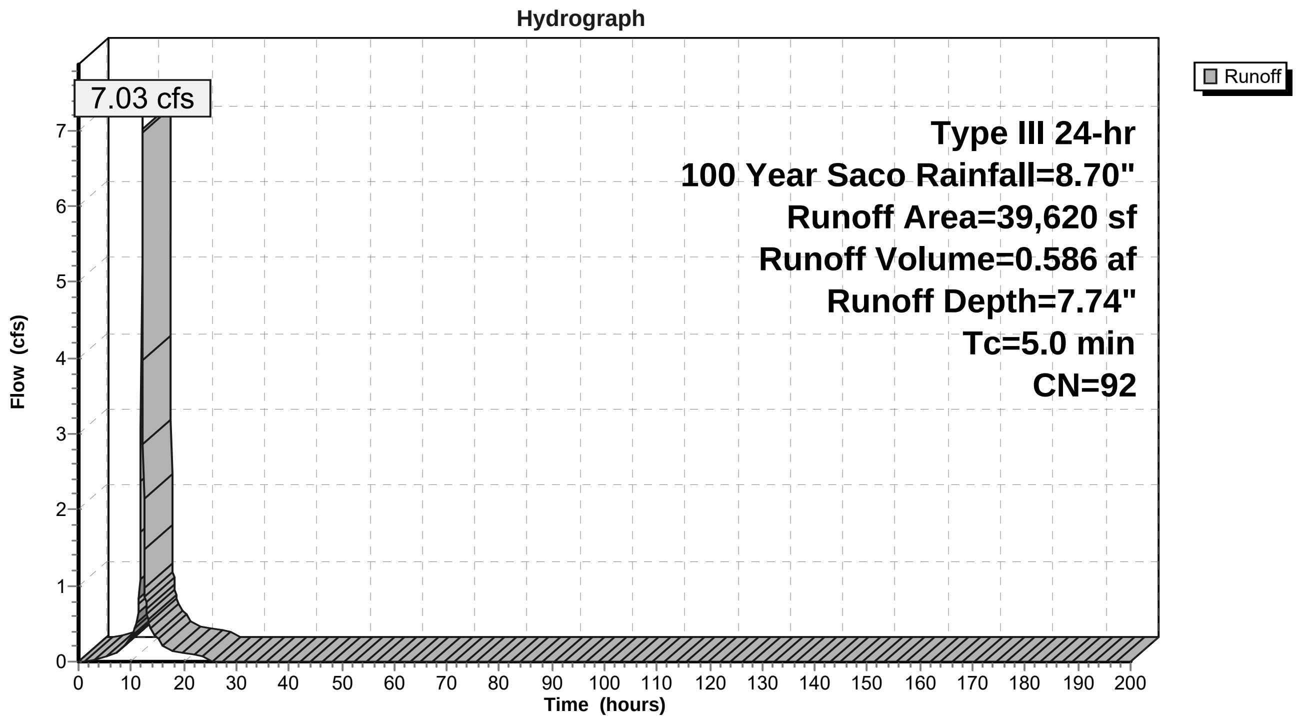
Runoff = 7.03 cfs @ 12.08 hrs, Volume= 0.586 af, Depth= 7.74"
Routed to Pond 4P : GUSF #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
26,921	98	Paved parking, HSG D
439	39	>75% Grass cover, Good, HSG A
12,260	80	>75% Grass cover, Good, HSG D
39,620	92	Weighted Average
12,699		32.05% Pervious Area
26,921		67.95% Impervious Area

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

Subcatchment 4S: Sub to GUSF #5



Summary for Subcatchment 5S: Sub to GW #2

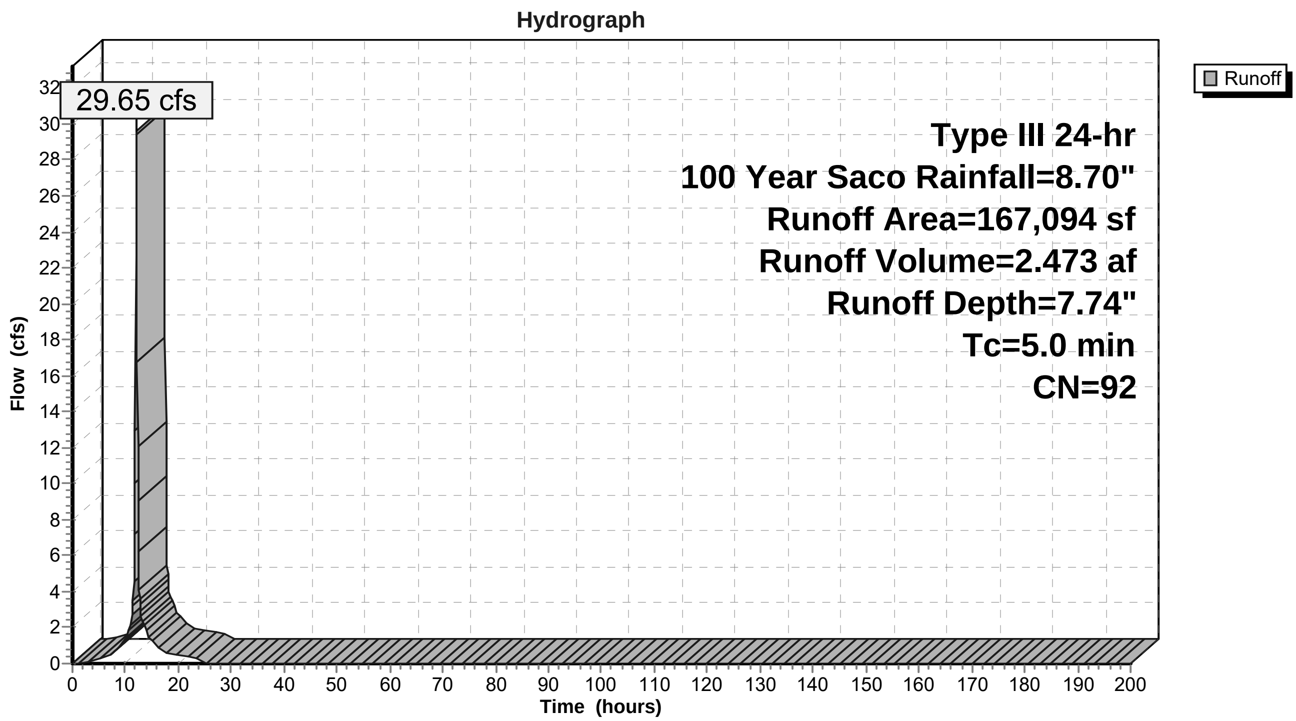
Runoff = 29.65 cfs @ 12.08 hrs, Volume= 2.473 af, Depth= 7.74"
Routed to Pond 5P : Gravel Wetland #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
106,853	98	Paved parking, HSG D
60,241	80	>75% Grass cover, Good, HSG D
167,094	92	Weighted Average
60,241		36.05% Pervious Area
106,853		63.95% Impervious Area

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

Subcatchment 5S: Sub to GW #2



Summary for Subcatchment 6S: Sub to GUSF #4

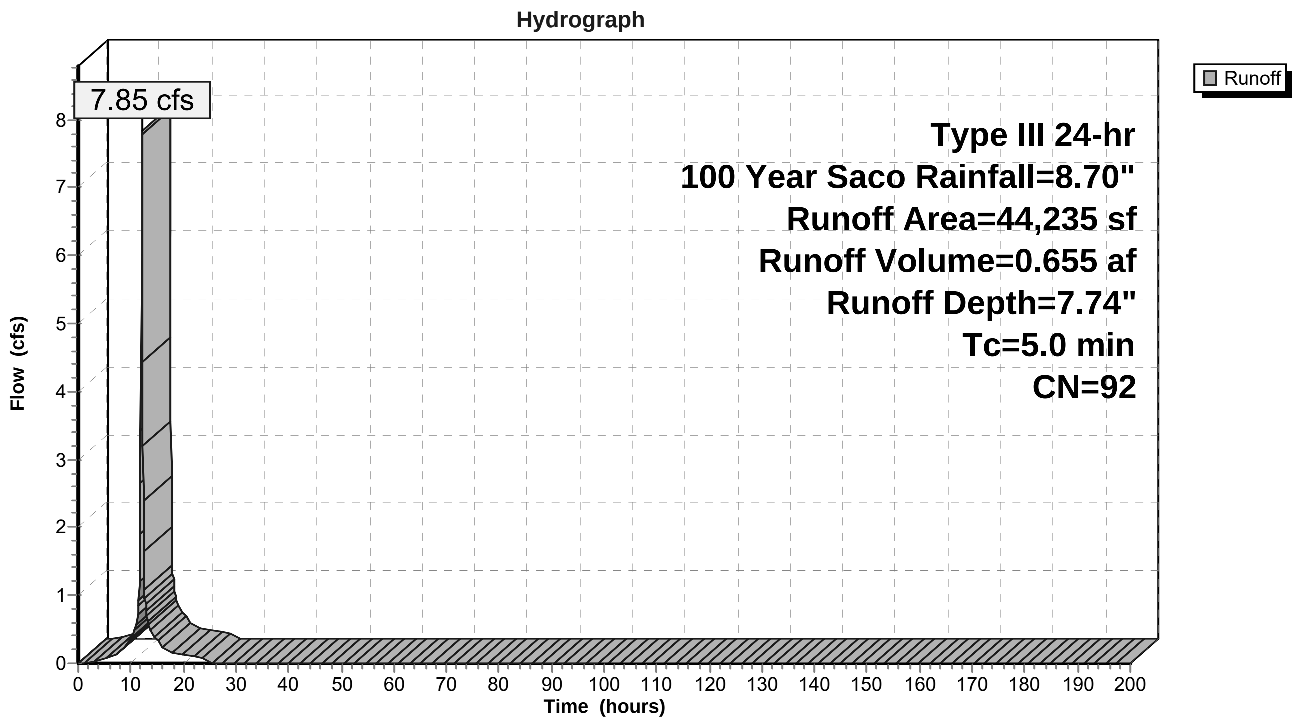
Runoff = 7.85 cfs @ 12.08 hrs, Volume= 0.655 af, Depth= 7.74"
Routed to Pond 6P : GUSF #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
29,518	98	Paved parking, HSG D
14,717	80	>75% Grass cover, Good, HSG D
44,235	92	Weighted Average
14,717		33.27% Pervious Area
29,518		66.73% Impervious Area

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

Subcatchment 6S: Sub to GUSF #4



Summary for Subcatchment 7S: Sub to GW #1

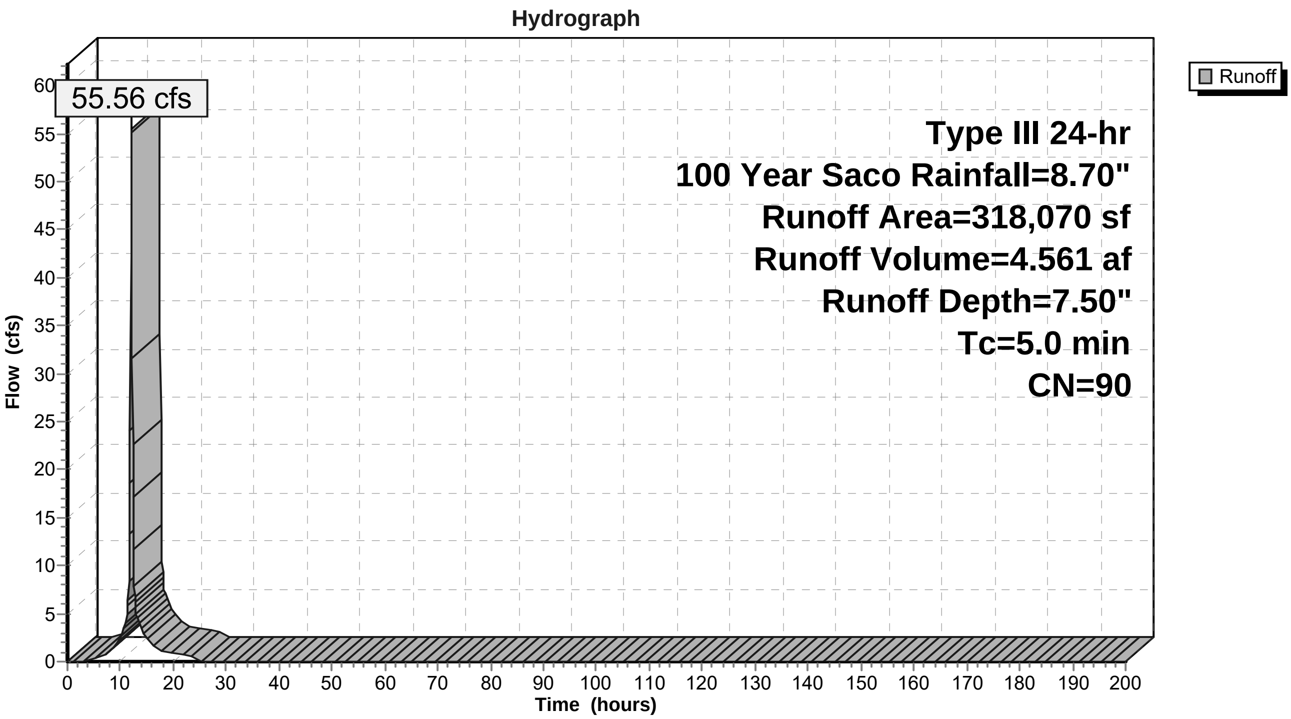
Runoff = 55.56 cfs @ 12.09 hrs, Volume= 4.561 af, Depth= 7.50"
Routed to Pond 88P : Gravel Wetland #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
191,968	98	Paved parking, HSG D
7,411	39	>75% Grass cover, Good, HSG A
118,691	80	>75% Grass cover, Good, HSG D
318,070	90	Weighted Average
126,102		39.65% Pervious Area
191,968		60.35% Impervious Area

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

Subcatchment 7S: Sub to GW #1



Summary for Subcatchment 8S: Sub to GUSF #6

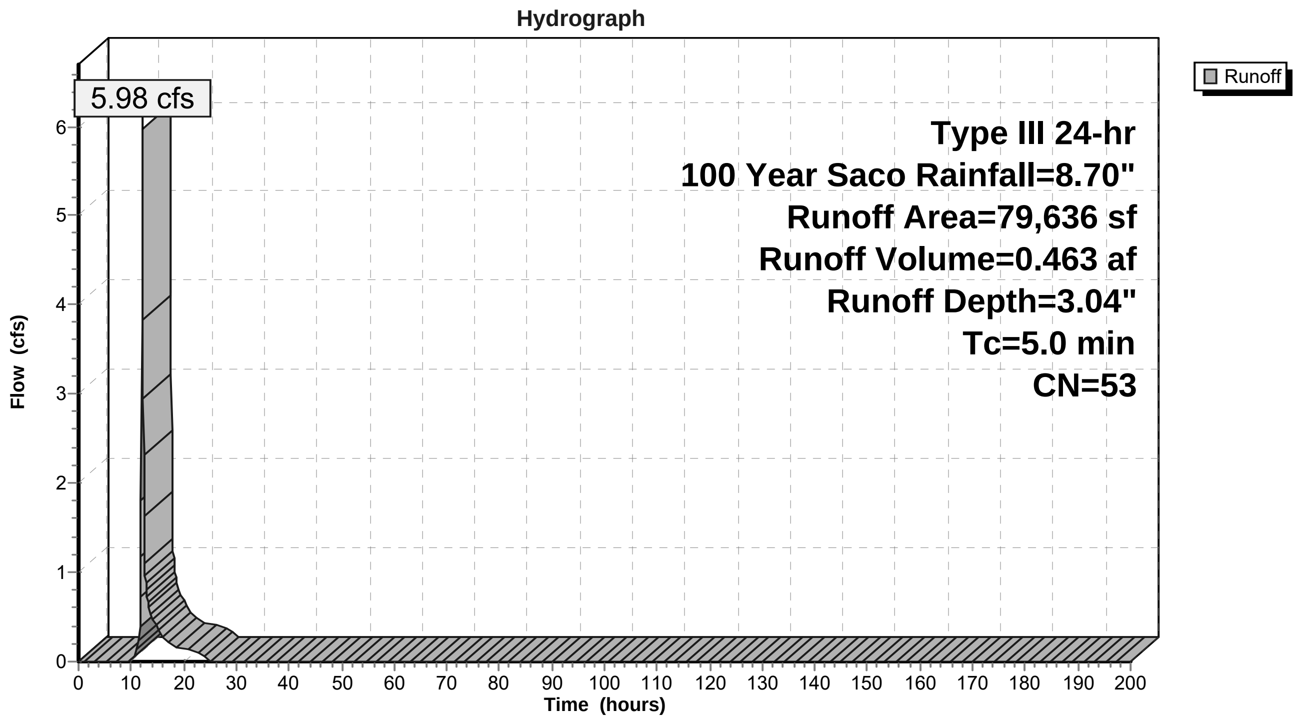
Runoff = 5.98 cfs @ 12.10 hrs, Volume= 0.463 af, Depth= 3.04"
Routed to Pond 8/9P : GUSF #6 & #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
18,778	98	Paved parking, HSG D
60,443	39	>75% Grass cover, Good, HSG A
415	80	>75% Grass cover, Good, HSG D
79,636	53	Weighted Average
60,858		76.42% Pervious Area
18,778		23.58% Impervious Area

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

Subcatchment 8S: Sub to GUSF #6



Summary for Subcatchment 9S: Sub to GUSF #7

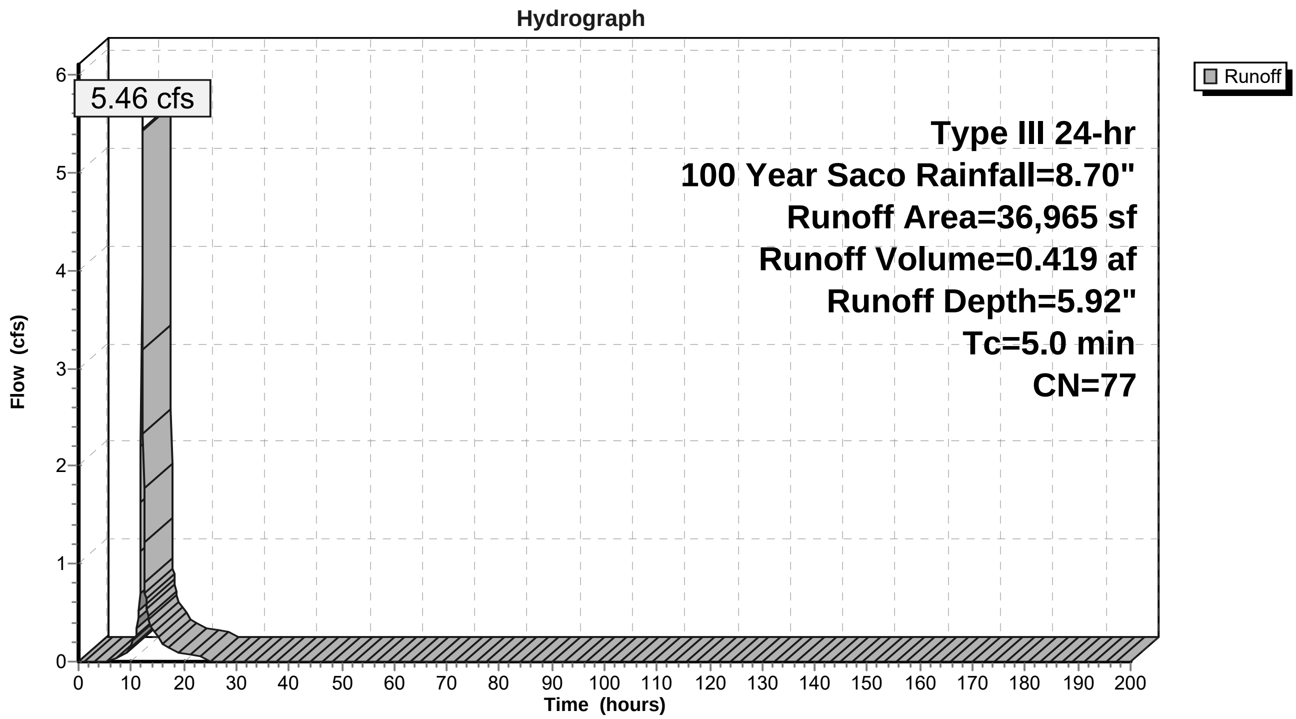
Runoff = 5.46 cfs @ 12.09 hrs, Volume= 0.419 af, Depth= 5.92"
Routed to Pond 8/9P : GUSF #6 & #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
23,580	98	Paved parking, HSG D
405	80	>75% Grass cover, Good, HSG D
12,980	39	>75% Grass cover, Good, HSG A
36,965	77	Weighted Average
13,385		36.21% Pervious Area
23,580		63.79% Impervious Area

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

Subcatchment 9S: Sub to GUSF #7



Summary for Subcatchment 10S: Sub to GUSF #8

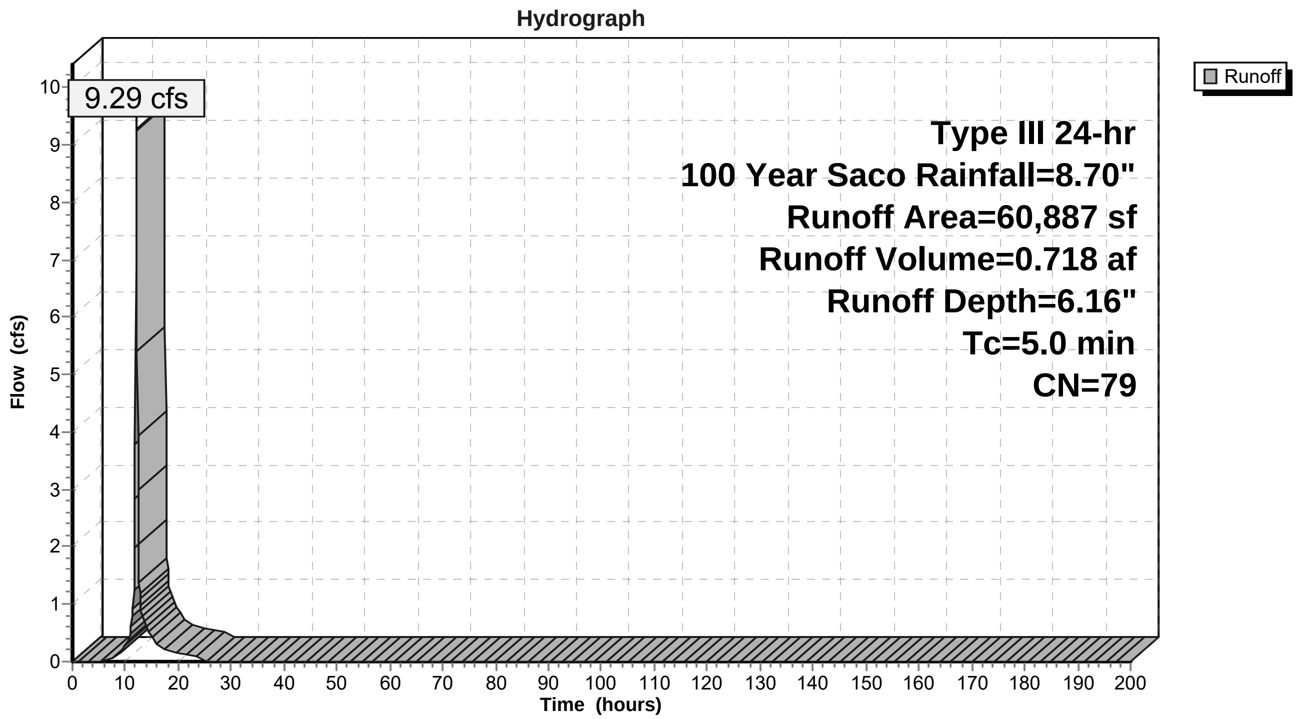
Runoff = 9.29 cfs @ 12.09 hrs, Volume= 0.718 af, Depth= 6.16"
Routed to Pond 10P : GUSF #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
36,998	98	Paved parking, HSG D
6,024	80	>75% Grass cover, Good, HSG D
17,865	39	>75% Grass cover, Good, HSG A
60,887	79	Weighted Average
23,889		39.23% Pervious Area
36,998		60.77% Impervious Area

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

Subcatchment 10S: Sub to GUSF #8



Summary for Subcatchment 11S: Sub to GUSF #9

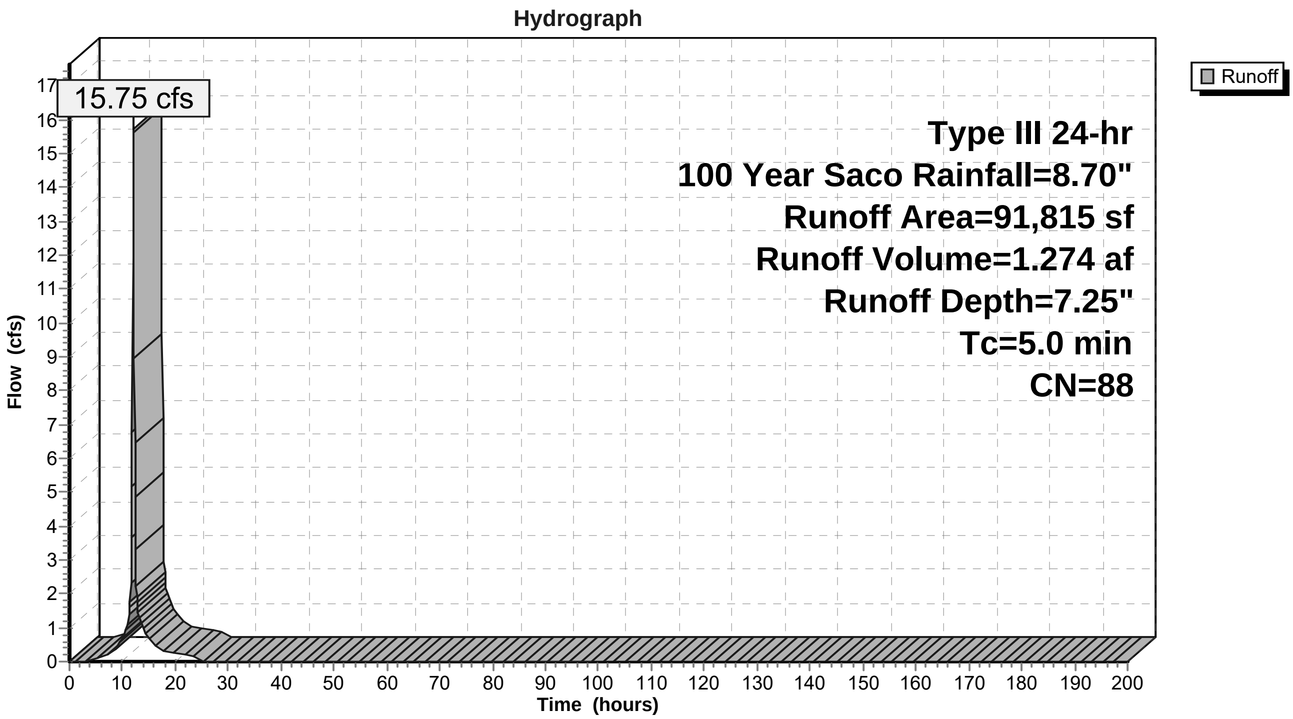
Runoff = 15.75 cfs @ 12.09 hrs, Volume= 1.274 af, Depth= 7.25"
Routed to Pond 11P : GUSF #9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
64,781	98	Paved parking, HSG D
17,188	80	>75% Grass cover, Good, HSG D
9,846	39	>75% Grass cover, Good, HSG A
91,815	88	Weighted Average
27,034		29.44% Pervious Area
64,781		70.56% Impervious Area

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

Subcatchment 11S: Sub to GUSF #9



Summary for Subcatchment 12S: PRE S1

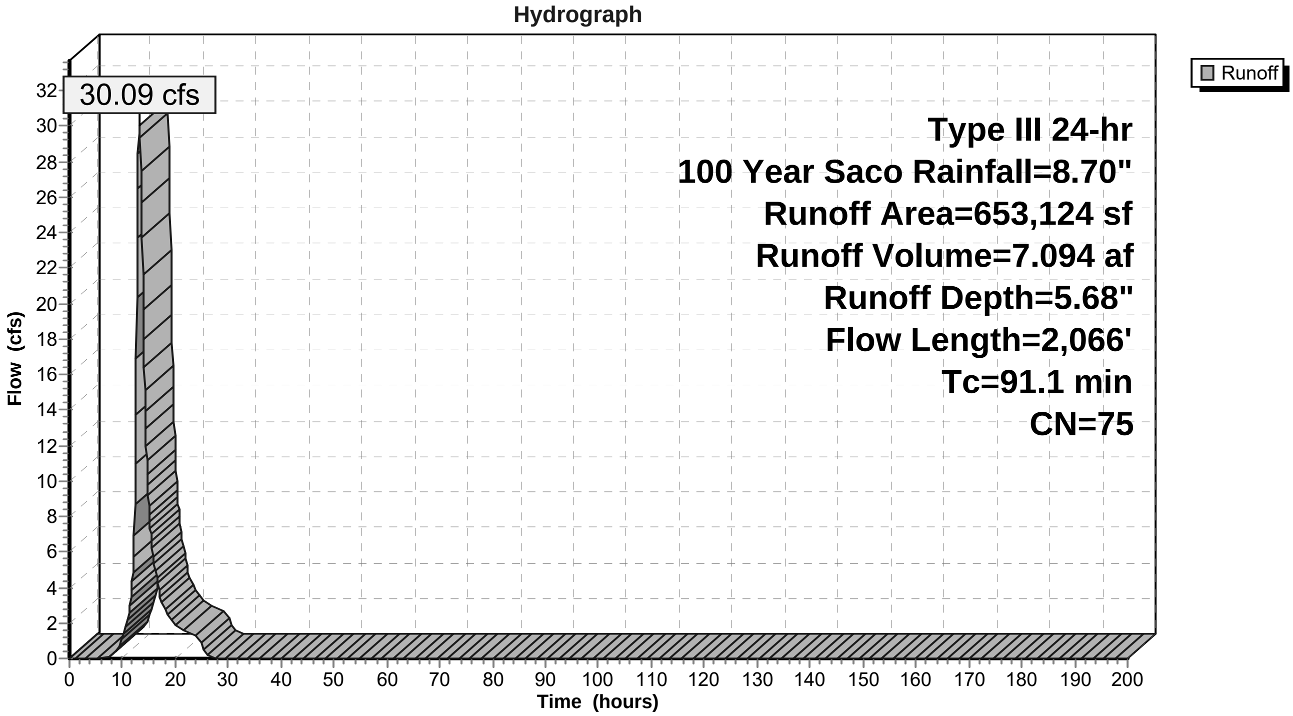
Runoff = 30.09 cfs @ 13.21 hrs, Volume= 7.094 af, Depth= 5.68"
Routed to Reach 1R : POI #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
64,275	30	Woods, Good, HSG A
439,956	77	Woods, Good, HSG D
36,631	85	1/8 acre lots, 65% imp, HSG B
4,922	98	Roofs, HSG D
29,435	98	Paved parking, HSG D
48,787	86	1/3 acre lots, 30% imp, HSG D
5,619	81	1/3 acre lots, 30% imp, HSG C
7,971	92	1/8 acre lots, 65% imp, HSG D
15,528	80	>75% Grass cover, Good, HSG D
653,124	75	Weighted Average
573,454		87.80% Pervious Area
79,670		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	105	0.0200	0.08		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
29.1	731	0.0070	0.42		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
9.7	265	0.0083	0.46		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
28.4	408	0.0023	0.24		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
1.9	557	0.0083	4.89	29.32	**Channel Flow, E - F** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.025 Earth, clean & winding
91.1	2,066	Total			

Subcatchment 12S: PRE S1



Summary for Subcatchment 13S: PRE S2

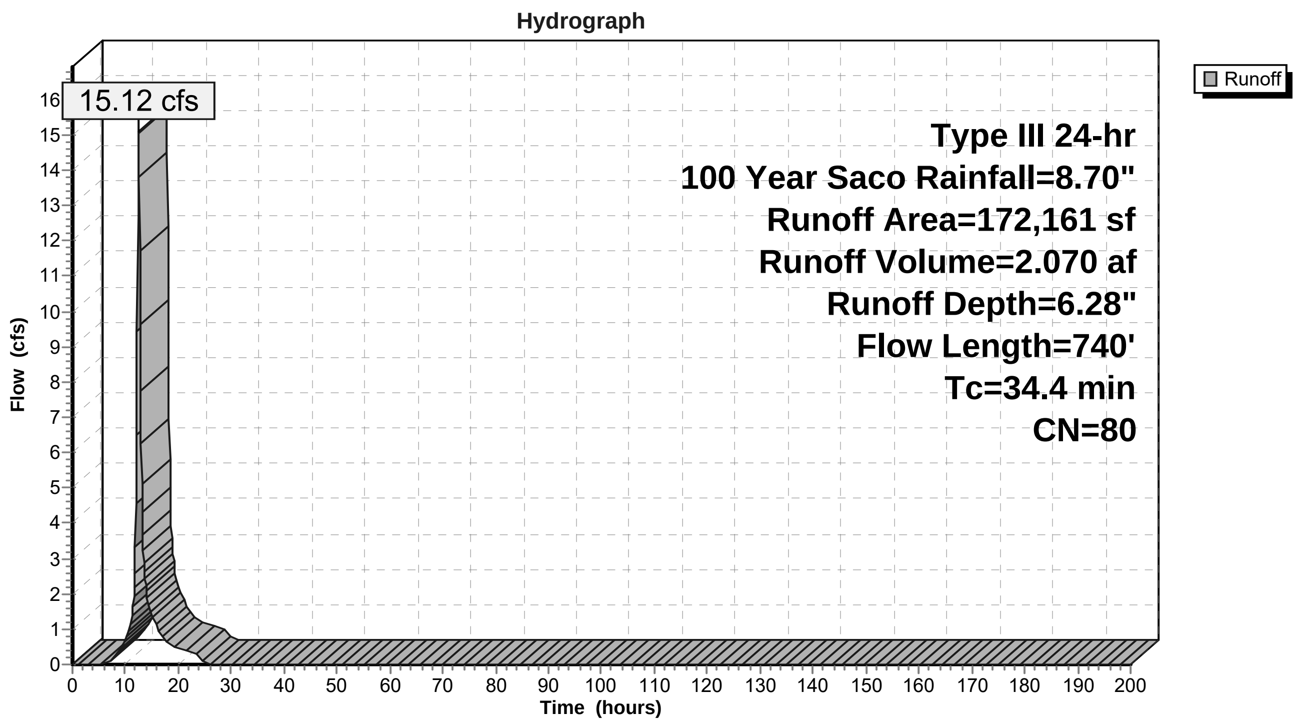
Runoff = 15.12 cfs @ 12.47 hrs, Volume= 2.070 af, Depth= 6.28"
Routed to Reach 4R : POI #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
112,222	77	Woods, Good, HSG D
47,872	87	1/4 acre lots, 38% imp, HSG D
11,315	80	>75% Grass cover, Good, HSG D
752	98	Paved parking, HSG D
172,161	80	Weighted Average
153,218		89.00% Pervious Area
18,943		11.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	84	0.0436	0.10		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
3.4	220	0.0454	1.07		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
17.5	436	0.0069	0.42		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
34.4	740	Total			

Subcatchment 13S: PRE S2



Summary for Subcatchment 14S: PRE S3

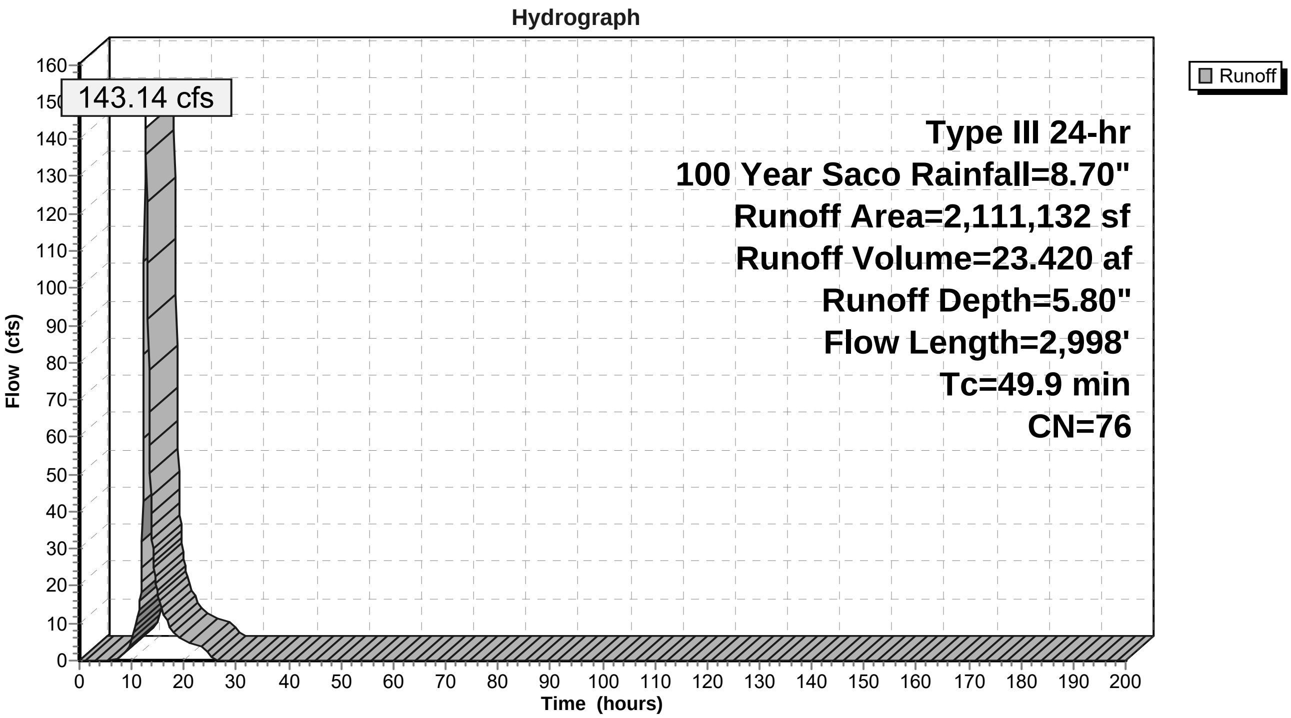
Runoff = 143.14 cfs @ 12.67 hrs, Volume= 23.420 af, Depth= 5.80"
Routed to Reach 5R : POI #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
62,552	30	Woods, Good, HSG A
1,067,368	77	Woods, Good, HSG D
209,654	54	1/2 acre lots, 25% imp, HSG A
119,137	87	1/4 acre lots, 38% imp, HSG D
580,960	85	1/2 acre lots, 25% imp, HSG D
26,858	98	Paved parking, HSG D
44,603	80	>75% Grass cover, Good, HSG D
2,111,132	76	Weighted Average
1,841,348		87.22% Pervious Area
269,784		12.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	125	0.0161	0.17		**Sheet Flow, A - B** Grass: Short n= 0.150 P2= 3.30"
3.2	380	0.0172	1.97		**Shallow Concentrated Flow, B - C** Grassed Waterway Kv= 15.0 fps
0.1	40	0.0373	11.48	20.29	**Pipe Channel, C - D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
24.8	721	0.0094	0.48		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
3.3	584	0.0062	2.93	23.40	**Channel Flow, E - F** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
2.5	540	0.0095	3.62	28.97	**Channel Flow, F - G** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
3.4	608	0.0066	3.02	24.14	**Channel Flow, G - H** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
49.9	2,998	Total			

Subcatchment 14S: PRE S3



Summary for Subcatchment 15S: Chamber 1 Subcatchment

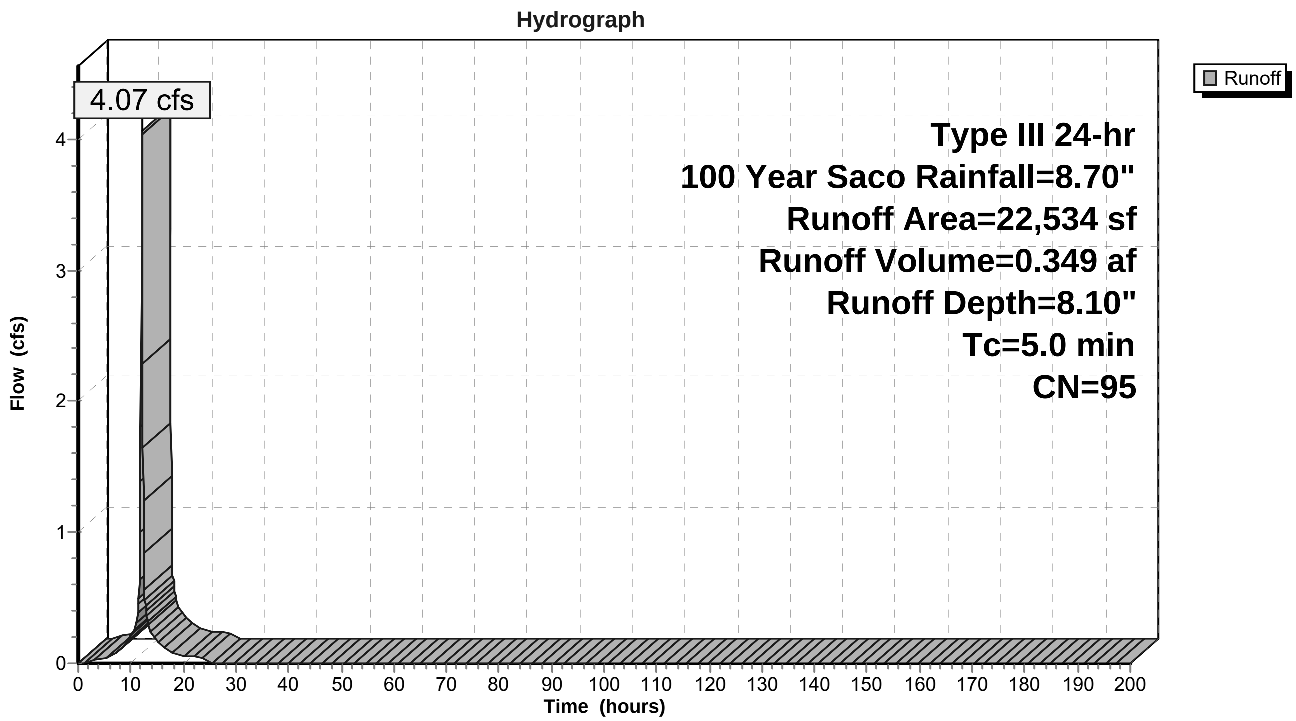
Runoff = 4.07 cfs @ 12.08 hrs, Volume= 0.349 af, Depth= 8.10"
Routed to Pond 12P : CHAMBER1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
18,955	98	Paved parking, HSG D
3,579	80	>75% Grass cover, Good, HSG D
22,534	95	Weighted Average
3,579		15.88% Pervious Area
18,955		84.12% Impervious Area

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

Subcatchment 15S: Chamber 1 Subcatchment



Summary for Subcatchment 16S: Chamber 2 Subcatchment

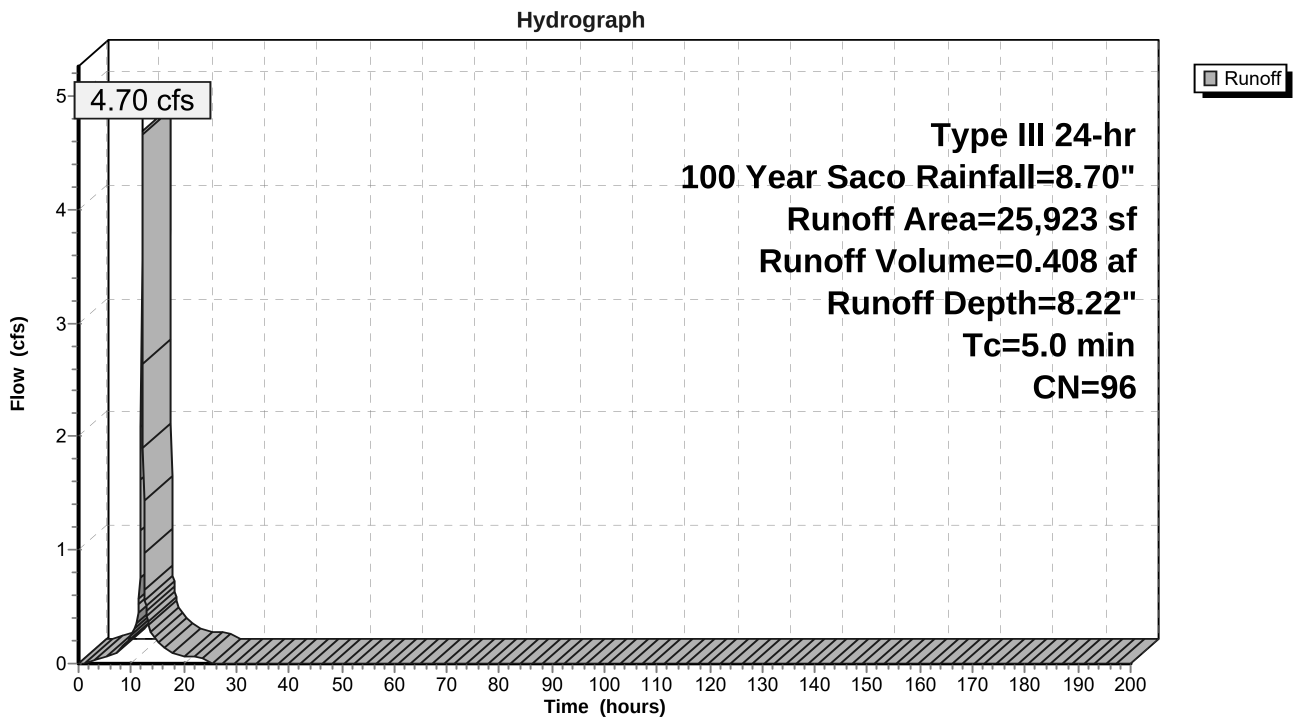
Runoff = 4.70 cfs @ 12.08 hrs, Volume= 0.408 af, Depth= 8.22"
Routed to Pond 13P : CHAMBER2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
22,426	98	Paved parking, HSG D
3,497	80	>75% Grass cover, Good, HSG D
25,923	96	Weighted Average
3,497		13.49% Pervious Area
22,426		86.51% Impervious Area

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

Subcatchment 16S: Chamber 2 Subcatchment



Summary for Subcatchment 17S: SF Dripedges

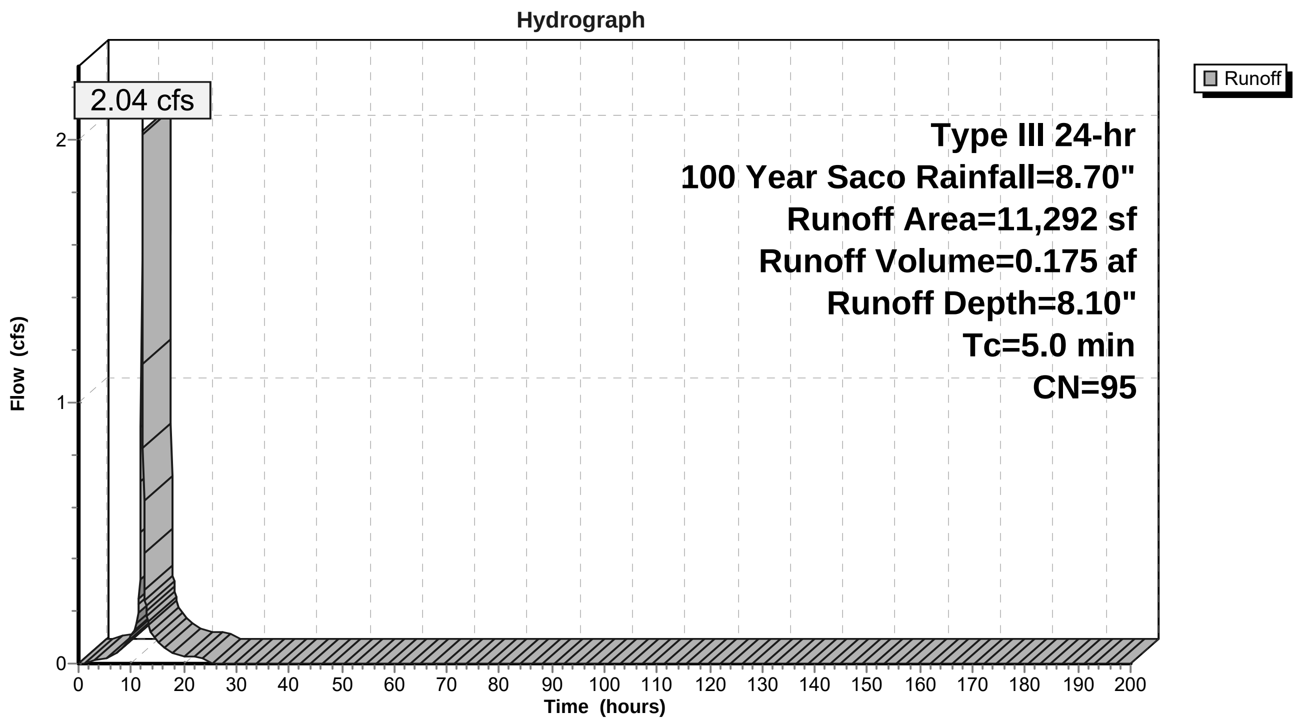
Runoff = 2.04 cfs @ 12.08 hrs, Volume= 0.175 af, Depth= 8.10"
Routed to Reach 7R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
9,276	98	Paved parking, HSG D
2,016	80	>75% Grass cover, Good, HSG D
11,292	95	Weighted Average
2,016		17.85% Pervious Area
9,276		82.15% Impervious Area

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

Subcatchment 17S: SF Dripedges



Summary for Subcatchment 19S: Front Duplex (Drip Edges)

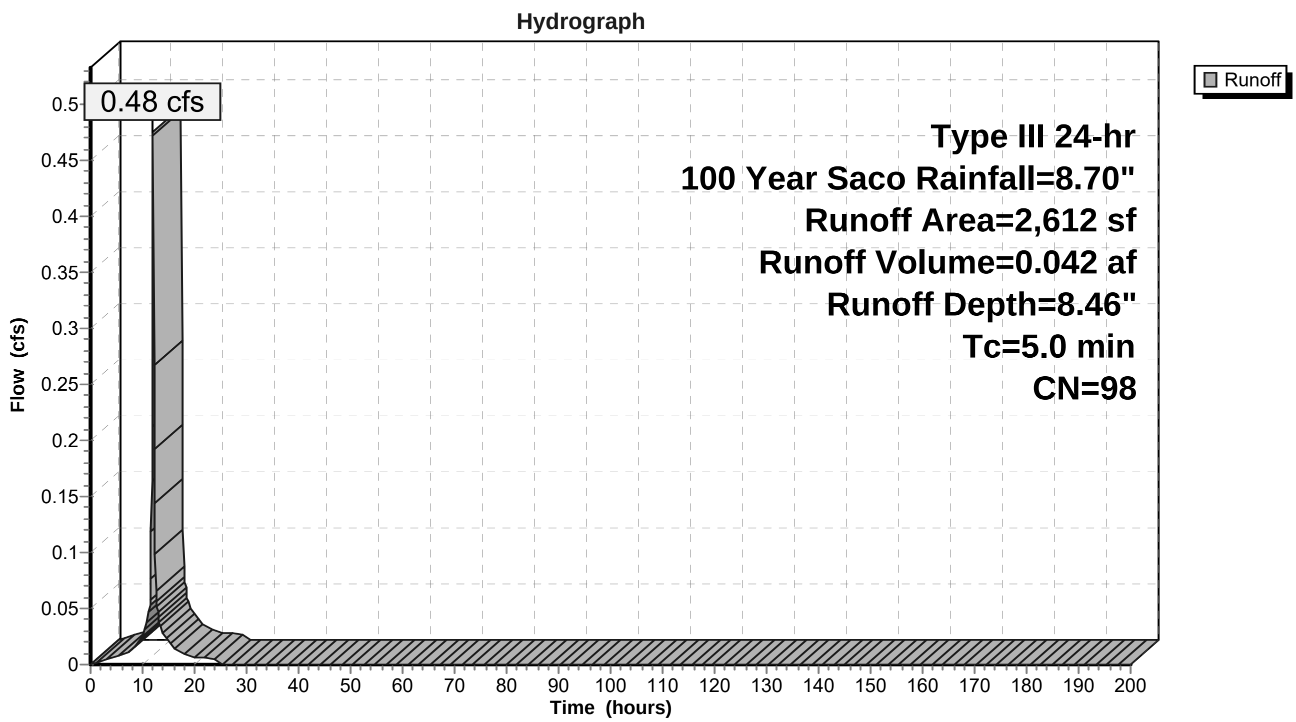
Runoff = 0.48 cfs @ 12.08 hrs, Volume= 0.042 af, Depth= 8.46"
Routed to Reach 4R : POI #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
2,612	98	Roofs, HSG D
2,612		100.00% Impervious Area

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

Subcatchment 19S: Front Duplex (Drip Edges)



Summary for Subcatchment 20S: FP 1 Subcatchment

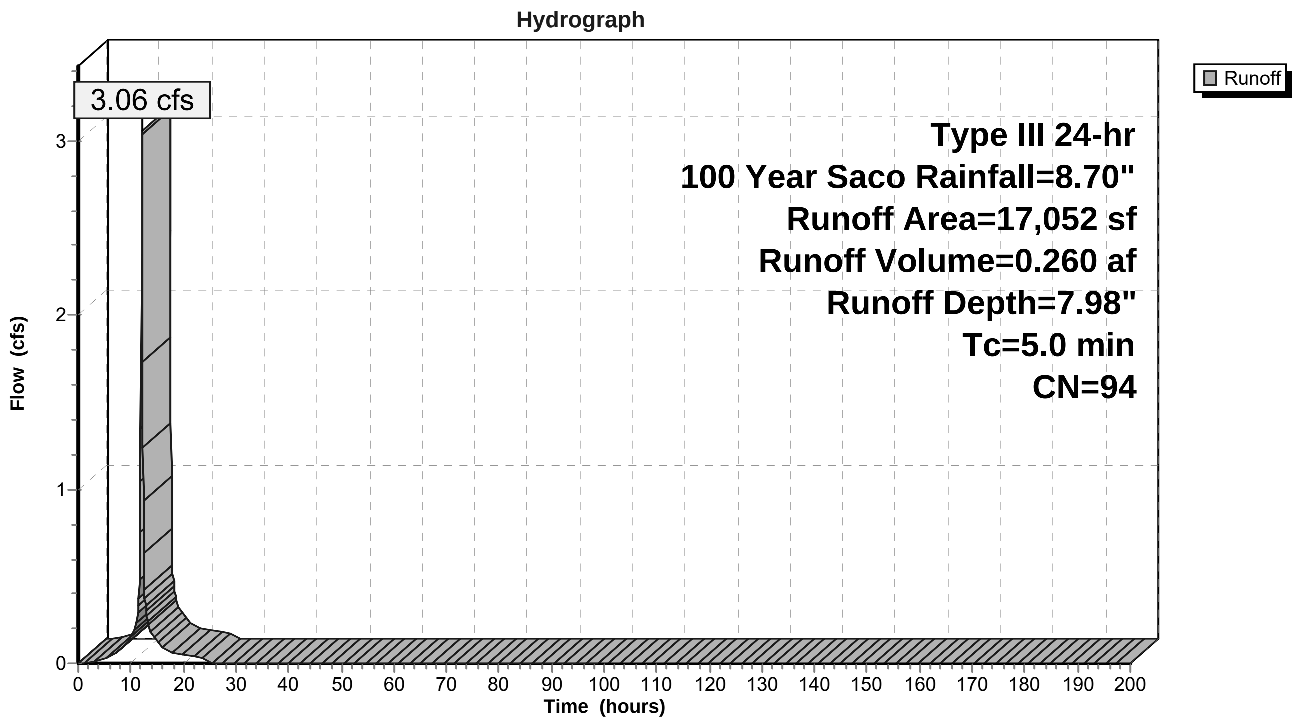
Runoff = 3.06 cfs @ 12.08 hrs, Volume= 0.260 af, Depth= 7.98"
Routed to Pond 14P : FocalPoint 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
13,730	98	Paved parking, HSG D
3,322	80	>75% Grass cover, Good, HSG D
17,052	94	Weighted Average
3,322		19.48% Pervious Area
13,730		80.52% Impervious Area

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

Subcatchment 20S: FP 1 Subcatchment



Summary for Subcatchment 21S: FP 2 Subcatchment

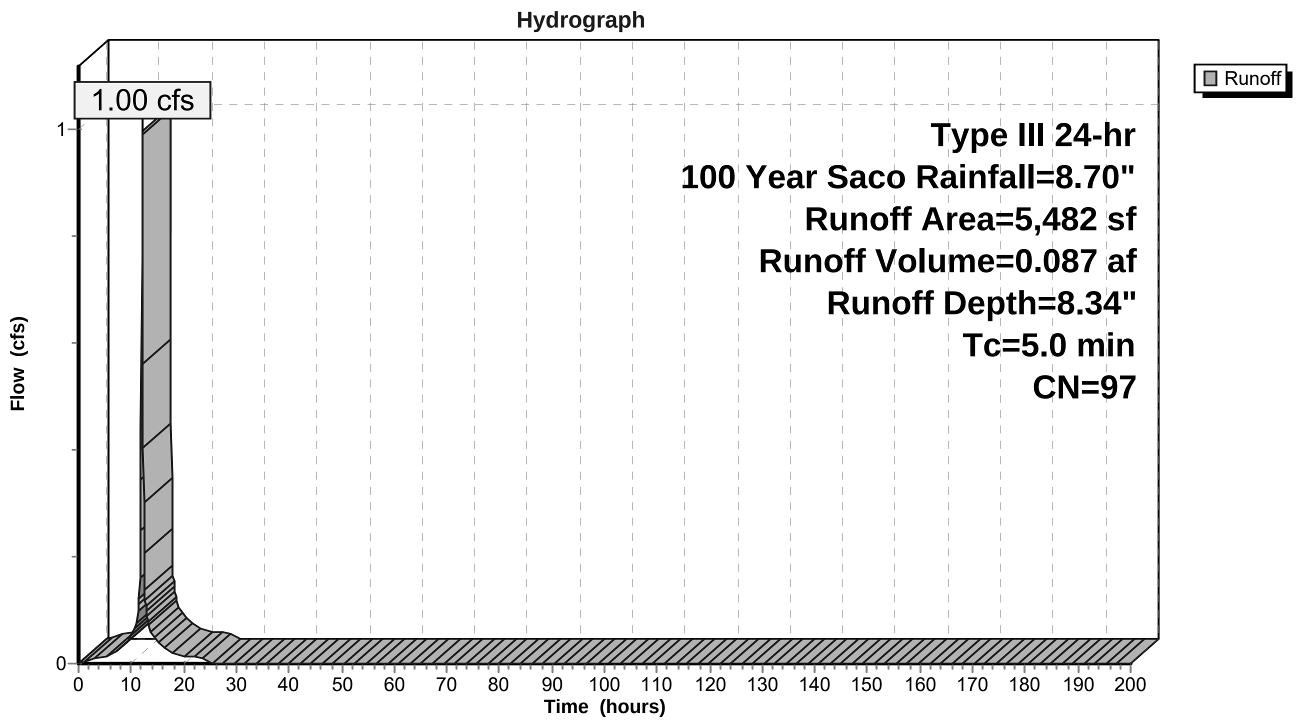
Runoff = 1.00 cfs @ 12.08 hrs, Volume= 0.087 af, Depth= 8.34"
Routed to Pond 15P : FocalPoint 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
5,225	98	Paved parking, HSG D
257	80	>75% Grass cover, Good, HSG D
5,482	97	Weighted Average
257		4.69% Pervious Area
5,225		95.31% Impervious Area

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

Subcatchment 21S: FP 2 Subcatchment



Summary for Subcatchment 22S: FP 3 Subcatchment

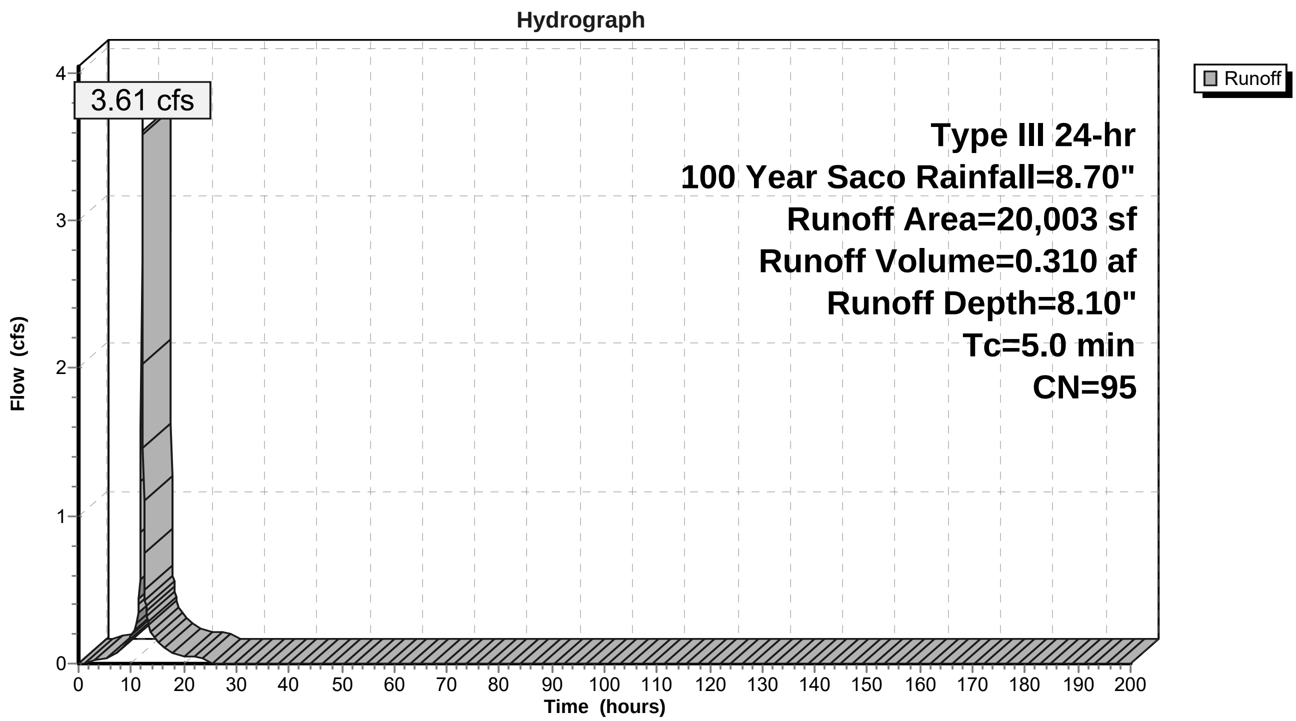
Runoff = 3.61 cfs @ 12.08 hrs, Volume= 0.310 af, Depth= 8.10"
Routed to Pond 16P : FocalPoint 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
16,742	98	Paved parking, HSG D
3,261	80	>75% Grass cover, Good, HSG D
20,003	95	Weighted Average
3,261		16.30% Pervious Area
16,742		83.70% Impervious Area

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

Subcatchment 22S: FP 3 Subcatchment



Summary for Subcatchment 23S: FP 4 Subcatchment

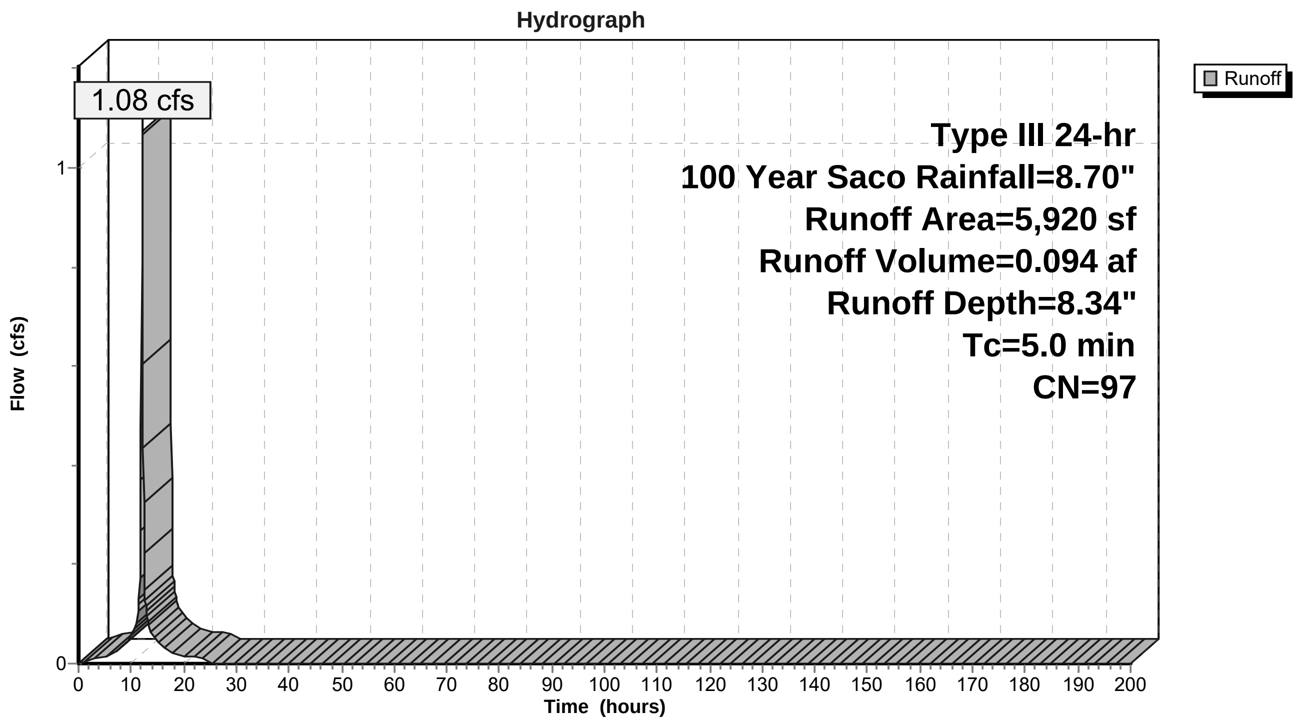
Runoff = 1.08 cfs @ 12.08 hrs, Volume= 0.094 af, Depth= 8.34"
Routed to Pond 17P : FocalPoint 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
5,684	98	Paved parking, HSG D
236	80	>75% Grass cover, Good, HSG D
5,920	97	Weighted Average
236		3.99% Pervious Area
5,684		96.01% Impervious Area

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

Subcatchment 23S: FP 4 Subcatchment

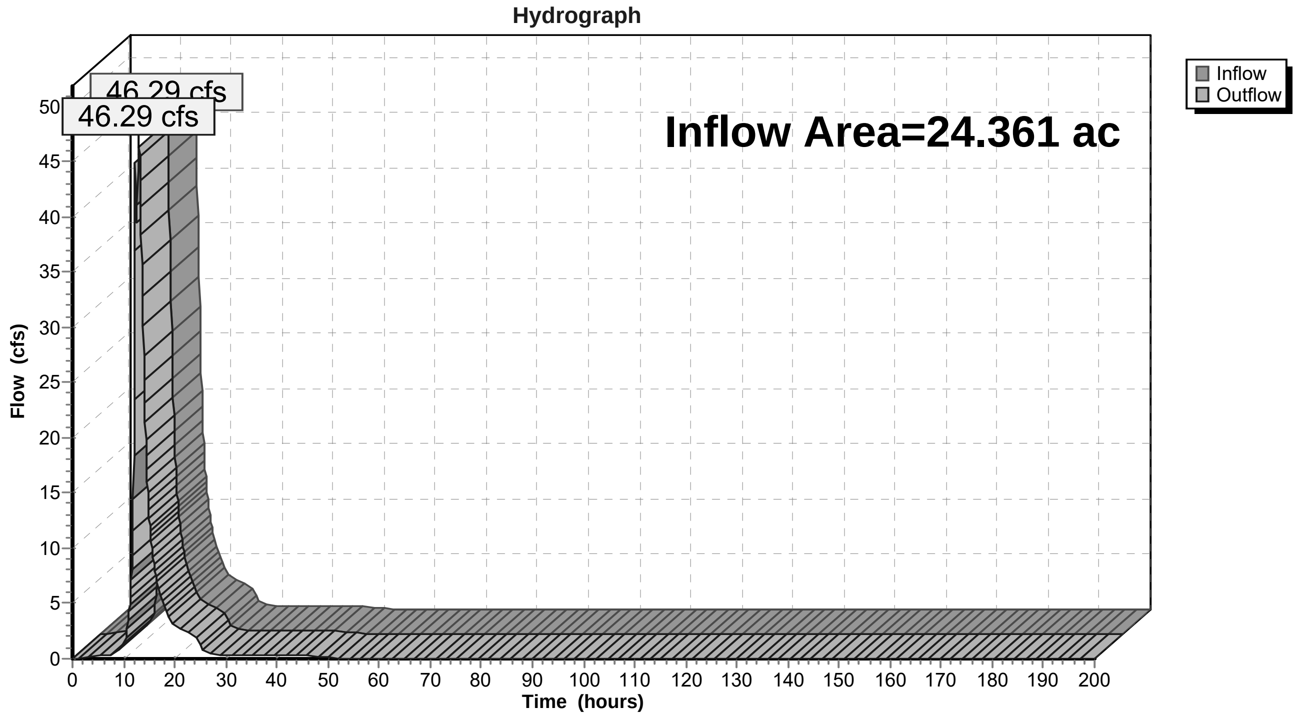


Summary for Reach 1R: POI #1

Inflow Area = 24.361 ac, 31.49% Impervious, Inflow Depth = 6.44" for 100 Year Saco event
Inflow = 46.29 cfs @ 13.02 hrs, Volume= 13.068 af
Outflow = 46.29 cfs @ 13.02 hrs, Volume= 13.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs

Reach 1R: POI #1



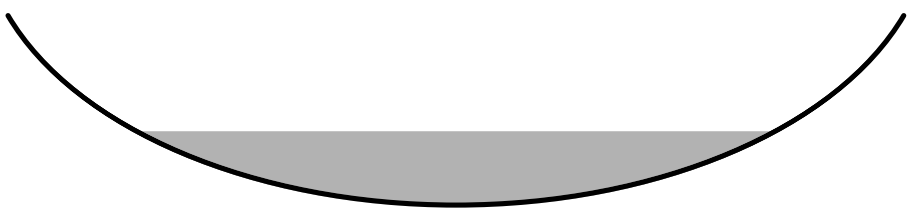
Summary for Reach 2R:

Inflow Area = 7.670 ac, 61.31% Impervious, Inflow Depth = 7.63" for 100 Year Saco event
Inflow = 32.82 cfs @ 12.23 hrs, Volume= 4.880 af
Outflow = 29.95 cfs @ 12.31 hrs, Volume= 4.880 af, Atten= 9%, Lag= 4.8 min
Routed to Reach 1R : POI #1

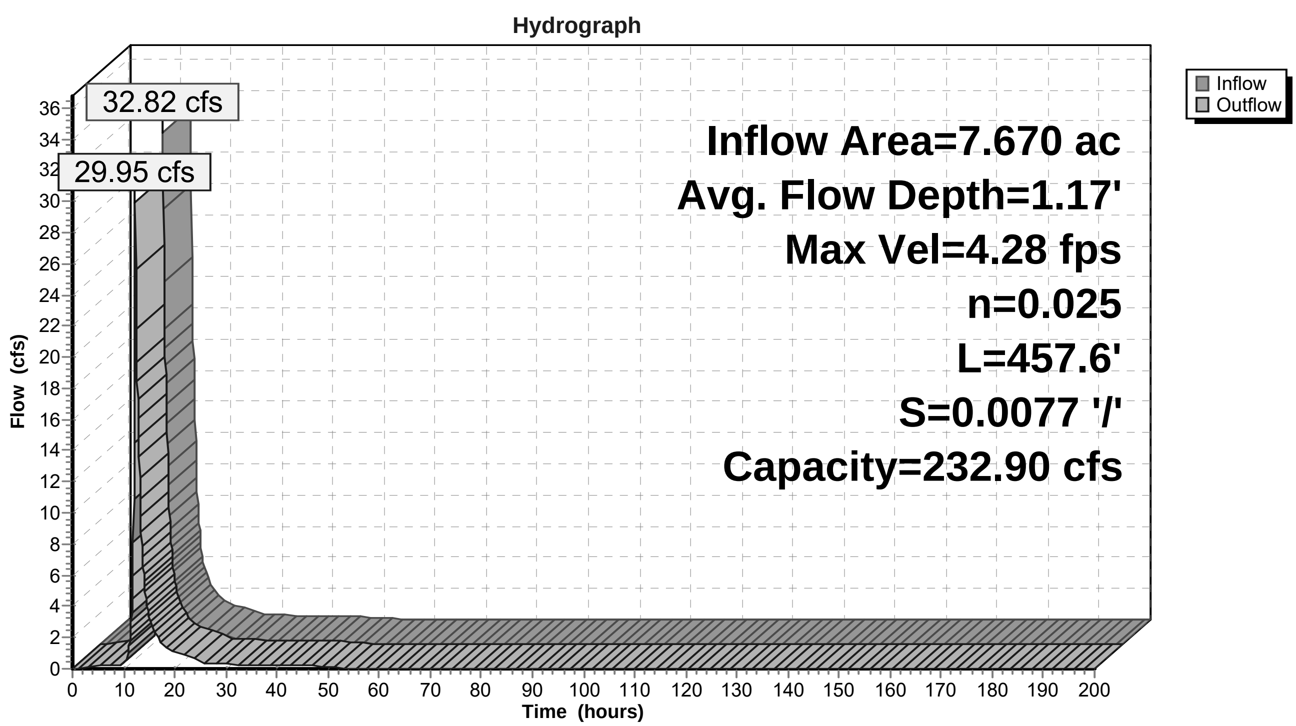
Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Max. Velocity= 4.28 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 6.4 min

Peak Storage= 3,325 cf @ 12.28 hrs
Average Depth at Peak Storage= 1.17' , Surface Width= 9.35'
Bank-Full Depth= 3.00' Flow Area= 30.0 sf, Capacity= 232.90 cfs

15.00' x 3.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 457.6' Slope= 0.0077 '/'
Inlet Invert= 95.91', Outlet Invert= 92.40'



Reach 2R:



Summary for Reach 3R:

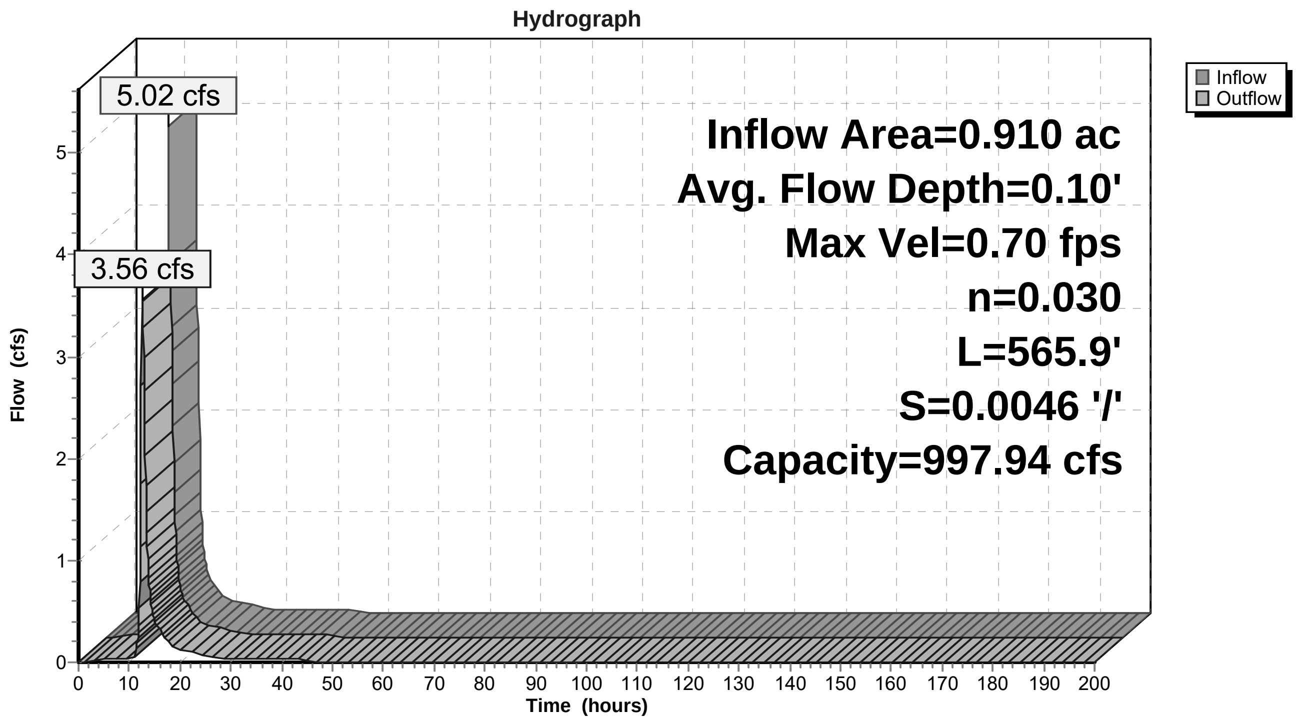
Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 5.02 cfs @ 12.21 hrs, Volume= 0.587 af
Outflow = 3.56 cfs @ 12.56 hrs, Volume= 0.587 af, Atten= 29%, Lag= 21.5 min
Routed to Reach 2R :

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.70 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 31.6 min

Peak Storage= 2,986 cf @ 12.33 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 55.73'
Bank-Full Depth= 2.50' Flow Area= 191.3 sf, Capacity= 997.94 cfs

54.00' x 2.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 8.0 '/' Top Width= 99.00'
Length= 565.9' Slope= 0.0046 '/'
Inlet Invert= 98.53', Outlet Invert= 95.91'

Reach 3R:

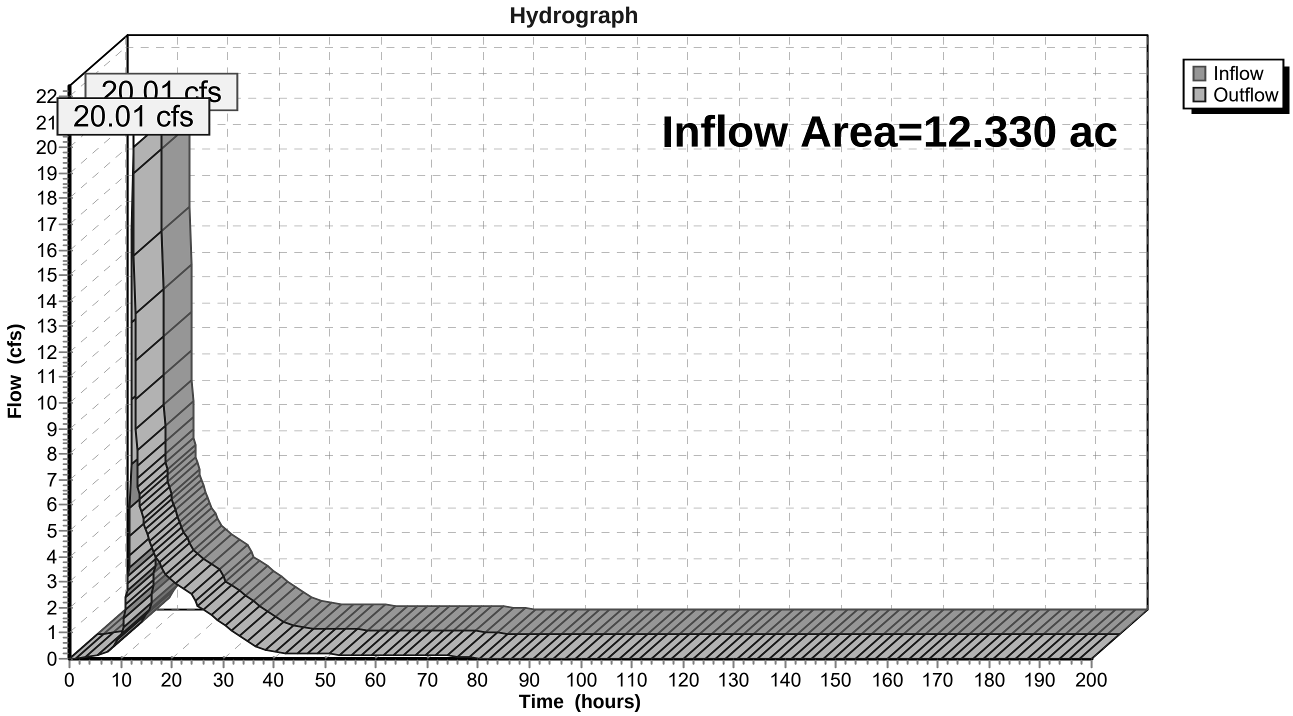


Summary for Reach 4R: POI #2

Inflow Area =	12.330 ac, 45.25% Impervious, Inflow Depth = 7.13" for 100 Year Saco event			
Inflow =	20.01 cfs @	12.45 hrs, Volume=	7.328 af	
Outflow =	20.01 cfs @	12.45 hrs, Volume=	7.328 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs

Reach 4R: POI #2

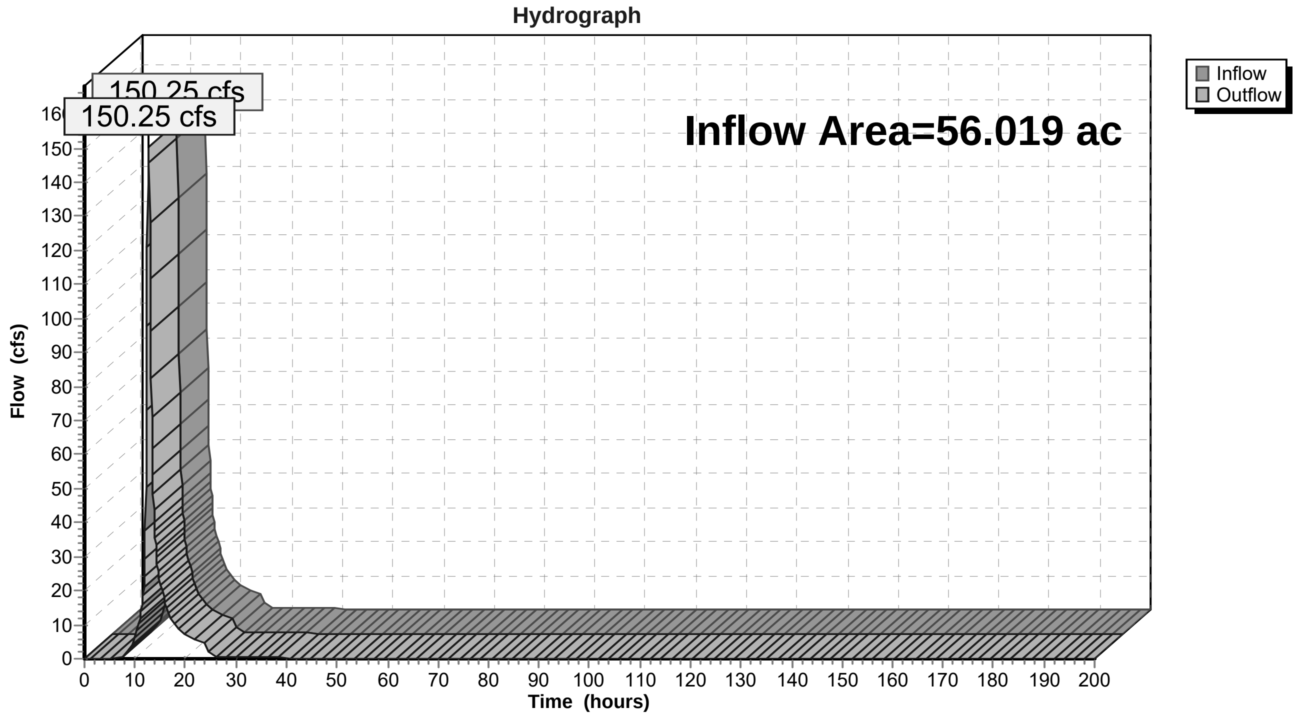


Summary for Reach 5R: POI #3

Inflow Area =	56.019 ac,	19.04% Impervious,	Inflow Depth = 5.83"	for 100 Year Saco event	
Inflow =	150.25 cfs @	12.66 hrs,	Volume=	27.224 af	
Outflow =	150.25 cfs @	12.66 hrs,	Volume=	27.224 af,	Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs

Reach 5R: POI #3



Summary for Reach 6R:

Inflow Area = 4.075 ac, 44.71% Impervious, Inflow Depth = 4.71" for 100 Year Saco event
Inflow = 9.04 cfs @ 12.32 hrs, Volume= 1.598 af
Outflow = 2.98 cfs @ 14.62 hrs, Volume= 1.598 af, Atten= 67%, Lag= 138.4 min
Routed to Reach 5R : POI #3

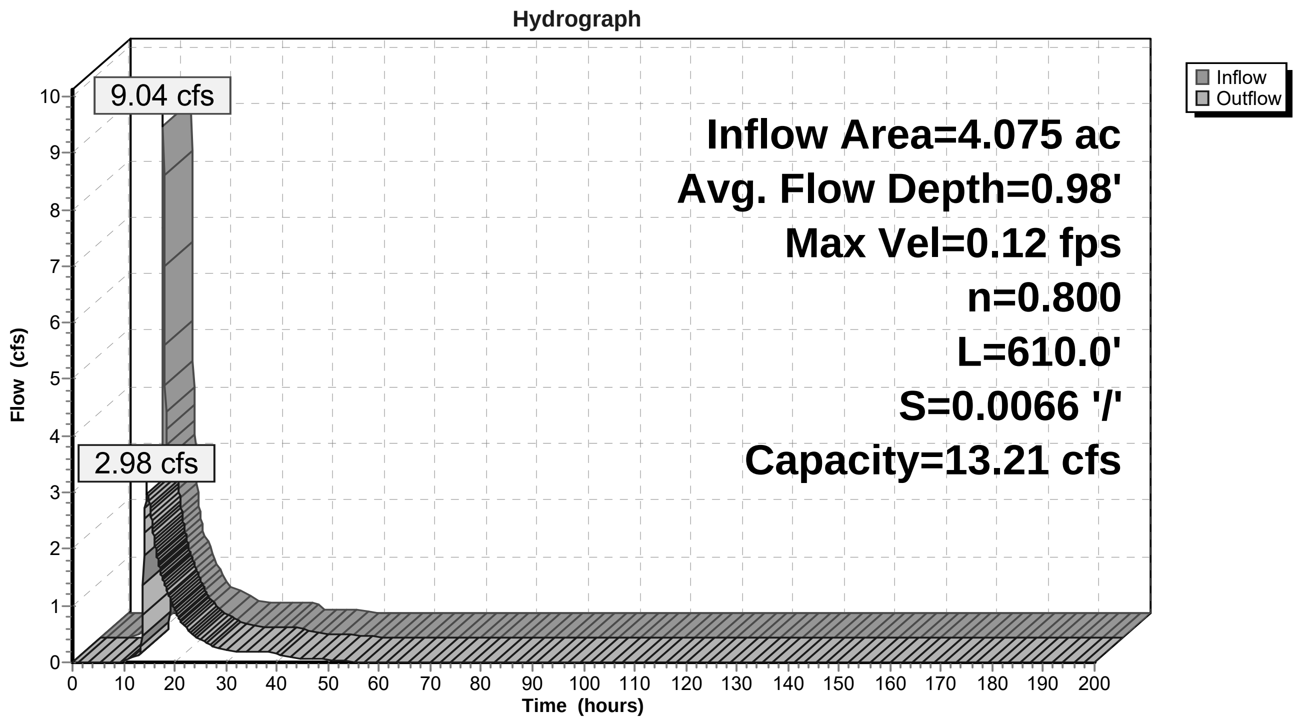
Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 87.2 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 470.3 min

Peak Storage= 15,616 cf @ 13.17 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 37.45'
Bank-Full Depth= 2.00' Flow Area= 76.0 sf, Capacity= 13.21 cfs

15.00' x 2.00' deep channel, n= 0.800 Sheet flow: Woods+dense brush
Side Slope Z-value= 13.0 10.0 '/' Top Width= 61.00'
Length= 610.0' Slope= 0.0066 '/'
Inlet Invert= 95.00', Outlet Invert= 91.00'

‡

Reach 6R:



Summary for Reach 7R:

Inflow Area = 1.372 ac, 84.78% Impervious, Inflow Depth = 8.16" for 100 Year Saco event
Inflow = 10.64 cfs @ 12.09 hrs, Volume= 0.932 af
Outflow = 8.01 cfs @ 12.31 hrs, Volume= 0.932 af, Atten= 25%, Lag= 13.7 min
Routed to Reach 5R : POI #3

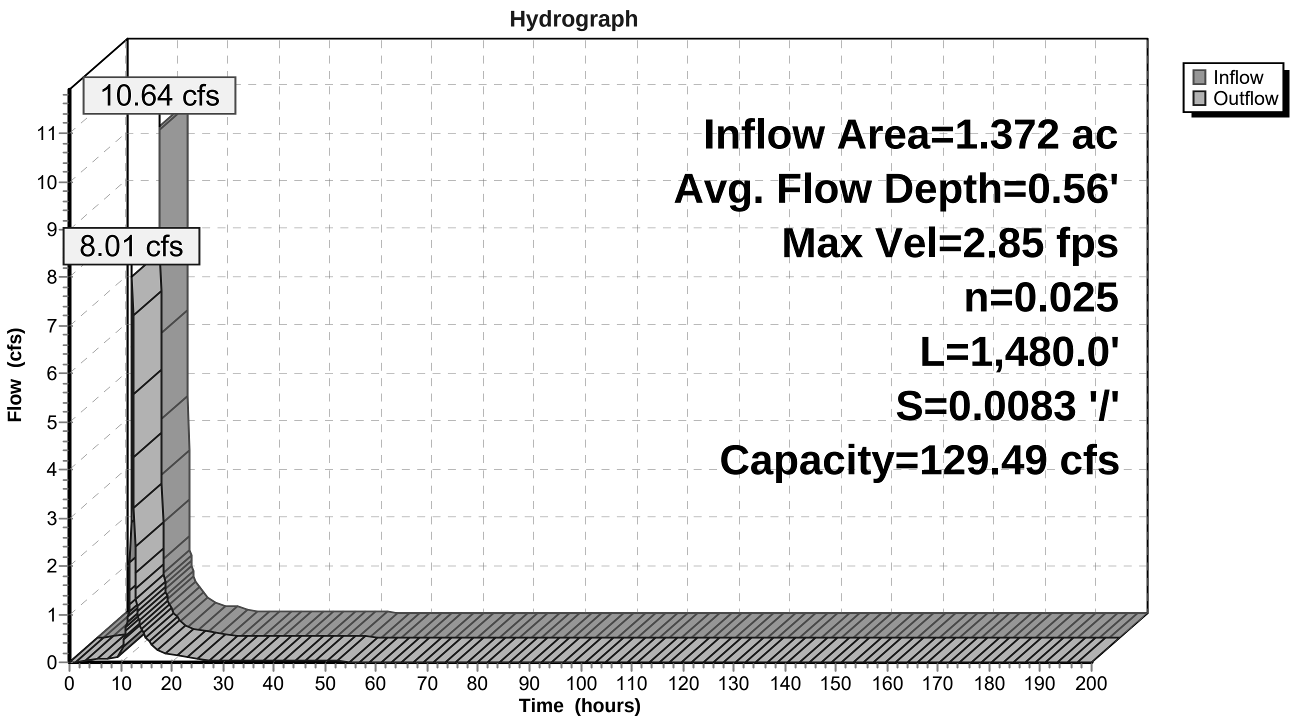
Routing by Stor-Ind+Trans method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Max. Velocity= 2.85 fps, Min. Travel Time= 8.7 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 38.7 min

Peak Storage= 4,288 cf @ 12.17 hrs
Average Depth at Peak Storage= 0.56' , Surface Width= 7.44'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 129.49 cfs

3.00' x 2.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 19.00'
Length= 1,480.0' Slope= 0.0083 '/'
Inlet Invert= 103.35', Outlet Invert= 91.00'

‡

Reach 7R:



Summary for Pond 1P: GUSF #1

Inflow Area = 1.697 ac, 67.19% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 13.12 cfs @ 12.08 hrs, Volume= 1.094 af
Outflow = 6.43 cfs @ 12.26 hrs, Volume= 1.094 af, Atten= 51%, Lag= 10.6 min
Primary = 0.06 cfs @ 4.00 hrs, Volume= 0.229 af
Routed to Reach 1R : POI #1
Secondary = 3.48 cfs @ 12.26 hrs, Volume= 0.802 af
Routed to Reach 1R : POI #1
Tertiary = 2.89 cfs @ 12.26 hrs, Volume= 0.063 af
Routed to Reach 1R : POI #1

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.12' @ 12.26 hrs Surf.Area= 6,840 sf Storage= 17,224 cf

Plug-Flow detention time= 221.6 min calculated for 1.094 af (100% of inflow)
Center-of-Mass det. time= 222.3 min (988.3 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.40'	23,689 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.40	3,110	0.0	0	0
100.59	3,110	0.0	0	0
100.60	3,110	100.0	31	31
101.00	3,450	100.0	1,312	1,343
102.00	4,334	100.0	3,892	5,235
103.00	5,677	100.0	5,006	10,241
104.00	6,715	100.0	6,196	16,437
105.00	7,789	100.0	7,252	23,689

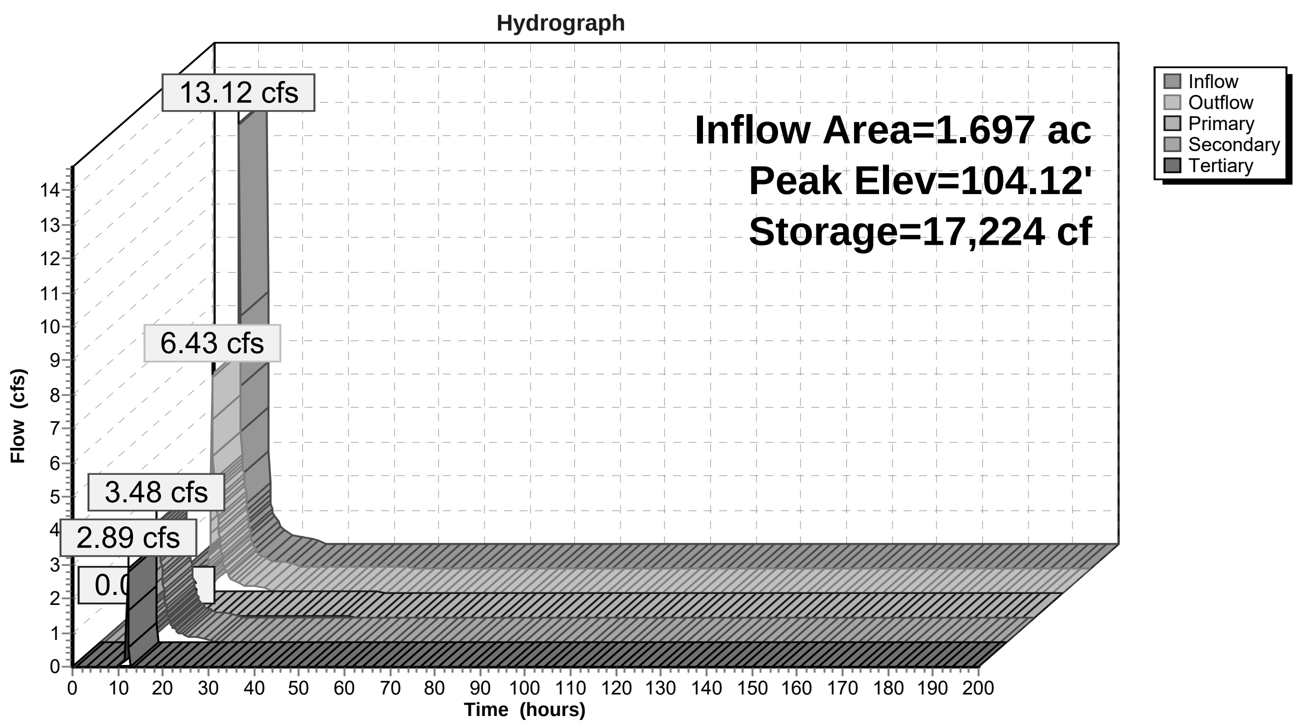
Device	Routing	Invert	Outlet Devices
#1	Primary	98.40'	**0.06 cfs Exfiltration at all elevations**
#2	Secondary	98.30'	**18.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.30' / 98.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.94'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.93'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.06 cfs @ 4.00 hrs HW=100.59' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=3.48 cfs @ 12.26 hrs HW=104.11' (Free Discharge)
└─**2=Culvert** (Passes 3.48 cfs of 15.11 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.48 cfs @ 6.37 fps)

Tertiary OutFlow Max=2.69 cfs @ 12.26 hrs HW=104.11' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 2.69 cfs @ 1.00 fps)

Pond 1P: GUSF #1



Summary for Pond 2P: GUSF #2

Inflow Area = 1.895 ac, 47.04% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 14.16 cfs @ 12.09 hrs, Volume= 1.145 af
Outflow = 8.96 cfs @ 12.22 hrs, Volume= 1.146 af, Atten= 37%, Lag= 8.2 min
Primary = 0.05 cfs @ 4.80 hrs, Volume= 0.201 af
Routed to Reach 2R :
Secondary = 4.93 cfs @ 12.23 hrs, Volume= 0.886 af
Routed to Reach 2R :
Tertiary = 3.98 cfs @ 12.22 hrs, Volume= 0.058 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 105.08' @ 12.23 hrs Surf.Area= 6,120 sf Storage= 15,994 cf

Plug-Flow detention time= 204.1 min calculated for 1.145 af (100% of inflow)
Center-of-Mass det. time= 204.9 min (983.5 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	22,037 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	2,848	0.0	0	0
101.49	2,848	0.0	0	0
101.50	2,848	100.0	28	28
102.00	3,087	100.0	1,484	1,512
103.00	4,294	100.0	3,691	5,203
104.00	5,146	100.0	4,720	9,923
105.00	6,046	100.0	5,596	15,519
106.00	6,991	100.0	6,519	22,037

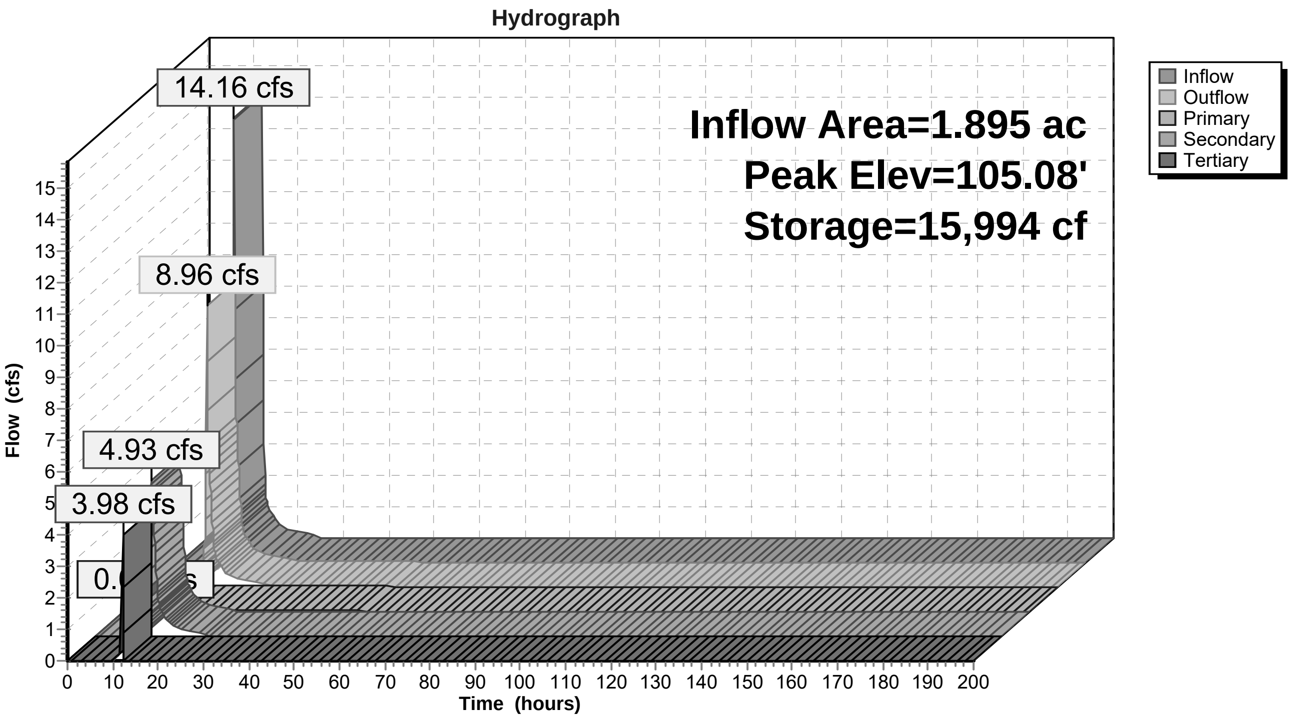
Device	Routing	Invert	Outlet Devices
#1	Secondary	99.20'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.20' / 99.00' S= 0.0044 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Primary	99.30'	**0.05 cfs Exfiltration at all elevations**
#3	Device 1	102.88'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	104.84'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.05 cfs @ 4.80 hrs HW=101.49' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=4.88 cfs @ 12.23 hrs HW=105.04' (Free Discharge)
└─**1=Culvert** (Passes 4.88 cfs of 15.16 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 4.88 cfs @ 6.21 fps)

Tertiary OutFlow Max=3.49 cfs @ 12.22 hrs HW=105.05' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.49 cfs @ 1.11 fps)

Pond 2P: GUSF #2



Summary for Pond 3P: GUSF #3

Inflow Area = 1.029 ac, 71.91% Impervious, Inflow Depth = 7.86" for 100 Year Saco event
Inflow = 8.01 cfs @ 12.08 hrs, Volume= 0.674 af
Outflow = 5.27 cfs @ 12.22 hrs, Volume= 0.674 af, Atten= 34%, Lag= 8.0 min
Primary = 0.04 cfs @ 3.80 hrs, Volume= 0.148 af
Routed to Reach 2R :
Secondary = 2.89 cfs @ 12.23 hrs, Volume= 0.495 af
Routed to Reach 2R :
Tertiary = 2.34 cfs @ 12.22 hrs, Volume= 0.032 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.17' @ 12.23 hrs Surf.Area= 4,613 sf Storage= 9,563 cf

Plug-Flow detention time= 209.5 min calculated for 0.674 af (100% of inflow)
Center-of-Mass det. time= 210.1 min (972.5 - 762.4)

Volume	Invert	Avail.Storage	Storage Description
#1	98.20'	13,683 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.20	2,466	0.0	0	0
100.39	2,466	0.0	0	0
100.40	2,466	100.0	25	25
101.00	2,593	100.0	1,518	1,542
102.00	3,724	100.0	3,159	4,701
103.00	4,479	100.0	4,102	8,802
104.00	5,282	100.0	4,881	13,683

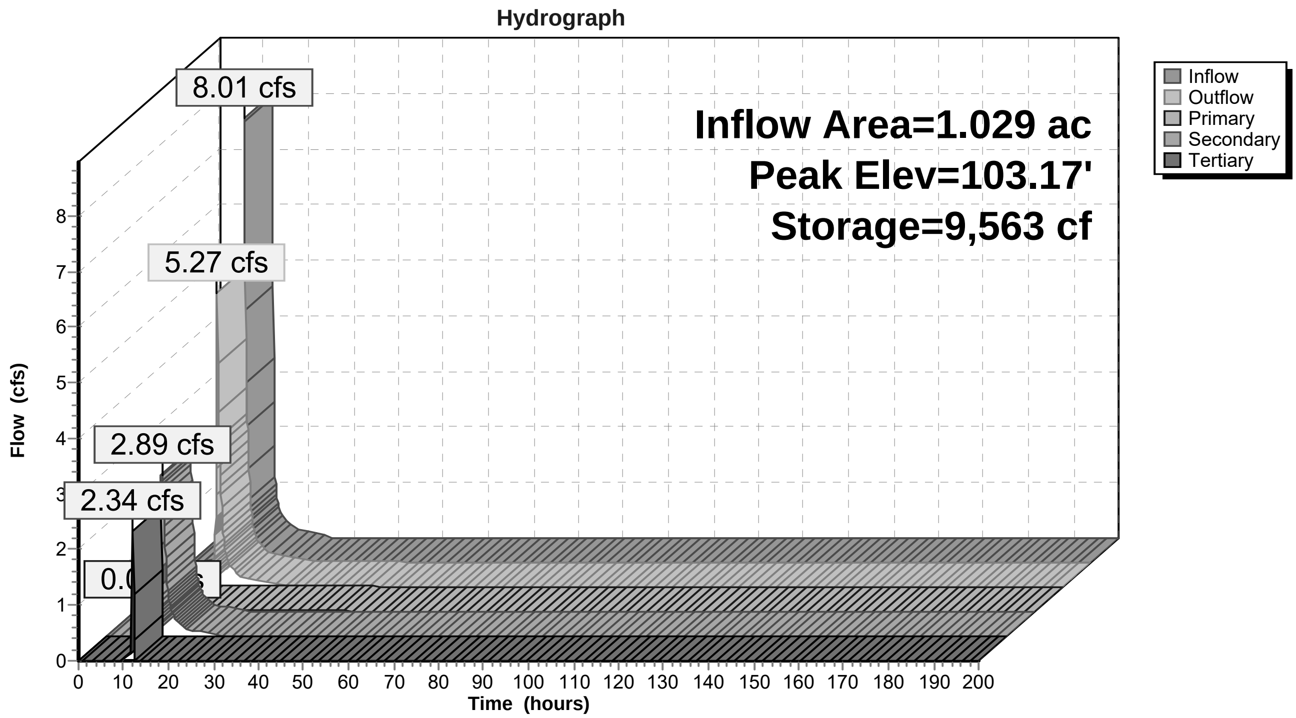
Device	Routing	Invert	Outlet Devices
#1	Primary	98.20'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	98.10'	**18.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.10' / 98.00' S= 0.0043 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.54'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.00'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 3.80 hrs HW=100.39' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=2.86 cfs @ 12.23 hrs HW=103.14' (Free Discharge)
└─**2=Culvert** (Passes 2.86 cfs of 13.92 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.86 cfs @ 5.25 fps)

Tertiary OutFlow Max=2.05 cfs @ 12.22 hrs HW=103.15' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 2.05 cfs @ 0.92 fps)

Pond 3P: GUSF #3



Summary for Pond 4P: GUSF #5

Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 7.03 cfs @ 12.08 hrs, Volume= 0.586 af
Outflow = 5.02 cfs @ 12.21 hrs, Volume= 0.587 af, Atten= 29%, Lag= 7.3 min
Primary = 0.04 cfs @ 4.40 hrs, Volume= 0.135 af
Routed to Reach 3R :
Secondary = 3.32 cfs @ 12.21 hrs, Volume= 0.432 af
Routed to Reach 3R :
Tertiary = 1.66 cfs @ 12.21 hrs, Volume= 0.019 af
Routed to Reach 3R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.87' @ 12.21 hrs Surf.Area= 4,534 sf Storage= 7,514 cf

Plug-Flow detention time= 189.5 min calculated for 0.586 af (100% of inflow)
Center-of-Mass det. time= 190.2 min (956.1 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	99.23'	13,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.23	1,763	0.0	0	0
101.42	1,763	0.0	0	0
101.43	1,763	100.0	18	18
102.00	2,135	100.0	1,111	1,129
103.00	3,583	100.0	2,859	3,988
104.00	4,677	100.0	4,130	8,118
105.00	5,828	100.0	5,253	13,370

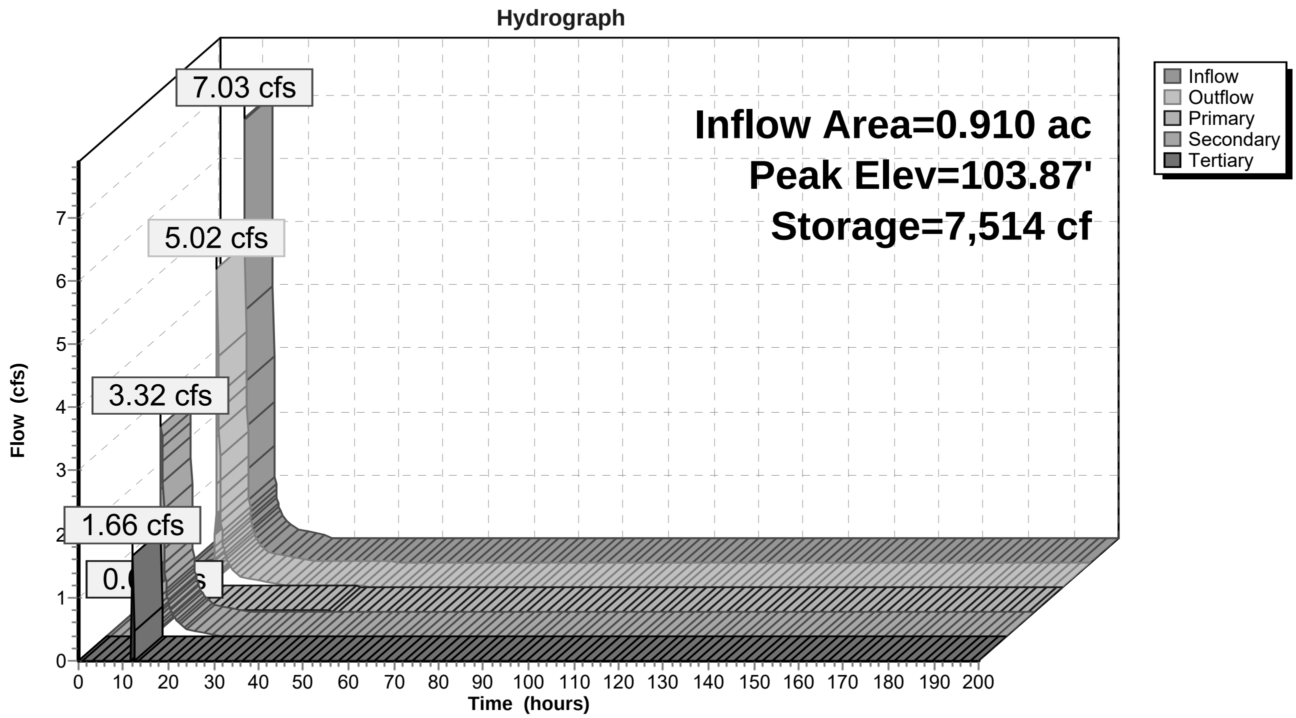
Device	Routing	Invert	Outlet Devices
#1	Primary	99.23'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	99.20'	**18.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.20' / 98.62' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	102.60'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.74'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 4.40 hrs HW=101.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=3.30 cfs @ 12.21 hrs HW=103.86' (Free Discharge)
└─**2=Culvert** (Passes 3.30 cfs of 13.28 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.30 cfs @ 4.20 fps)

Tertiary OutFlow Max=1.55 cfs @ 12.21 hrs HW=103.86' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.55 cfs @ 0.83 fps)

Pond 4P: GUSF #5



Summary for Pond 5P: Gravel Wetland #2

Inflow Area = 3.836 ac, 63.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 29.65 cfs @ 12.08 hrs, Volume= 2.473 af
Outflow = 17.34 cfs @ 12.23 hrs, Volume= 2.473 af, Atten= 42%, Lag= 8.8 min
Primary = 0.25 cfs @ 12.24 hrs, Volume= 0.572 af
Routed to Reach 2R :
Secondary = 9.26 cfs @ 12.24 hrs, Volume= 1.767 af
Routed to Reach 2R :
Tertiary = 7.83 cfs @ 12.23 hrs, Volume= 0.134 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 101.98' @ 12.24 hrs Surf.Area= 14,469 sf Storage= 39,896 cf

Plug-Flow detention time= 230.0 min calculated for 2.472 af (100% of inflow)
Center-of-Mass det. time= 230.7 min (996.7 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.14'	55,660 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.14	6,646	0.0	0	0
97.98	6,646	0.0	0	0
98.30	6,646	0.0	0	0
98.31	6,646	100.0	66	66
99.00	7,763	100.0	4,971	5,038
100.00	11,190	100.0	9,477	14,514
101.00	12,808	100.0	11,999	26,513
102.00	14,501	100.0	13,655	40,168
103.00	16,484	100.0	15,493	55,660

Device	Routing	Invert	Outlet Devices
#1	Device 2	95.14'	**2.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 3	97.98'	**0.5' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#3	Primary	97.90'	**24.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.90' / 97.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#4	Secondary	99.67'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	100.27'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	101.74'	**30.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65

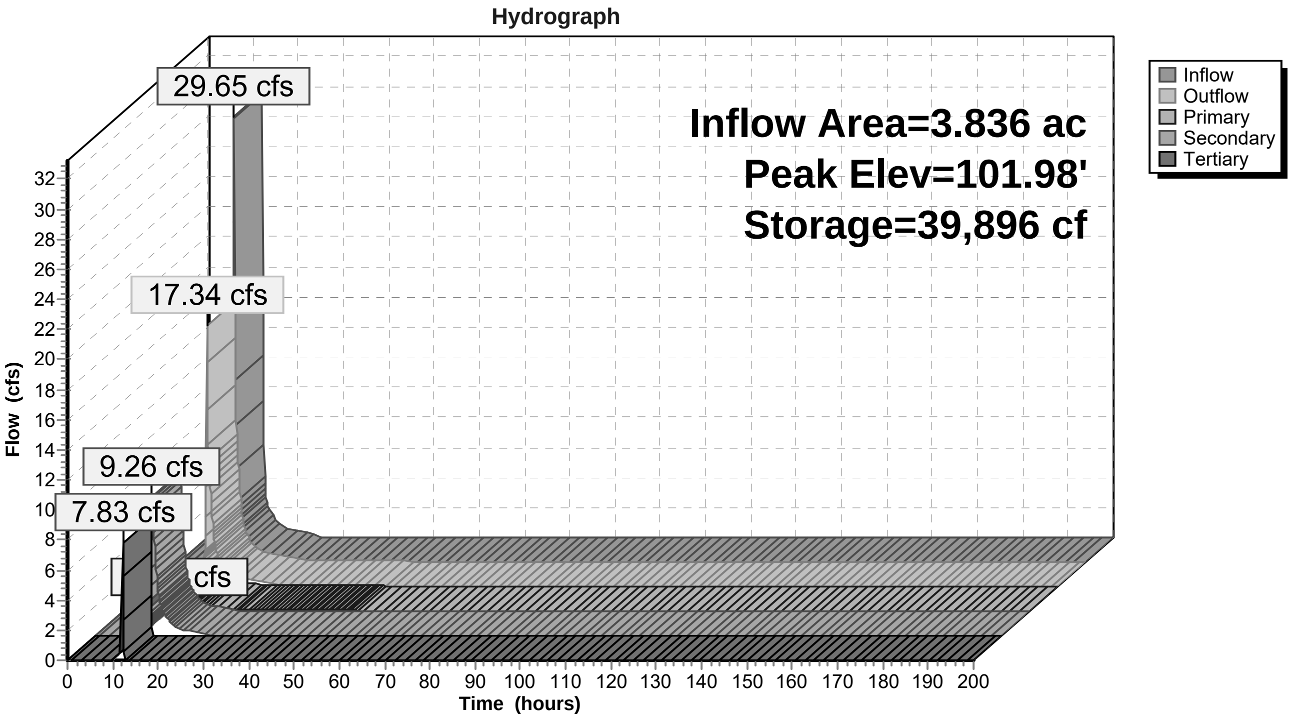
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.25 cfs @ 12.24 hrs HW=101.95' (Free Discharge)
└─**3=Culvert** (Passes 0.25 cfs of 26.40 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Passes 0.25 cfs of 10.62 cfs potential flow)
    └─**1=Orifice/Grate** (Orifice Controls 0.25 cfs @ 9.59 fps)

Secondary OutFlow Max=9.14 cfs @ 12.24 hrs HW=101.95' (Free Discharge)
├─**4=Orifice/Grate** (Orifice Controls 5.04 cfs @ 6.42 fps)
└─**5=Orifice/Grate** (Orifice Controls 4.10 cfs @ 5.22 fps)

Tertiary OutFlow Max=6.80 cfs @ 12.23 hrs HW=101.95' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 6.80 cfs @ 1.09 fps)

Pond 5P: Gravel Wetland #2



Summary for Pond 6P: GUSF #4

Inflow Area = 1.015 ac, 66.73% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 7.85 cfs @ 12.08 hrs, Volume= 0.655 af
Outflow = 2.35 cfs @ 12.43 hrs, Volume= 0.655 af, Atten= 70%, Lag= 20.7 min
Primary = 0.04 cfs @ 4.20 hrs, Volume= 0.143 af
Routed to Reach 4R : POI #2
Secondary = 1.15 cfs @ 12.43 hrs, Volume= 0.488 af
Routed to Reach 4R : POI #2
Tertiary = 1.17 cfs @ 12.43 hrs, Volume= 0.024 af
Routed to Reach 4R : POI #2

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.85' @ 12.43 hrs Surf.Area= 4,928 sf Storage= 13,153 cf

Plug-Flow detention time= 250.0 min calculated for 0.655 af (100% of inflow)
Center-of-Mass det. time= 250.7 min (1,016.6 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.70'	16,672 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.70	1,869	0.0	0	0
99.89	1,869	0.0	0	0
99.90	1,869	100.0	19	19
100.00	1,924	100.0	190	208
101.00	2,446	100.0	2,185	2,393
102.00	3,511	100.0	2,979	5,372
103.00	4,241	100.0	3,876	9,248
104.00	5,047	100.0	4,644	13,892
104.50	6,072	100.0	2,780	16,672

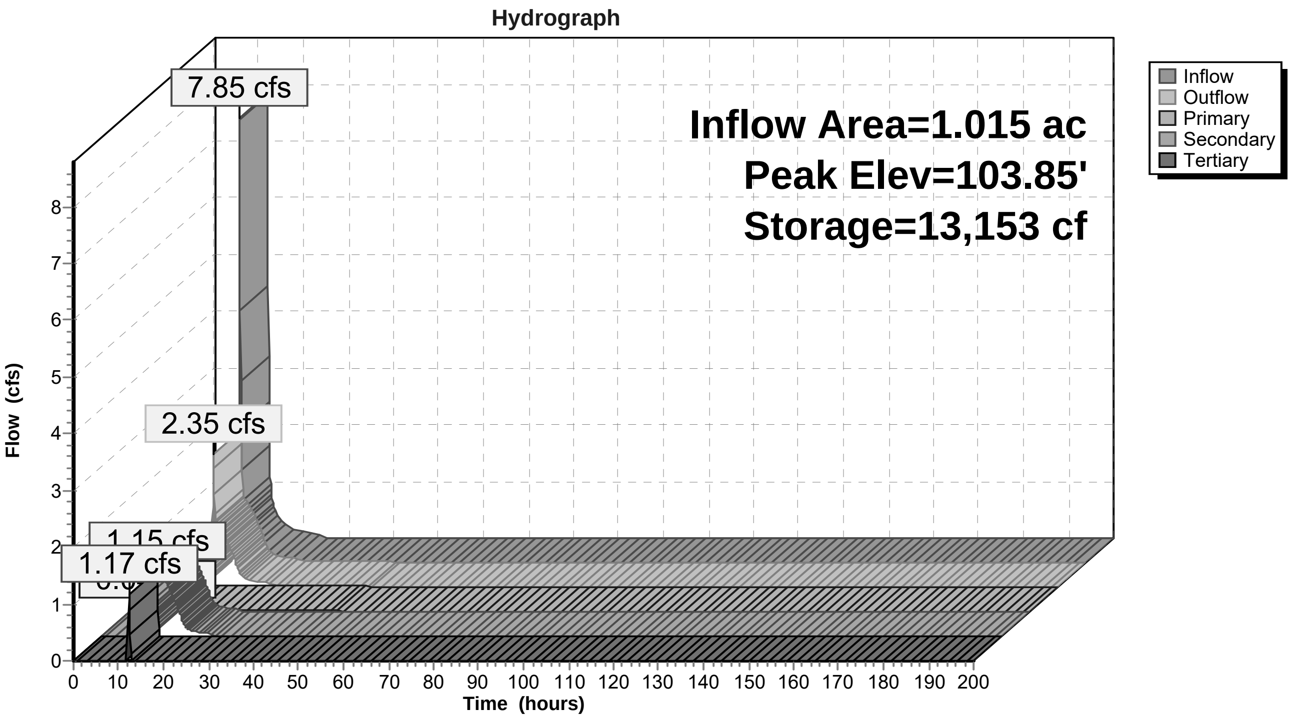
Device	Routing	Invert	Outlet Devices
#1	Primary	97.70'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	97.60'	**18.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.60' / 97.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.22'	**5.3" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.75'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 4.20 hrs HW=99.89' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=1.14 cfs @ 12.43 hrs HW=103.84' (Free Discharge)
└─**2=Culvert** (Passes 1.14 cfs of 19.94 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 1.14 cfs @ 7.46 fps)

Tertiary OutFlow Max=1.01 cfs @ 12.43 hrs HW=103.84' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.01 cfs @ 0.72 fps)

Pond 6P: GUSF #4



Summary for Pond 8/9P: GUSF #6 & #7

Inflow Area = 2.677 ac, 36.33% Impervious, Inflow Depth = 3.95" for 100 Year Saco event
Inflow = 11.43 cfs @ 12.09 hrs, Volume= 0.881 af
Outflow = 4.52 cfs @ 12.38 hrs, Volume= 0.880 af, Atten= 60%, Lag= 16.8 min
Primary = 0.14 cfs @ 9.80 hrs, Volume= 0.334 af
Routed to Reach 6R :
Secondary = 0.86 cfs @ 12.38 hrs, Volume= 0.411 af
Routed to Reach 6R :
Tertiary = 3.53 cfs @ 12.38 hrs, Volume= 0.134 af
Routed to Reach 6R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 101.49' @ 12.38 hrs Surf.Area= 8,030 sf Storage= 13,680 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 249.1 min (1,081.5 - 832.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	27,139 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	4,024	0.0	0	0
99.19	4,024	0.0	0	0
99.20	4,024	100.0	40	40
100.00	4,989	100.0	3,605	3,645
101.00	7,445	100.0	6,217	9,862
102.00	8,631	100.0	8,038	17,900
103.00	9,847	100.0	9,239	27,139

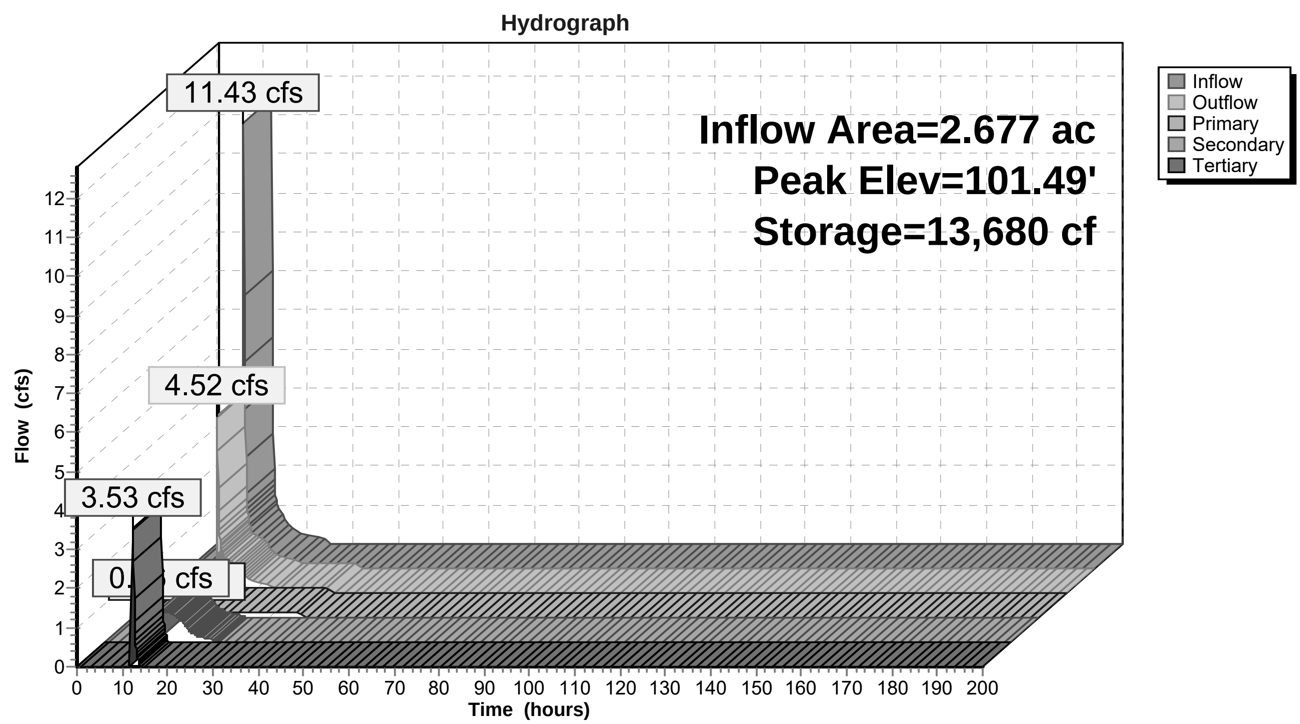
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**0.14 cfs Exfiltration at all elevations**
#2	Secondary	96.90'	**18.0" Round Culvert** L= 103.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 96.90' / 95.97' S= 0.0090 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	100.42'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	101.32'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.14 cfs @ 9.80 hrs HW=99.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=0.86 cfs @ 12.38 hrs HW=101.49' (Free Discharge)
└─**2=Culvert** (Passes 0.86 cfs of 13.16 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.86 cfs @ 4.36 fps)

Tertiary OutFlow Max=3.40 cfs @ 12.38 hrs HW=101.49' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.40 cfs @ 1.00 fps)

Pond 8/9P: GUSF #6 & #7



Summary for Pond 10P: GUSF #8

Inflow Area = 1.398 ac, 60.77% Impervious, Inflow Depth = 6.16" for 100 Year Saco event
Inflow = 9.29 cfs @ 12.09 hrs, Volume= 0.718 af
Outflow = 6.39 cfs @ 12.22 hrs, Volume= 0.718 af, Atten= 31%, Lag= 8.0 min
Primary = 0.05 cfs @ 7.30 hrs, Volume= 0.171 af
Routed to Reach 6R :
Secondary = 2.76 cfs @ 12.23 hrs, Volume= 0.490 af
Routed to Reach 6R :
Tertiary = 3.58 cfs @ 12.22 hrs, Volume= 0.057 af
Routed to Reach 6R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.09' @ 12.23 hrs Surf.Area= 5,089 sf Storage= 10,711 cf

Plug-Flow detention time= 230.5 min calculated for 0.718 af (100% of inflow)
Center-of-Mass det. time= 231.3 min (1,032.4 - 801.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.16'	21,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.16	2,918	0.0	0	0
100.35	2,918	0.0	0	0
100.36	2,918	100.0	29	29
101.00	3,108	100.0	1,928	1,958
102.00	4,231	100.0	3,670	5,627
103.00	5,012	100.0	4,622	10,249
104.00	5,850	100.0	5,431	15,680
105.00	6,741	100.0	6,296	21,975

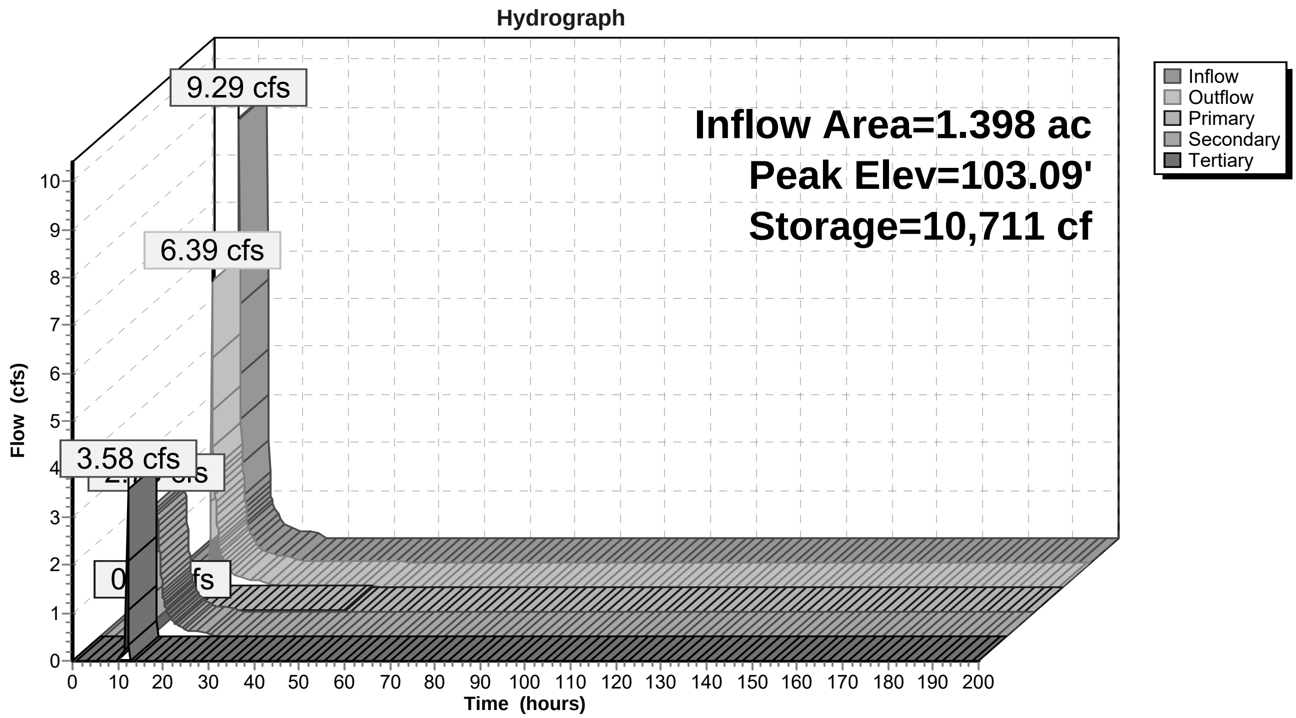
Device	Routing	Invert	Outlet Devices
#1	Primary	98.16'	**0.05 cfs Exfiltration at all elevations**
#2	Secondary	98.06'	**18.0" Round Culvert** L= 30.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.06' / 97.90' S= 0.0052 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.57'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	102.87'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.05 cfs @ 7.30 hrs HW=100.35' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=2.73 cfs @ 12.23 hrs HW=103.06' (Free Discharge)
└─**2=Culvert** (Passes 2.73 cfs of 13.85 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.73 cfs @ 5.00 fps)

Tertiary OutFlow Max=3.14 cfs @ 12.22 hrs HW=103.07' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.14 cfs @ 1.06 fps)

Pond 10P: GUSF #8



Summary for Pond 11P: GUSF #9

Inflow Area = 2.108 ac, 70.56% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 15.75 cfs @ 12.09 hrs, Volume= 1.274 af
Outflow = 7.36 cfs @ 12.29 hrs, Volume= 1.274 af, Atten= 53%, Lag= 12.4 min
Primary = 0.07 cfs @ 5.10 hrs, Volume= 0.275 af
Routed to Reach 5R : POI #3
Secondary = 3.52 cfs @ 12.29 hrs, Volume= 0.907 af
Routed to Reach 5R : POI #3
Tertiary = 3.77 cfs @ 12.29 hrs, Volume= 0.092 af
Routed to Reach 5R : POI #3

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 100.28' @ 12.29 hrs Surf.Area= 8,435 sf Storage= 21,683 cf

Plug-Flow detention time= 249.0 min calculated for 1.274 af (100% of inflow)
Center-of-Mass det. time= 249.8 min (1,028.4 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	94.46'	28,068 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.46	3,783	0.0	0	0
96.65	3,783	0.0	0	0
96.66	3,783	100.0	38	38
97.00	4,087	100.0	1,338	1,376
98.00	5,074	100.0	4,581	5,956
99.00	6,824	100.0	5,949	11,905
100.00	8,066	100.0	7,445	19,350
101.00	9,370	100.0	8,718	28,068

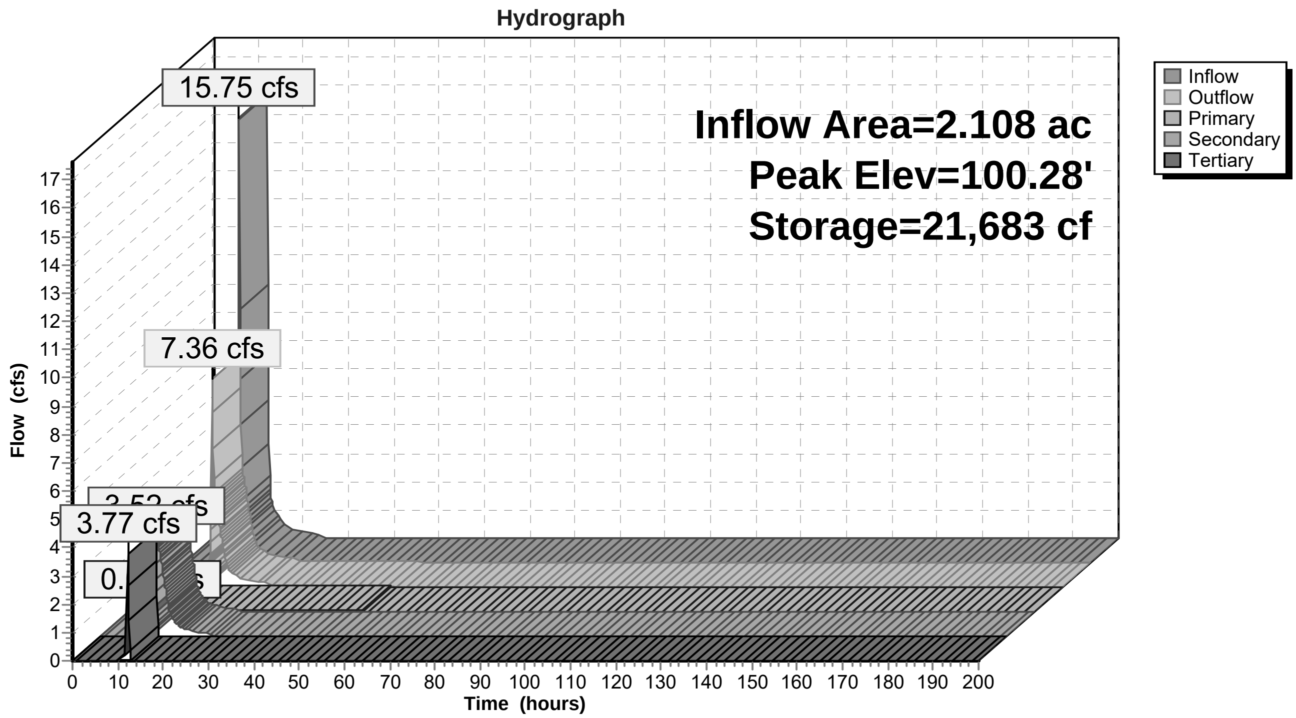
Device	Routing	Invert	Outlet Devices
#1	Primary	94.46'	**0.07 cfs Exfiltration at all elevations**
#2	Secondary	94.36'	**18.0" Round Culvert** L= 58.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.36' / 93.92' S= 0.0076 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	98.07'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	100.06'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.07 cfs @ 5.10 hrs HW=96.65' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=3.52 cfs @ 12.29 hrs HW=100.28' (Free Discharge)
└─**2=Culvert** (Passes 3.52 cfs of 15.27 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.52 cfs @ 6.45 fps)

Tertiary OutFlow Max=3.68 cfs @ 12.29 hrs HW=100.28' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.68 cfs @ 1.12 fps)

Pond 11P: GUSF #9



Summary for Pond 12P: CHAMBER1

Inflow Area = 0.517 ac, 84.12% Impervious, Inflow Depth = 8.10" for 100 Year Saco event
Inflow = 4.07 cfs @ 12.08 hrs, Volume= 0.349 af
Outflow = 4.00 cfs @ 12.09 hrs, Volume= 0.350 af, Atten= 2%, Lag= 0.1 min
Primary = 0.02 cfs @ 3.20 hrs, Volume= 0.077 af
Routed to Reach 7R :
Secondary = 3.98 cfs @ 12.09 hrs, Volume= 0.272 af
Routed to Reach 7R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 107.33' @ 12.09 hrs Surf.Area= 0.021 ac Storage= 0.045 af

Plug-Flow detention time= 198.3 min calculated for 0.349 af (100% of inflow)
Center-of-Mass det. time= 201.1 min (955.4 - 754.4)

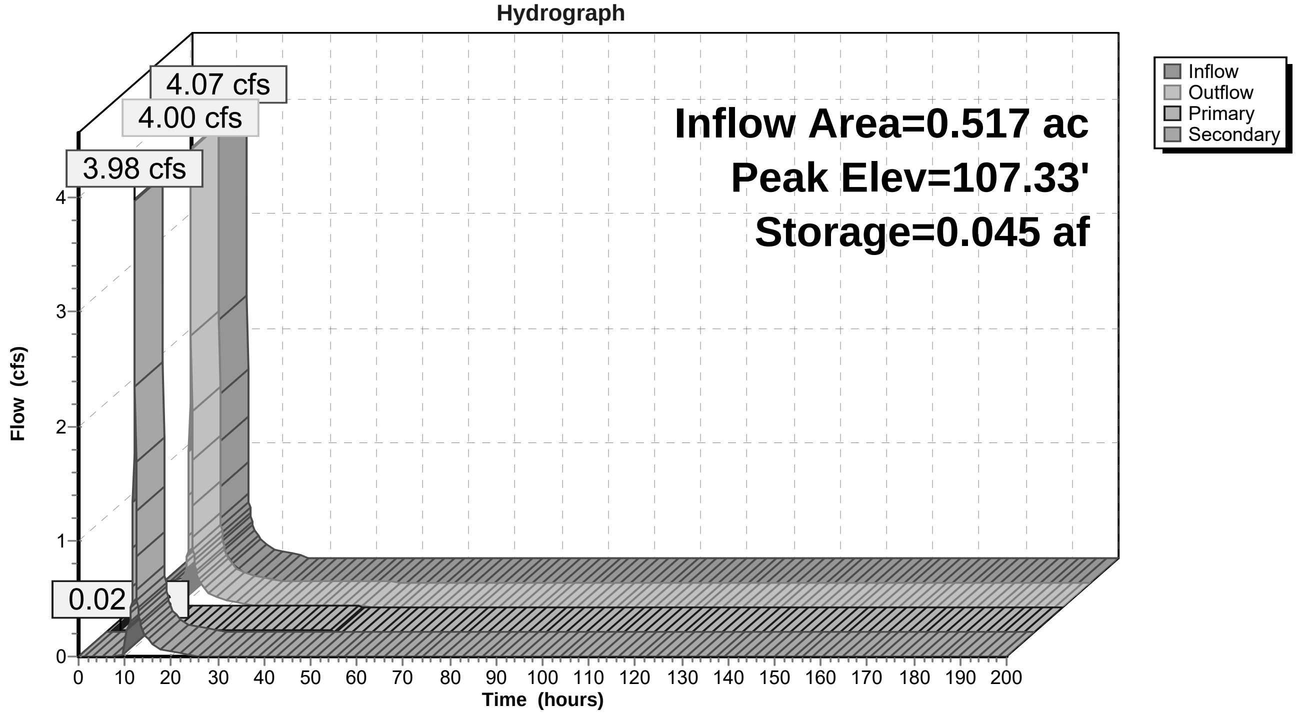
Volume	Invert	Avail.Storage	Storage Description
#1	104.10'	0.018 af	**5.33'W x 7.21'L x 3.54'H Prismatoid** x 24 0.075 af Overall - 0.029 af Embedded = 0.046 af x 40.0% Voids
#2	104.60'	0.029 af	**Cultec R-330XLHD** x 24 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		0.047 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	104.10'	**0.02 cfs Exfiltration at all elevations**
#2	Secondary	106.95'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.02 cfs @ 3.20 hrs HW=104.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=3.82 cfs @ 12.09 hrs HW=107.32' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 3.82 cfs @ 1.71 fps)

Pond 12P: CHAMBER1



Summary for Pond 13P: CHAMBER2

Inflow Area = 0.595 ac, 86.51% Impervious, Inflow Depth = 8.22" for 100 Year Saco event
Inflow = 4.70 cfs @ 12.08 hrs, Volume= 0.408 af
Outflow = 4.60 cfs @ 12.09 hrs, Volume= 0.408 af, Atten= 2%, Lag= 0.2 min
Primary = 0.02 cfs @ 2.60 hrs, Volume= 0.085 af
Routed to Reach 7R :
Secondary = 4.58 cfs @ 12.09 hrs, Volume= 0.323 af
Routed to Reach 7R :

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 107.12' @ 12.09 hrs Surf.Area= 0.026 ac Storage= 0.053 af

Plug-Flow detention time= 217.8 min calculated for 0.407 af (100% of inflow)
Center-of-Mass det. time= 218.6 min (968.5 - 749.9)

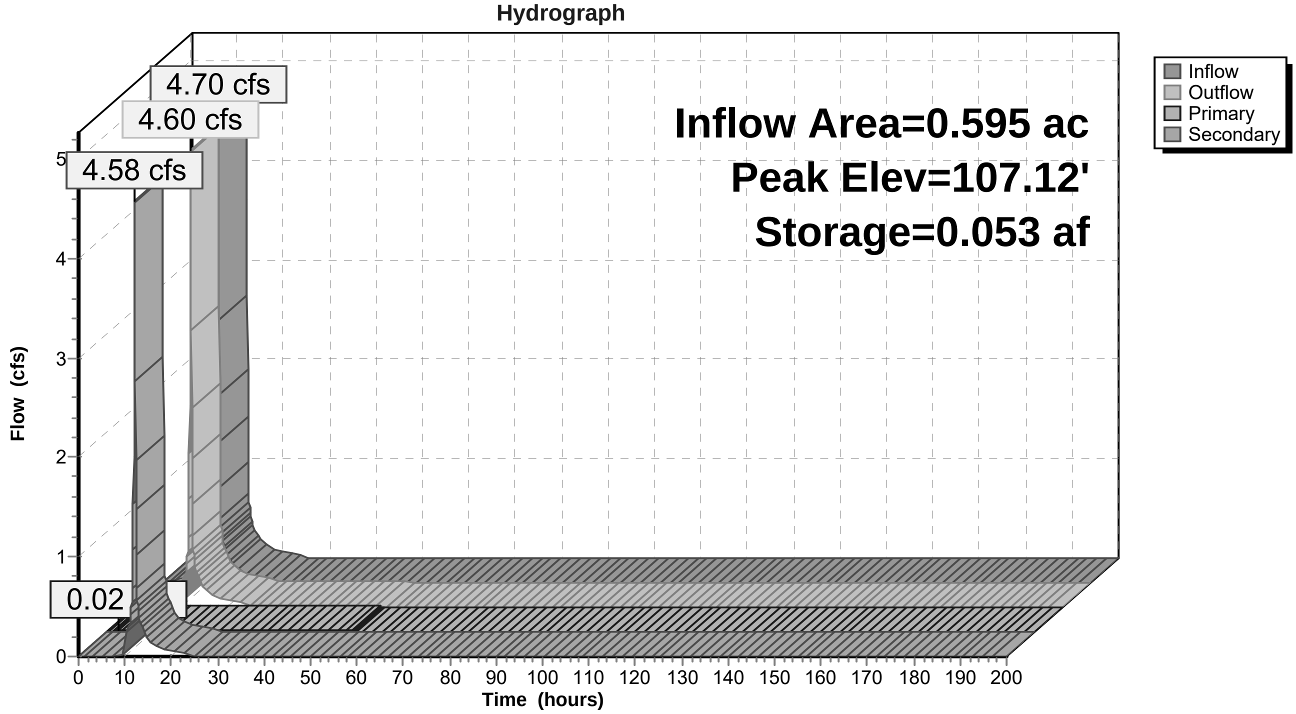
Volume	Invert	Avail.Storage	Storage Description
#1	104.10'	0.023 af	**5.33'W x 7.21'L x 3.54'H Prismatoid** x 30 0.094 af Overall - 0.036 af Embedded = 0.058 af x 40.0% Voids
#2	104.60'	0.036 af	**Cultec R-330XLHD** x 30 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		0.059 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	104.10'	**0.02 cfs Exfiltration at all elevations**
#2	Secondary	106.70'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.02 cfs @ 2.60 hrs HW=104.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=4.41 cfs @ 12.09 hrs HW=107.11' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.41 cfs @ 1.80 fps)

Pond 13P: CHAMBER2



Summary for Pond 14P: FocalPoint 1

Inflow Area = 0.391 ac, 80.52% Impervious, Inflow Depth = 7.98" for 100 Year Saco event
Inflow = 3.06 cfs @ 12.08 hrs, Volume= 0.260 af
Outflow = 3.06 cfs @ 12.09 hrs, Volume= 0.260 af, Atten= 0%, Lag= 0.2 min
Primary = 0.15 cfs @ 10.00 hrs, Volume= 0.138 af
Secondary = 2.91 cfs @ 12.09 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 108.97' @ 12.09 hrs Surf.Area= 64 sf Storage= 96 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (760.1 - 758.5)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**16.00'W x 4.00'L x 2.25'H FocalPoint** 144 cf Overall x 0.0% Voids
#2	108.20'	100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		100 cf	Total Available Storage

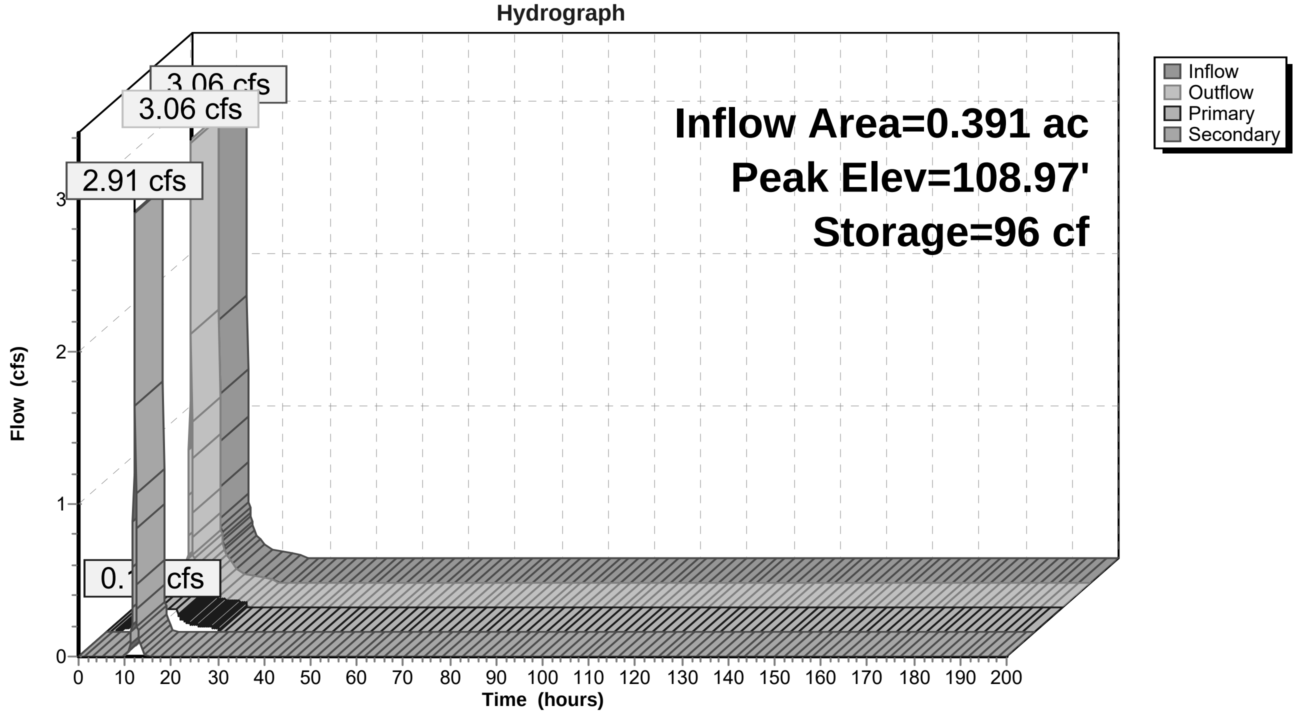
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	64	0	0
108.50	124	28	28
109.00	164	72	100

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 10.00 hrs HW=108.21' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=2.80 cfs @ 12.09 hrs HW=108.96' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 2.80 cfs @ 1.68 fps)

Pond 14P: FocalPoint 1



Summary for Pond 15P: FocalPoint 2

Inflow Area = 0.126 ac, 95.31% Impervious, Inflow Depth = 8.34" for 100 Year Saco event
Inflow = 1.00 cfs @ 12.08 hrs, Volume= 0.087 af
Outflow = 0.99 cfs @ 12.08 hrs, Volume= 0.066 af, Atten= 1%, Lag= 0.0 min
Primary = 0.15 cfs @ 11.60 hrs, Volume= 0.042 af
Secondary = 0.84 cfs @ 12.08 hrs, Volume= 0.023 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 108.84' @ 12.08 hrs Surf.Area= 64 sf Storage= 39 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**16.00'W x 4.00'L x 2.25'H FocalPoint** 144 cf Overall x 0.0% Voids
#2	108.20'	53 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		53 cf	Total Available Storage

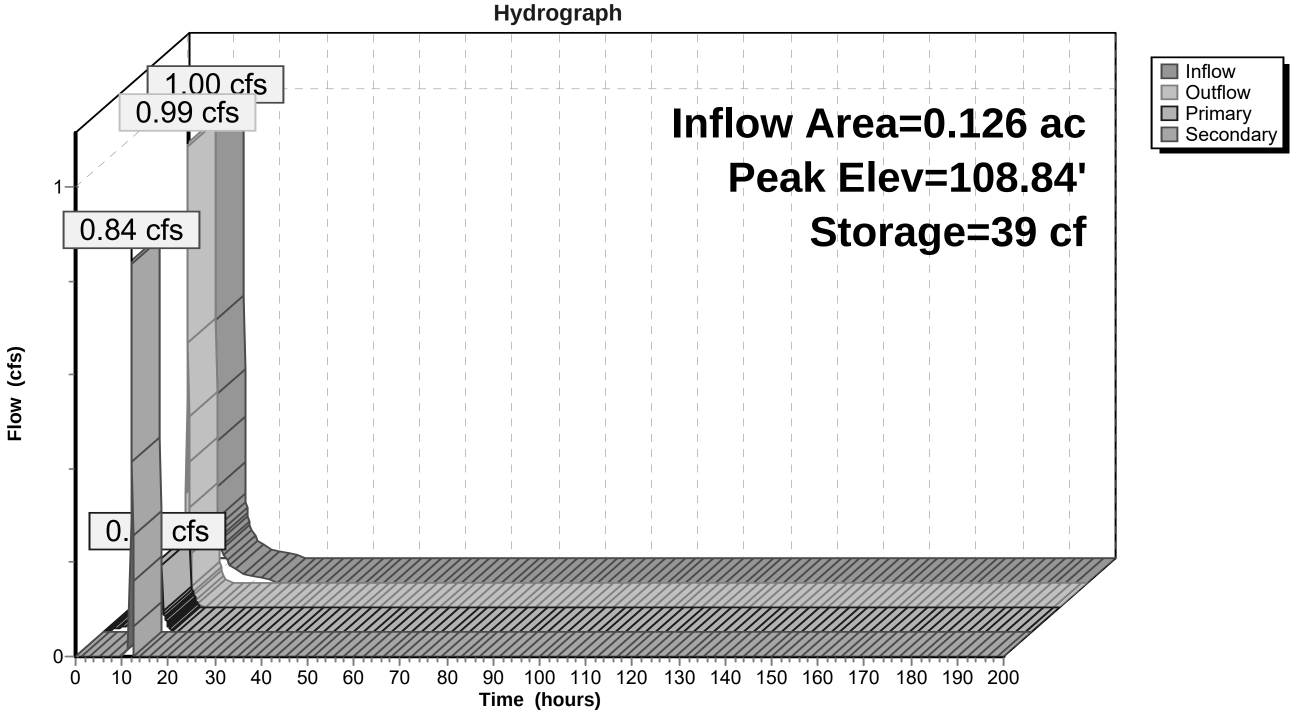
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	24	0	0
108.50	64	13	13
109.00	96	40	53

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 11.60 hrs HW=108.24' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=0.80 cfs @ 12.08 hrs HW=108.84' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 0.80 cfs @ 1.22 fps)

Pond 15P: FocalPoint 2



Summary for Pond 16P: FocalPoint 3

Inflow Area = 0.459 ac, 83.70% Impervious, Inflow Depth = 8.10" for 100 Year Saco event
Inflow = 3.61 cfs @ 12.08 hrs, Volume= 0.310 af
Outflow = 3.59 cfs @ 12.09 hrs, Volume= 0.294 af, Atten= 1%, Lag= 0.1 min
Primary = 0.18 cfs @ 9.90 hrs, Volume= 0.148 af
Secondary = 3.41 cfs @ 12.09 hrs, Volume= 0.146 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 109.00' @ 12.08 hrs Surf.Area= 76 sf Storage= 97 cf

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

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**19.00'W x 4.00'L x 2.25'H FocalPoint** 171 cf Overall x 0.0% Voids
#2	108.20'	97 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		97 cf	Total Available Storage

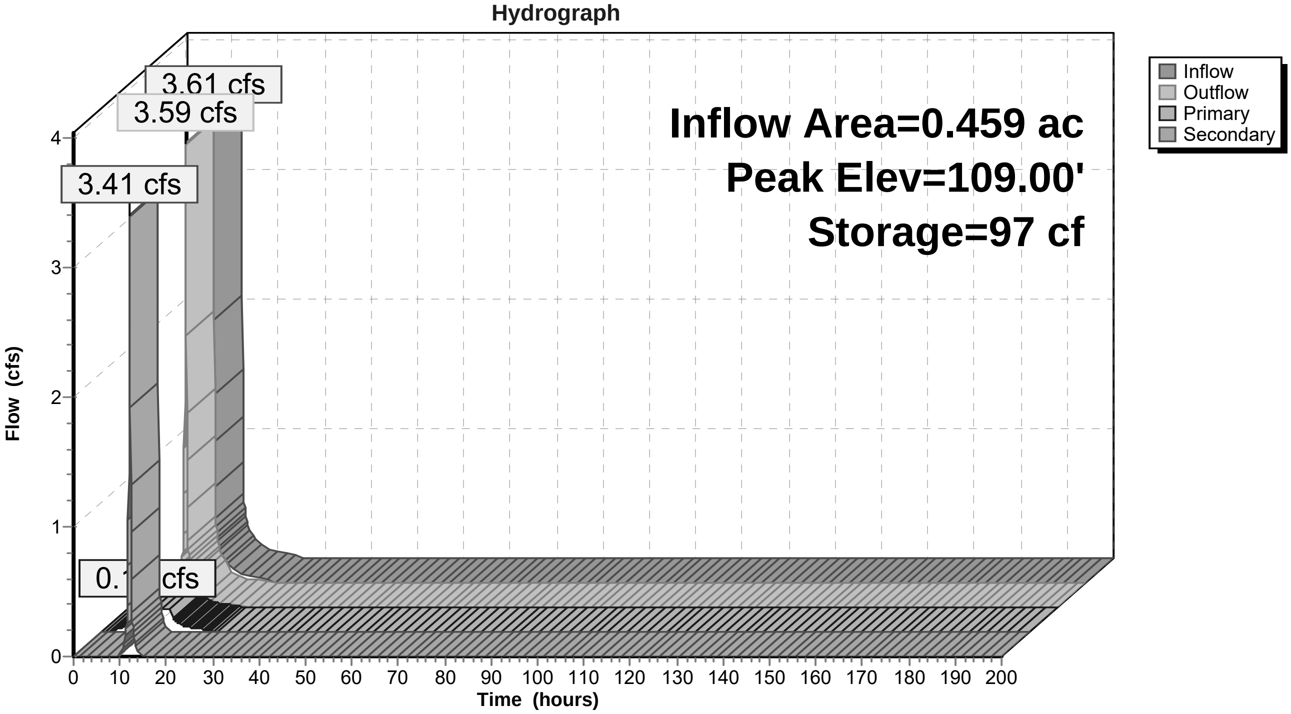
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	76	0	0
108.50	128	31	31
108.95	168	67	97

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 9.90 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Secondary OutFlow Max=3.27 cfs @ 12.09 hrs HW=108.99' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 3.27 cfs @ 1.77 fps)

Pond 16P: FocalPoint 3



Summary for Pond 17P: FocalPoint 4

Inflow Area = 0.136 ac, 96.01% Impervious, Inflow Depth = 8.34" for 100 Year Saco event
Inflow = 1.08 cfs @ 12.08 hrs, Volume= 0.094 af
Outflow = 1.07 cfs @ 12.08 hrs, Volume= 0.102 af, Atten= 1%, Lag= 0.0 min
Primary = 0.07 cfs @ 10.70 hrs, Volume= 0.066 af
Secondary = 1.00 cfs @ 12.08 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs / 2
Peak Elev= 108.83' @ 12.08 hrs Surf.Area= 32 sf Storage= 52 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 33.1 min (778.0 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**8.00'W x 4.00'L x 2.25'H FocalPoint** 72 cf Overall x 0.0% Voids
#2	108.20'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		67 cf	Total Available Storage

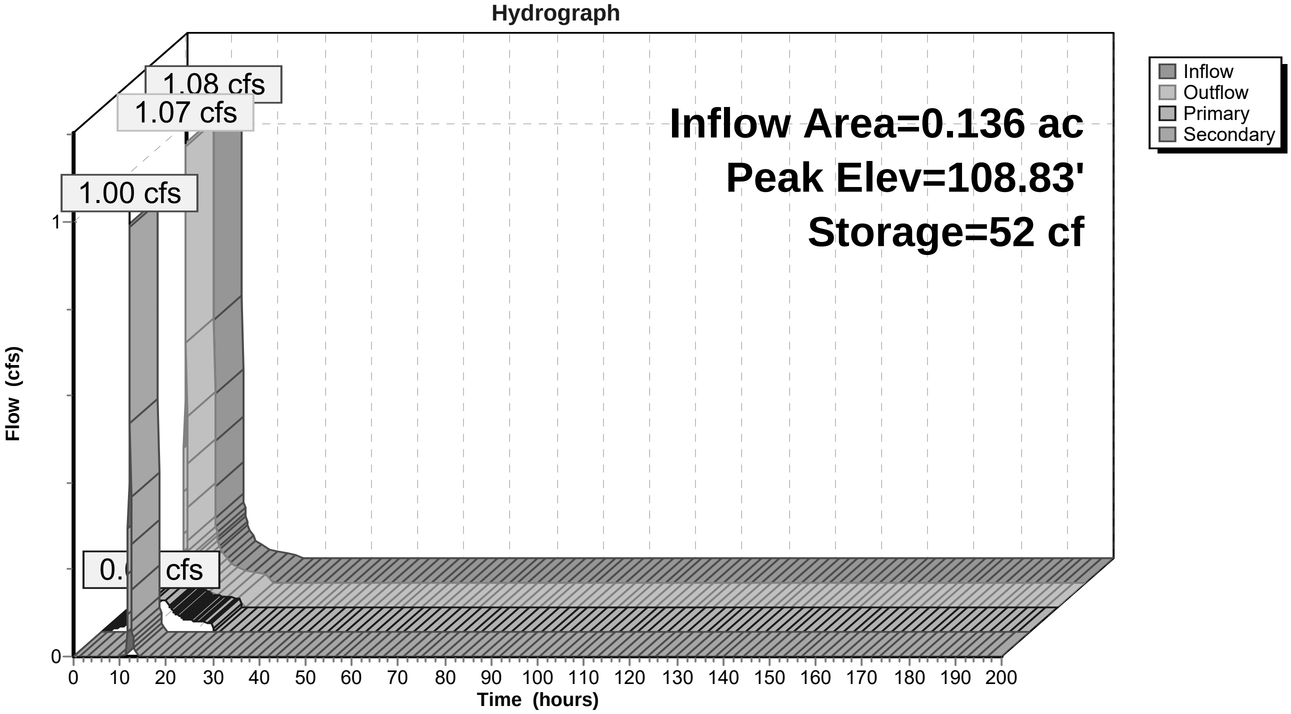
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	32	0	0
108.50	88	18	18
108.95	128	49	67

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 10.70 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=0.95 cfs @ 12.08 hrs HW=108.83' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 0.95 cfs @ 1.17 fps)

Pond 17P: FocalPoint 4



Summary for Pond 88P: Gravel Wetland #1

Inflow Area = 7.302 ac, 60.35% Impervious, Inflow Depth = 7.50" for 100 Year Saco event
Inflow = 55.56 cfs @ 12.09 hrs, Volume= 4.561 af
Outflow = 2.73 cfs @ 14.57 hrs, Volume= 4.561 af, Atten= 95%, Lag= 149.0 min
Primary = 2.40 cfs @ 14.57 hrs, Volume= 4.166 af
Routed to Reach 4R : POI #2
Secondary = 0.32 cfs @ 14.57 hrs, Volume= 0.395 af
Routed to Reach 4R : POI #2
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 4R : POI #2

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.19' @ 14.57 hrs Surf.Area= 29,193 sf Storage= 128,663 cf

Plug-Flow detention time= 737.0 min calculated for 4.559 af (100% of inflow)
Center-of-Mass det. time= 738.3 min (1,510.9 - 772.6)

Volume	Invert	Avail.Storage	Storage Description
#1	94.76'	138,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.76	12,121	0.0	0	0
97.60	12,121	0.0	0	0
97.92	12,121	0.0	0	0
97.93	12,121	100.0	121	121
98.00	12,239	100.0	853	974
99.00	14,188	100.0	13,214	14,187
100.00	18,901	100.0	16,545	30,732
101.00	20,916	100.0	19,909	50,640
102.00	23,050	100.0	21,983	72,623
103.00	25,237	100.0	24,144	96,767
104.00	27,639	100.0	26,438	123,205
104.25	29,662	100.0	7,163	130,367
104.50	31,500	100.0	7,645	138,013

Device	Routing	Invert	Outlet Devices
#1	Device 2	94.76'	**2.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 3	97.60'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32
#3	Primary	97.50'	**36.0" Round Culvert** L= 69.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.50' / 96.50' S= 0.0145 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#4	Device 2	99.41'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	100.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	104.25'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

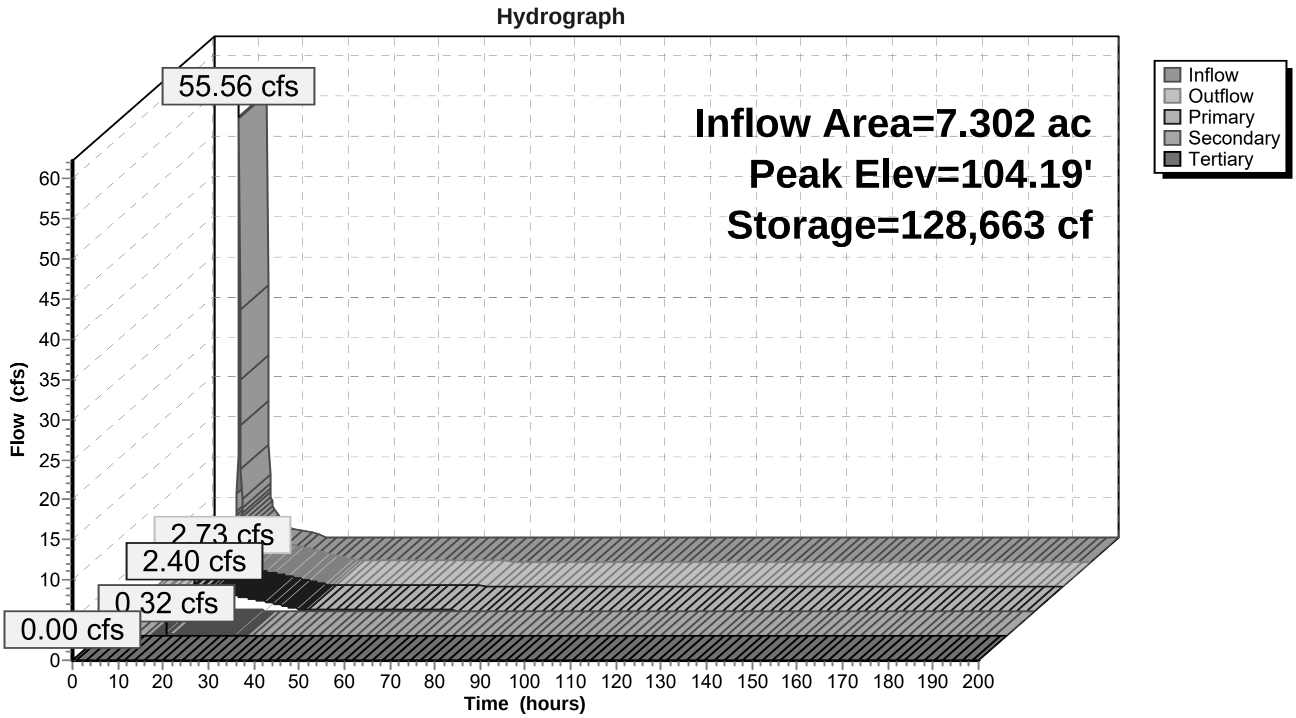
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.40 cfs @ 14.57 hrs HW=104.19' (Free Discharge)
└─**3=Culvert** (Passes 2.40 cfs of 77.55 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Passes 2.40 cfs of 337.14 cfs potential flow)
    ├─**1=Orifice/Grate** (Orifice Controls 0.39 cfs @ 12.36 fps)
    └─**4=Orifice/Grate** (Orifice Controls 2.01 cfs @ 10.25 fps)

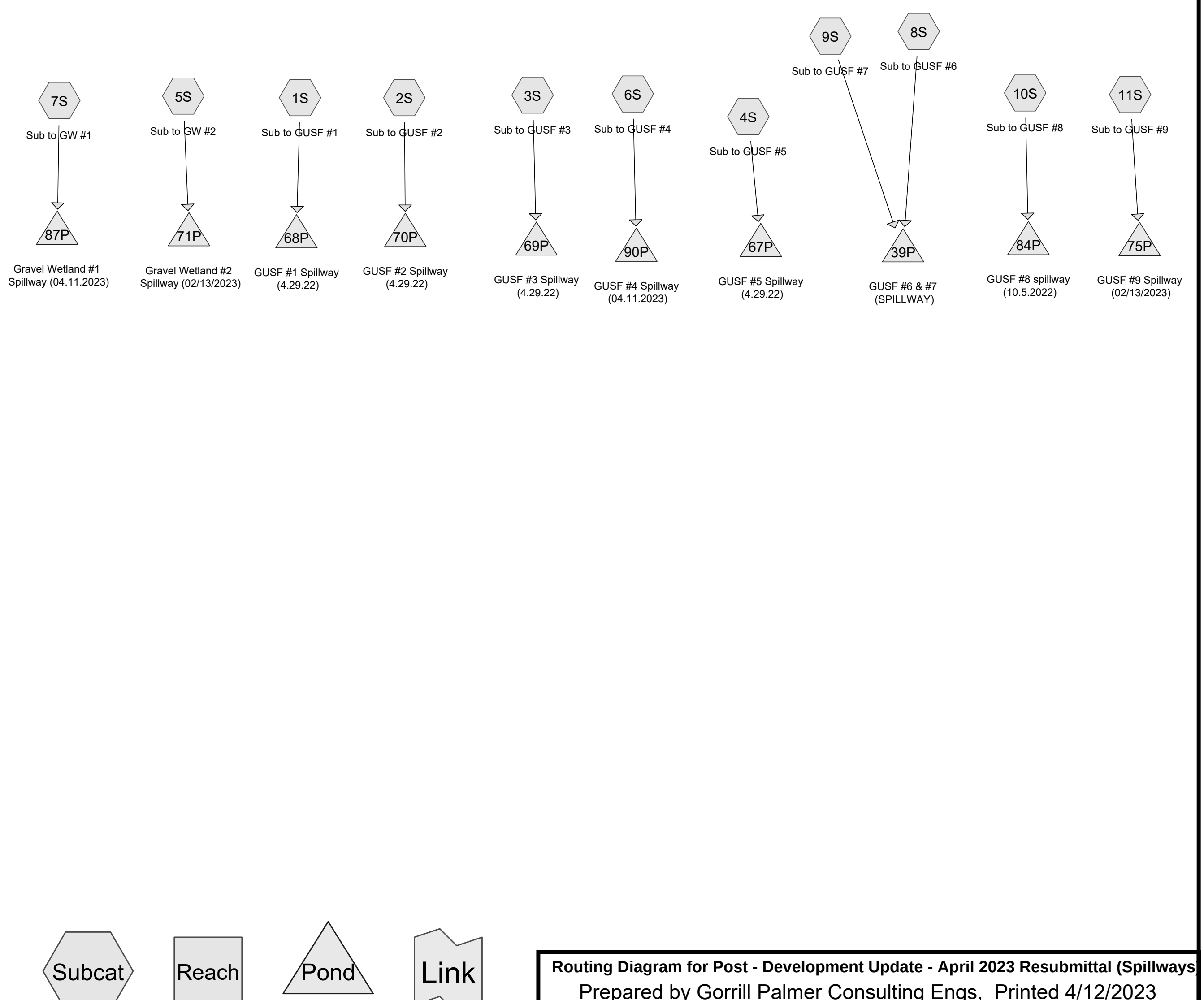
Secondary OutFlow Max=0.32 cfs @ 14.57 hrs HW=104.19' (Free Discharge)
└─**5=Orifice/Grate** (Orifice Controls 0.32 cfs @ 9.52 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.76' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 88P: Gravel Wetland #1



EMERGENCY SPILLWAY CALCULATIONS



Routing Diagram for Post - Development Update - April 2023 Resubmittal (Spillways)

Prepared by Gorrill Palmer Consulting Engs, Printed 4/12/2023

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	25 Year Saco	Type III 24-hr		Default	24.00	1	6.20	2
2	100 Year Saco	Type III 24-hr		Default	24.00	1	8.70	2

Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1	Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=9.13 cfs 0.745 af
Subcatchment 2S: Sub to GUSF #2	Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=4.82" Tc=5.0 min CN=88 Runoff=9.64 cfs 0.761 af
Subcatchment 3S: Sub to GUSF #3	Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=5.38" Tc=5.0 min CN=93 Runoff=5.60 cfs 0.461 af
Subcatchment 4S: Sub to GUSF #5	Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=4.89 cfs 0.399 af
Subcatchment 5S: Sub to GW #2	Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=20.64 cfs 1.683 af
Subcatchment 6S: Sub to GUSF #4	Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=5.46 cfs 0.446 af
Subcatchment 7S: Sub to GW #1	Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=5.04" Tc=5.0 min CN=90 Runoff=38.28 cfs 3.067 af
Subcatchment 8S: Sub to GUSF #6	Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=1.47" Tc=5.0 min CN=53 Runoff=2.67 cfs 0.225 af
Subcatchment 9S: Sub to GUSF #7	Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=3.65" Tc=5.0 min CN=77 Runoff=3.42 cfs 0.258 af
Subcatchment 10S: Sub to GUSF #8	Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=3.86" Tc=5.0 min CN=79 Runoff=5.92 cfs 0.449 af
Subcatchment 11S: Sub to GUSF #9	Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=4.82" Tc=5.0 min CN=88 Runoff=10.72 cfs 0.846 af
Pond 39P: GUSF #6 & #7 (SPILLWAY)	Peak Elev=101.37' Storage=12,661 cf Inflow=6.07 cfs 0.483 af Outflow=0.54 cfs 0.200 af
Pond 67P: GUSF #5 Spillway (4.29.22)	Peak Elev=103.96' Storage=7,933 cf Inflow=4.89 cfs 0.399 af Outflow=3.69 cfs 0.240 af
Pond 68P: GUSF #1 Spillway (4.29.22)	Peak Elev=104.16' Storage=17,517 cf Inflow=9.13 cfs 0.745 af Outflow=3.91 cfs 0.378 af
Pond 69P: GUSF #3 Spillway (4.29.22)	Peak Elev=103.24' Storage=9,885 cf Inflow=5.60 cfs 0.461 af Outflow=4.08 cfs 0.259 af
Pond 70P: GUSF #2 Spillway (4.29.22)	Peak Elev=105.09' Storage=16,078 cf Inflow=9.64 cfs 0.761 af Outflow=4.70 cfs 0.427 af

Pond 71P: Gravel Wetland #2 Spillway Peak Elev=101.99' Storage=39,954 cf Inflow=20.64 cfs 1.683 af
Outflow=8.64 cfs 0.847 af

Pond 75P: GUSF #9 Spillway (02/13/2023) Peak Elev=100.24' Storage=21,296 cf Inflow=10.72 cfs 0.846 af
Outflow=2.68 cfs 0.391 af

Pond 84P: GUSF #8 spillway (10.5.2022) Peak Elev=103.00' Storage=10,239 cf Inflow=5.92 cfs 0.449 af
Outflow=1.64 cfs 0.229 af

Pond 87P: Gravel Wetland #1 Spillway Peak Elev=104.29' Storage=131,615 cf Inflow=38.28 cfs 3.067 af
Outflow=0.37 cfs 0.074 af

Pond 90P: GUSF #4 Spillway (04.11.2023) Peak Elev=103.59' Storage=11,883 cf Inflow=5.46 cfs 0.446 af
Outflow=1.32 cfs 0.184 af

Total Runoff Area = 23.867 ac Runoff Volume = 9.342 af Average Runoff Depth = 4.70"
40.35% Pervious = 9.630 ac 59.65% Impervious = 14.237 ac

Summary for Pond 39P: GUSF #6 & #7 (SPILLWAY)

Inflow Area = 2.677 ac, 36.33% Impervious, Inflow Depth = 2.17" for 25 Year Saco event
Inflow = 6.07 cfs @ 12.10 hrs, Volume= 0.483 af
Outflow = 0.54 cfs @ 13.80 hrs, Volume= 0.200 af, Atten= 91%, Lag= 102.3 min
Primary = 0.54 cfs @ 13.80 hrs, Volume= 0.200 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 101.37' @ 13.80 hrs Surf.Area= 7,878 sf Storage= 12,661 cf

Plug-Flow detention time= 318.2 min calculated for 0.200 af (42% of inflow)
Center-of-Mass det. time= 181.1 min (1,028.5 - 847.5)

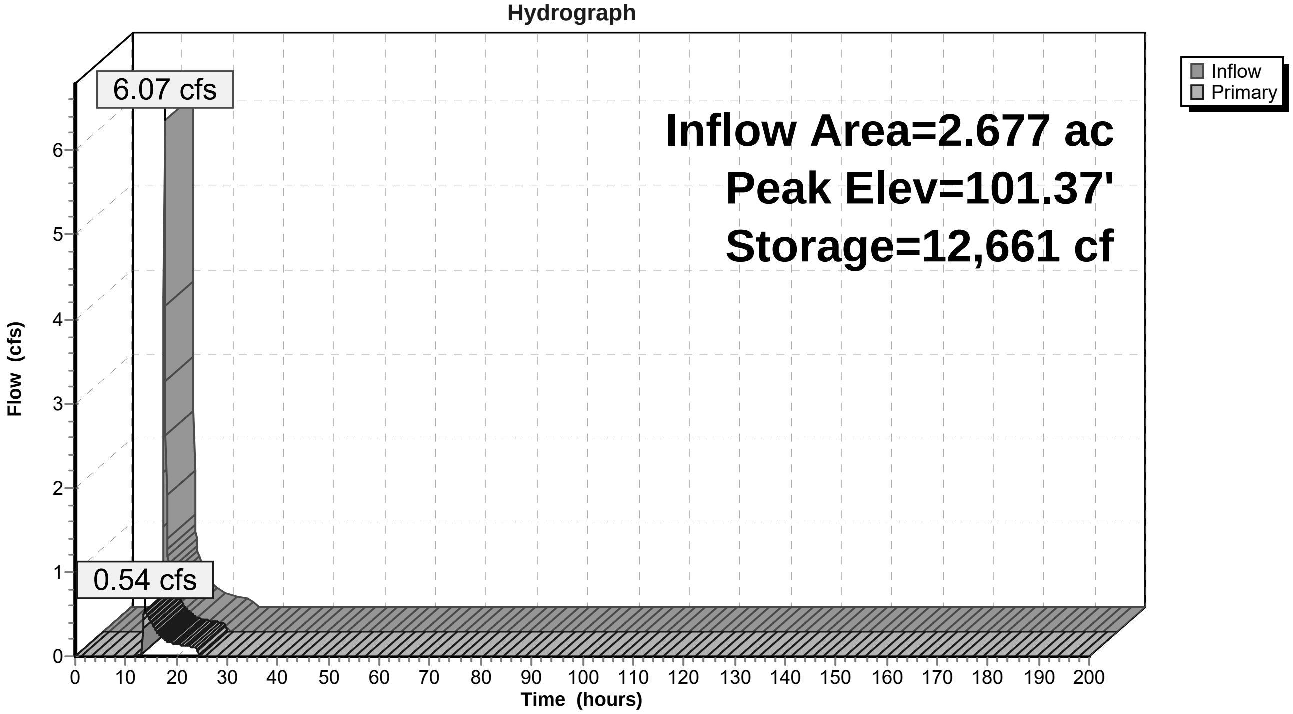
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	27,139 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	4,024	0.0	0	0
99.19	4,024	0.0	0	0
99.20	4,024	100.0	40	40
100.00	4,989	100.0	3,605	3,645
101.00	7,445	100.0	6,217	9,862
102.00	8,631	100.0	8,038	17,900
103.00	9,847	100.0	9,239	27,139

Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.47 cfs @ 13.80 hrs HW=101.37' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.47 cfs @ 0.52 fps)

Pond 39P: GUSF #6 & #7 (SPILLWAY)



Summary for Pond 67P: GUSF #5 Spillway (4.29.22)

Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 5.27" for 25 Year Saco event
Inflow = 4.89 cfs @ 12.09 hrs, Volume= 0.399 af
Outflow = 3.69 cfs @ 12.21 hrs, Volume= 0.240 af, Atten= 25%, Lag= 7.6 min
Primary = 3.69 cfs @ 12.21 hrs, Volume= 0.240 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.96' @ 12.21 hrs Surf.Area= 4,634 sf Storage= 7,933 cf

Plug-Flow detention time= 200.0 min calculated for 0.240 af (60% of inflow)
Center-of-Mass det. time= 96.4 min (871.7 - 775.3)

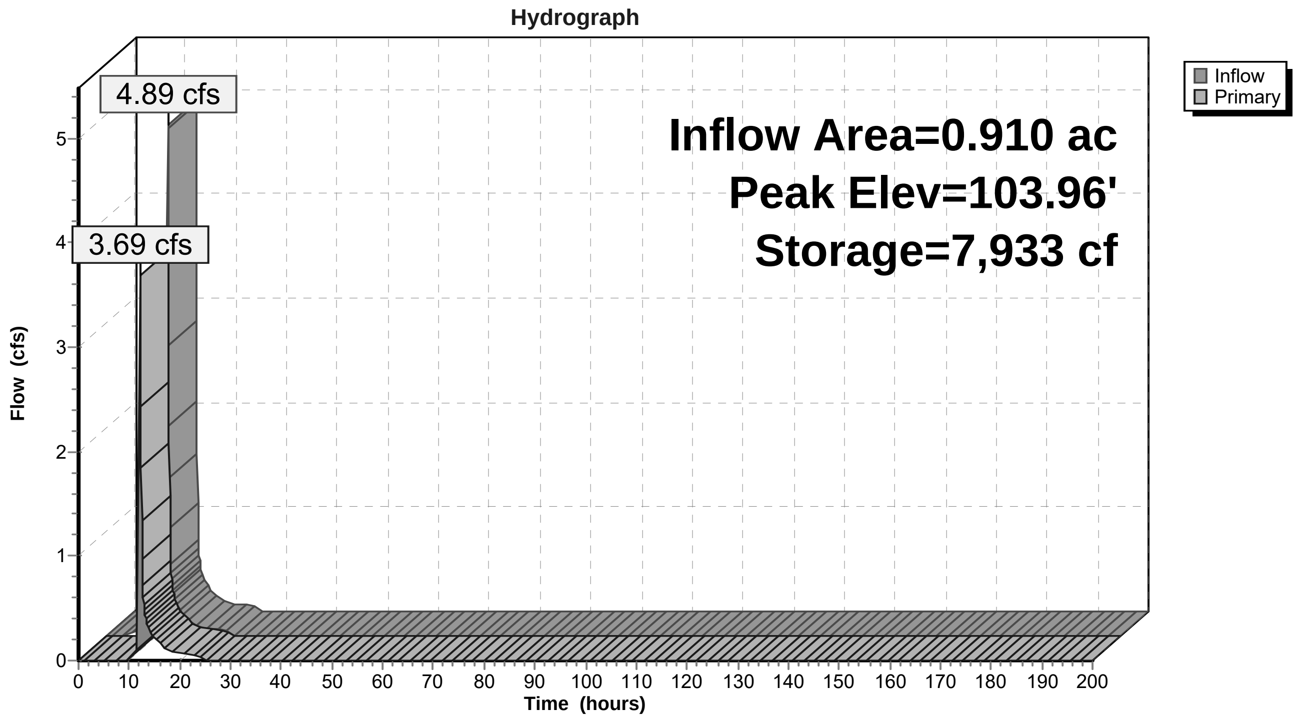
Volume	Invert	Avail.Storage	Storage Description
#1	99.23'	13,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.23	1,763	0.0	0	0
101.42	1,763	0.0	0	0
101.43	1,763	100.0	18	18
102.00	2,135	100.0	1,111	1,129
103.00	3,583	100.0	2,859	3,988
104.00	4,677	100.0	4,130	8,118
105.00	5,828	100.0	5,253	13,370

Device	Routing	Invert	Outlet Devices
#1	Primary	103.74'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.51 cfs @ 12.21 hrs HW=103.95' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.51 cfs @ 1.10 fps)

Pond 67P: GUSF #5 Spillway (4.29.22)



Summary for Pond 68P: GUSF #1 Spillway (4.29.22)

Inflow Area = 1.697 ac, 67.19% Impervious, Inflow Depth = 5.27" for 25 Year Saco event
Inflow = 9.13 cfs @ 12.09 hrs, Volume= 0.745 af
Outflow = 3.91 cfs @ 12.33 hrs, Volume= 0.378 af, Atten= 57%, Lag= 14.9 min
Primary = 3.91 cfs @ 12.33 hrs, Volume= 0.378 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.16' @ 12.34 hrs Surf.Area= 6,886 sf Storage= 17,517 cf

Plug-Flow detention time= 241.6 min calculated for 0.378 af (51% of inflow)
Center-of-Mass det. time= 126.0 min (901.3 - 775.3)

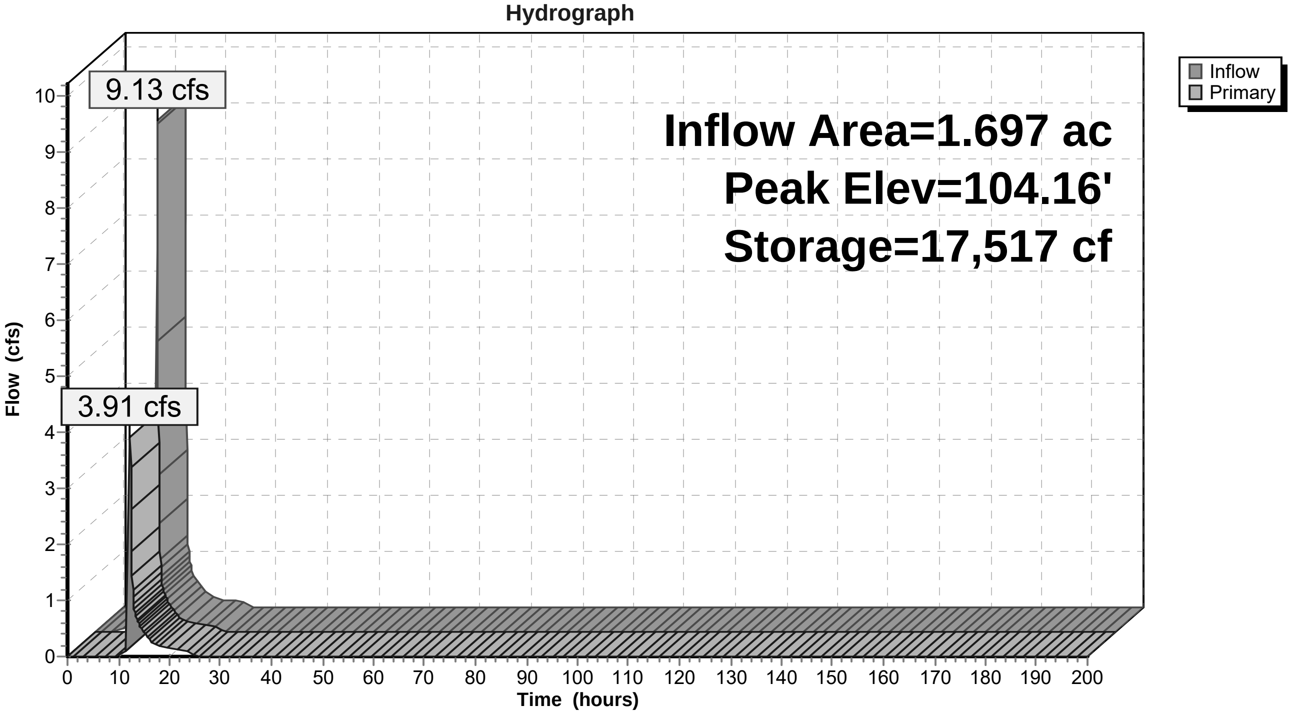
Volume	Invert	Avail.Storage	Storage Description
#1	98.40'	23,689 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.40	3,110	0.0	0	0
100.59	3,110	0.0	0	0
100.60	3,110	100.0	31	31
101.00	3,450	100.0	1,312	1,343
102.00	4,334	100.0	3,892	5,235
103.00	5,677	100.0	5,006	10,241
104.00	6,715	100.0	6,196	16,437
105.00	7,789	100.0	7,252	23,689

Device	Routing	Invert	Outlet Devices
#1	Primary	103.93'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.61 cfs @ 12.33 hrs HW=104.15' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 3.61 cfs @ 1.11 fps)

Pond 68P: GUSF #1 Spillway (4.29.22)



Summary for Pond 69P: GUSF #3 Spillway (4.29.22)

Inflow Area = 1.029 ac, 71.91% Impervious, Inflow Depth = 5.38" for 25 Year Saco event
Inflow = 5.60 cfs @ 12.09 hrs, Volume= 0.461 af
Outflow = 4.08 cfs @ 12.22 hrs, Volume= 0.259 af, Atten= 27%, Lag= 8.3 min
Primary = 4.08 cfs @ 12.22 hrs, Volume= 0.259 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.24' @ 12.23 hrs Surf.Area= 4,669 sf Storage= 9,885 cf

Plug-Flow detention time= 217.9 min calculated for 0.259 af (56% of inflow)
Center-of-Mass det. time= 108.9 min (880.0 - 771.2)

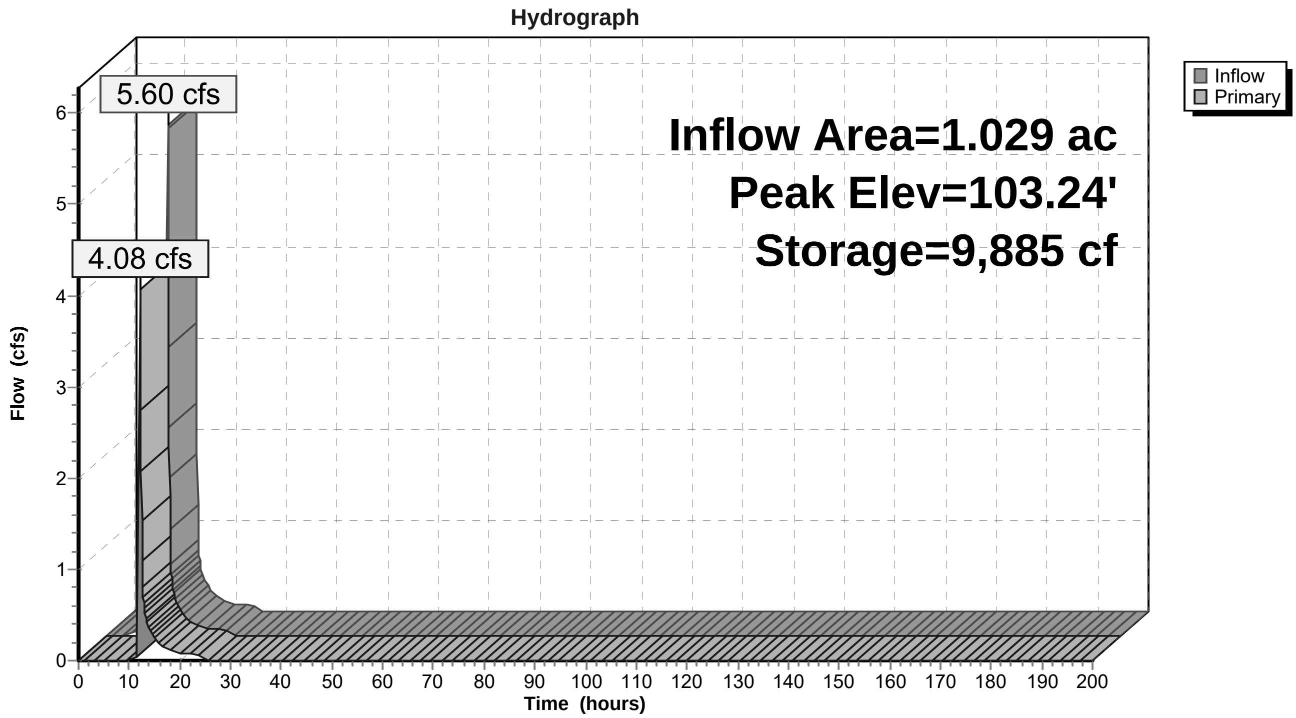
Volume	Invert	Avail.Storage	Storage Description
#1	98.20'	13,683 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.20	2,466	0.0	0	0
100.39	2,466	0.0	0	0
100.40	2,466	100.0	25	25
101.00	2,593	100.0	1,518	1,542
102.00	3,724	100.0	3,159	4,701
103.00	4,479	100.0	4,102	8,802
104.00	5,282	100.0	4,881	13,683

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=3.63 cfs @ 12.22 hrs HW=103.22' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 3.63 cfs @ 1.11 fps)

Pond 69P: GUSF #3 Spillway (4.29.22)



Summary for Pond 70P: GUSF #2 Spillway (4.29.22)

Inflow Area = 1.895 ac, 47.04% Impervious, Inflow Depth = 4.82" for 25 Year Saco event
Inflow = 9.64 cfs @ 12.09 hrs, Volume= 0.761 af
Outflow = 4.70 cfs @ 12.29 hrs, Volume= 0.427 af, Atten= 51%, Lag= 12.5 min
Primary = 4.70 cfs @ 12.29 hrs, Volume= 0.427 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 105.09' @ 12.29 hrs Surf.Area= 6,133 sf Storage= 16,078 cf

Plug-Flow detention time= 211.4 min calculated for 0.426 af (56% of inflow)
Center-of-Mass det. time= 104.7 min (894.1 - 789.4)

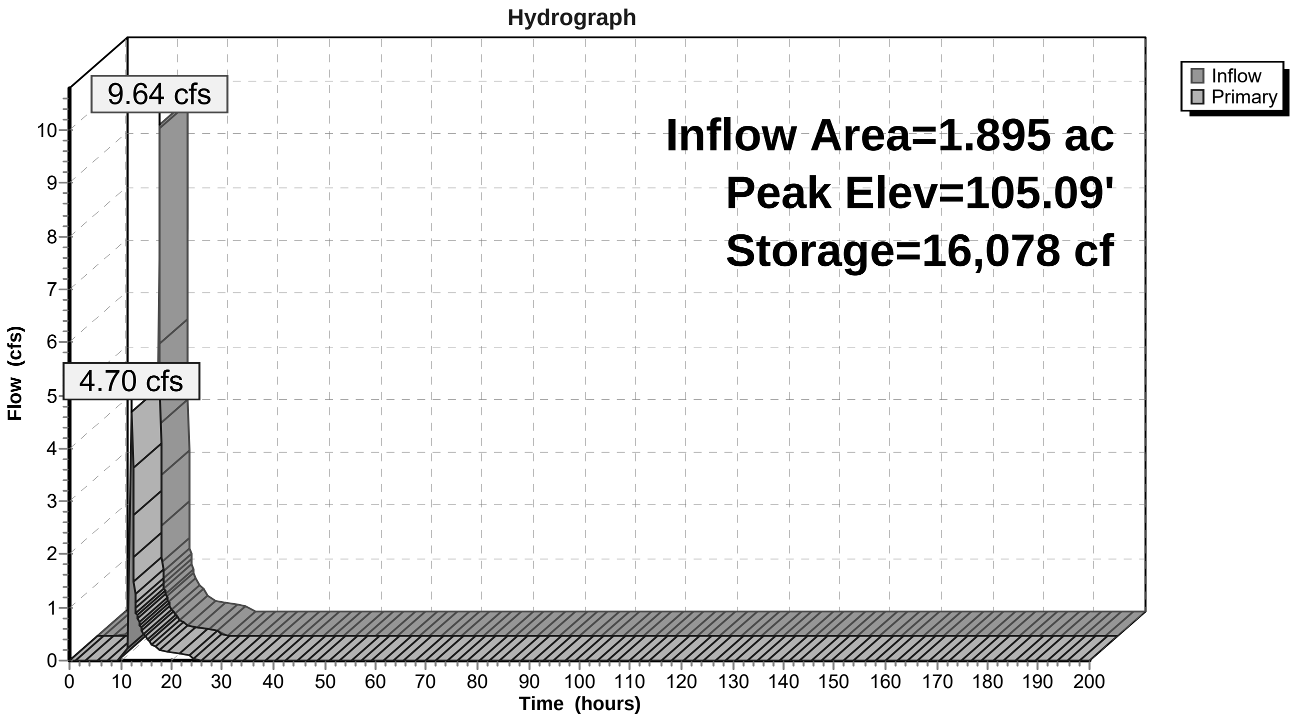
Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	22,037 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	2,848	0.0	0	0
101.49	2,848	0.0	0	0
101.50	2,848	100.0	28	28
102.00	3,087	100.0	1,484	1,512
103.00	4,294	100.0	3,691	5,203
104.00	5,146	100.0	4,720	9,923
105.00	6,046	100.0	5,596	15,519
106.00	6,991	100.0	6,519	22,037

Device	Routing	Invert	Outlet Devices
#1	Primary	104.84'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=4.61 cfs @ 12.29 hrs HW=105.09' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 4.61 cfs @ 1.23 fps)

Pond 70P: GUSF #2 Spillway (4.29.22)



Summary for Pond 71P: Gravel Wetland #2 Spillway (02/13/2023)

Inflow Area = 3.836 ac, 63.95% Impervious, Inflow Depth = 5.27" for 25 Year Saco event
Inflow = 20.64 cfs @ 12.09 hrs, Volume= 1.683 af
Outflow = 8.64 cfs @ 12.34 hrs, Volume= 0.847 af, Atten= 58%, Lag= 15.2 min
Primary = 8.64 cfs @ 12.34 hrs, Volume= 0.847 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 101.99' @ 12.34 hrs Surf.Area= 14,476 sf Storage= 39,954 cf

Plug-Flow detention time= 246.7 min calculated for 0.847 af (50% of inflow)
Center-of-Mass det. time= 128.0 min (903.2 - 775.3)

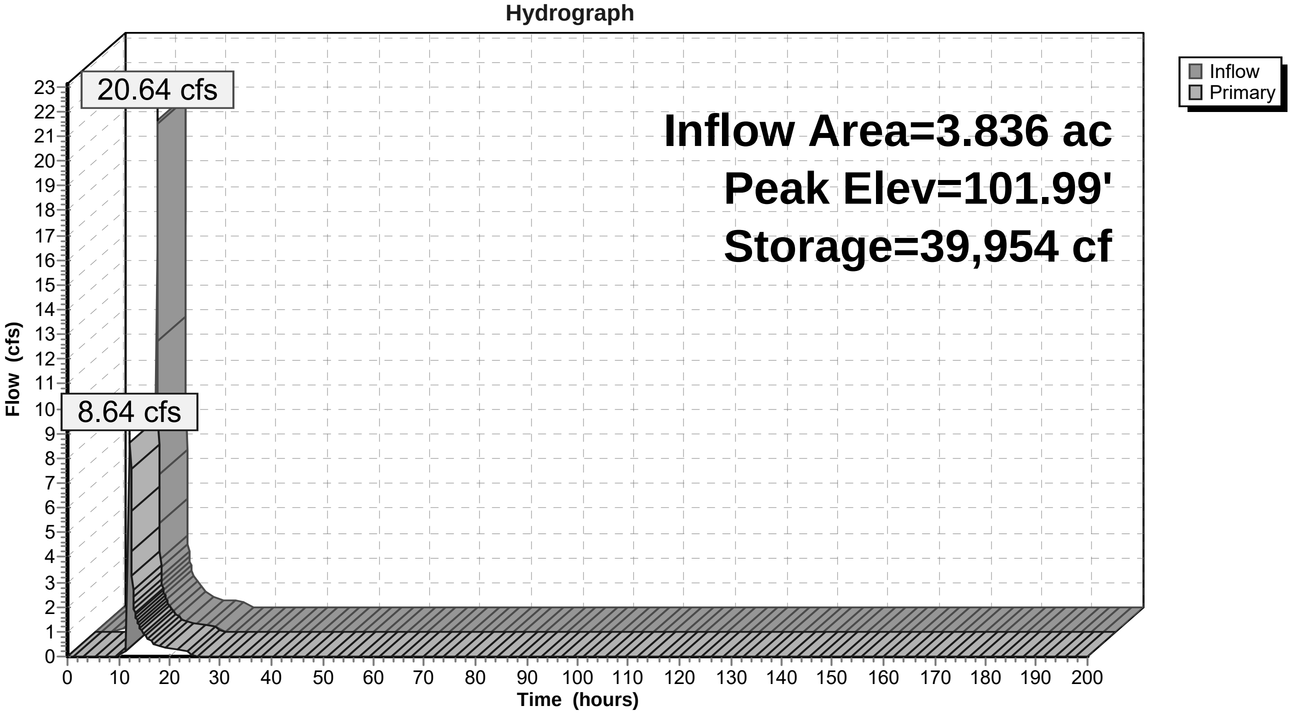
Volume	Invert	Avail.Storage	Storage Description
#1	95.14'	55,660 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.14	6,646	0.0	0	0
97.98	6,646	0.0	0	0
98.30	6,646	0.0	0	0
98.31	6,646	100.0	66	66
99.00	7,763	100.0	4,971	5,038
100.00	11,190	100.0	9,477	14,514
101.00	12,808	100.0	11,999	26,513
102.00	14,501	100.0	13,655	40,168
103.00	16,484	100.0	15,493	55,660

Device	Routing	Invert	Outlet Devices
#1	Primary	101.74'	**30.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.95 cfs @ 12.34 hrs HW=101.97' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 7.95 cfs @ 1.15 fps)

Pond 71P: Gravel Wetland #2 Spillway (02/13/2023)



Summary for Pond 75P: GUSF #9 Spillway (02/13/2023)

Inflow Area = 2.108 ac, 70.56% Impervious, Inflow Depth = 4.82" for 25 Year Saco event
Inflow = 10.72 cfs @ 12.09 hrs, Volume= 0.846 af
Outflow = 2.68 cfs @ 12.49 hrs, Volume= 0.391 af, Atten= 75%, Lag= 24.2 min
Primary = 2.68 cfs @ 12.49 hrs, Volume= 0.391 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 100.24' @ 12.49 hrs Surf.Area= 8,375 sf Storage= 21,296 cf

Plug-Flow detention time= 260.1 min calculated for 0.391 af (46% of inflow)
Center-of-Mass det. time= 142.6 min (932.0 - 789.4)

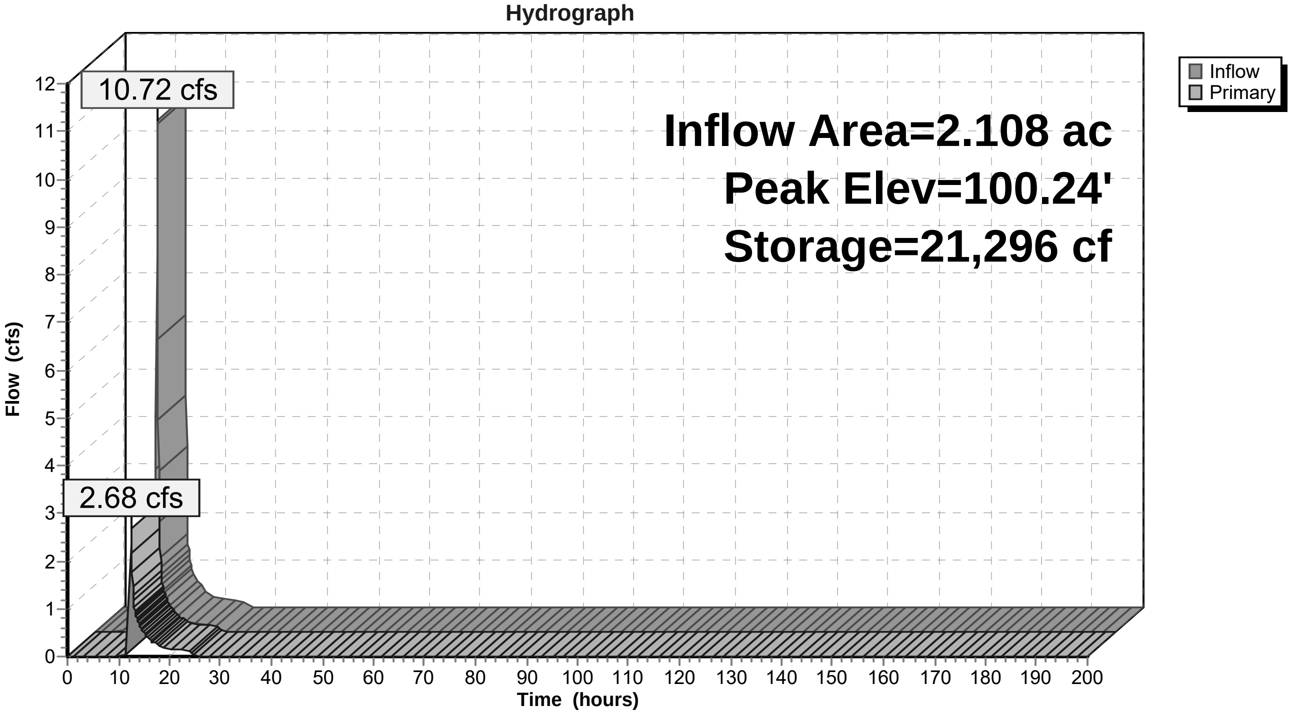
Volume	Invert	Avail.Storage	Storage Description
#1	94.46'	28,068 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.46	3,783	0.0	0	0
96.65	3,783	0.0	0	0
96.66	3,783	100.0	38	38
97.00	4,087	100.0	1,338	1,376
98.00	5,074	100.0	4,581	5,956
99.00	6,824	100.0	5,949	11,905
100.00	8,066	100.0	7,445	19,350
101.00	9,370	100.0	8,718	28,068

Device	Routing	Invert	Outlet Devices
#1	Primary	100.06'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=2.61 cfs @ 12.49 hrs HW=100.24' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 2.61 cfs @ 0.99 fps)

Pond 75P: GUSF #9 Spillway (02/13/2023)



Summary for Pond 84P: GUSF #8 spillway (10.5.2022)

Inflow Area = 1.398 ac, 60.77% Impervious, Inflow Depth = 3.86" for 25 Year Saco event
Inflow = 5.92 cfs @ 12.09 hrs, Volume= 0.449 af
Outflow = 1.64 cfs @ 12.48 hrs, Volume= 0.229 af, Atten= 72%, Lag= 23.1 min
Primary = 1.64 cfs @ 12.48 hrs, Volume= 0.229 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.00' @ 12.48 hrs Surf.Area= 5,011 sf Storage= 10,239 cf

Plug-Flow detention time= 235.5 min calculated for 0.229 af (51% of inflow)
Center-of-Mass det. time= 120.0 min (934.3 - 814.4)

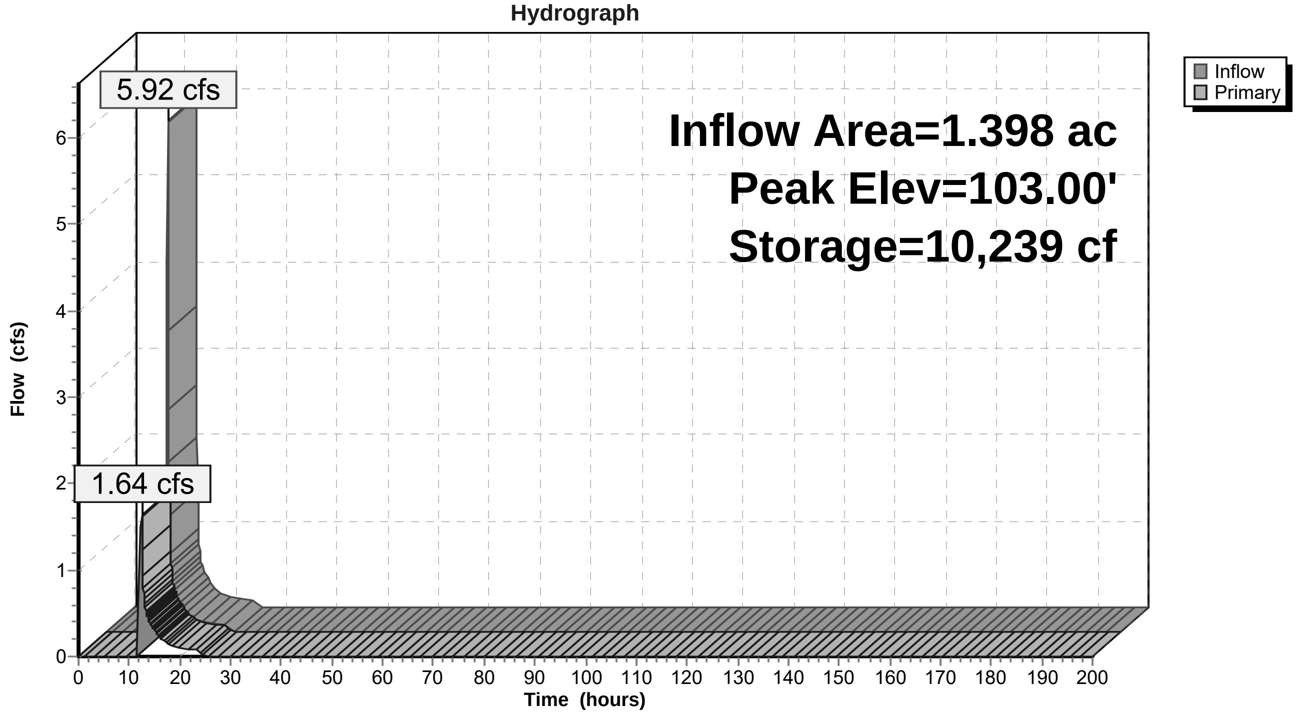
Volume	Invert	Avail.Storage	Storage Description
#1	98.16'	21,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.16	2,918	0.0	0	0
100.35	2,918	0.0	0	0
100.36	2,918	100.0	29	29
101.00	3,108	100.0	1,928	1,958
102.00	4,231	100.0	3,670	5,627
103.00	5,012	100.0	4,622	10,249
104.00	5,850	100.0	5,431	15,680
105.00	6,741	100.0	6,296	21,975

Device	Routing	Invert	Outlet Devices
#1	Primary	102.87'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.58 cfs @ 12.48 hrs HW=103.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.58 cfs @ 0.84 fps)

Pond 84P: GUSF #8 spillway (10.5.2022)



Summary for Pond 87P: Gravel Wetland #1 Spillway (04.11.2023)

Inflow Area = 7.302 ac, 60.35% Impervious, Inflow Depth = 5.04" for 25 Year Saco event
Inflow = 38.28 cfs @ 12.09 hrs, Volume= 3.067 af
Outflow = 0.37 cfs @ 23.96 hrs, Volume= 0.074 af, Atten= 99%, Lag= 712.5 min
Primary = 0.37 cfs @ 23.96 hrs, Volume= 0.074 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.29' @ 23.96 hrs Surf.Area= 29,970 sf Storage= 131,615 cf

Plug-Flow detention time= 1,046.6 min calculated for 0.074 af (2% of inflow)
Center-of-Mass det. time= 653.4 min (1,436.1 - 782.7)

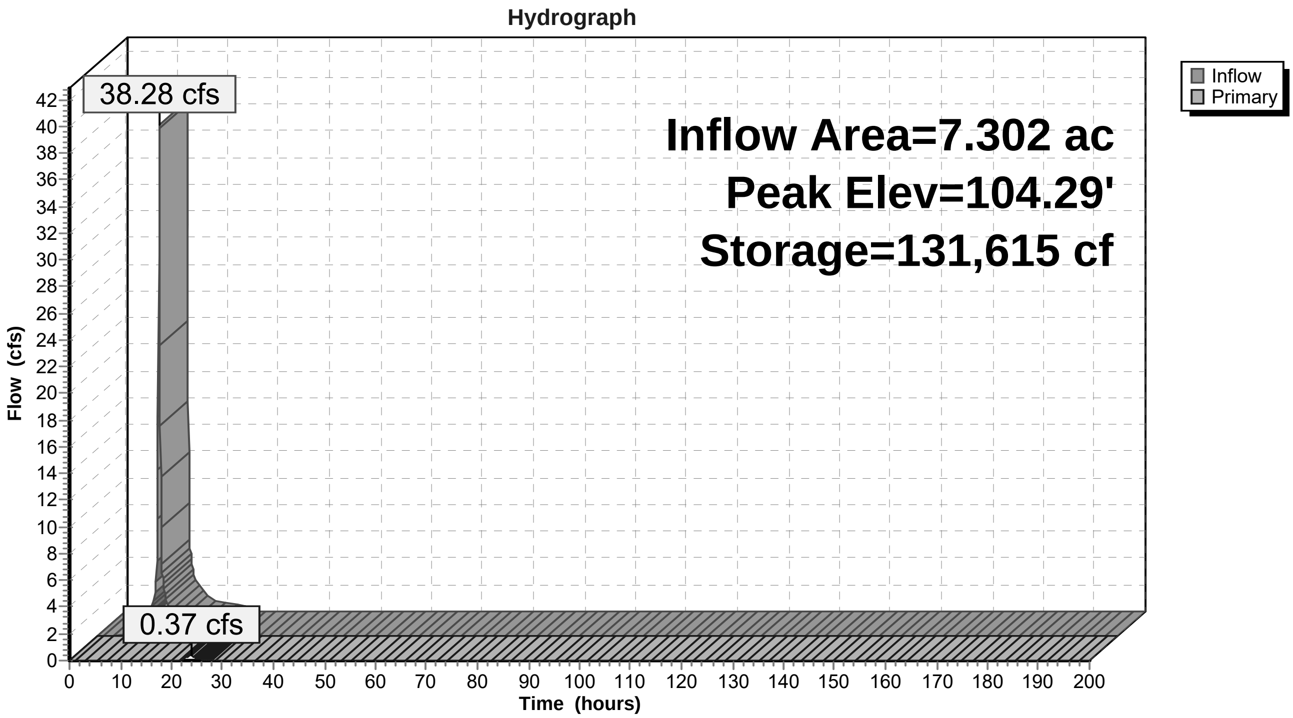
Volume	Invert	Avail.Storage	Storage Description
#1	94.76'	138,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.76	12,121	0.0	0	0
97.60	12,121	0.0	0	0
97.92	12,121	0.0	0	0
97.93	12,121	100.0	121	121
98.00	12,239	100.0	853	974
99.00	14,188	100.0	13,214	14,187
100.00	18,901	100.0	16,545	30,732
101.00	20,916	100.0	19,909	50,640
102.00	23,050	100.0	21,983	72,623
103.00	25,237	100.0	24,144	96,767
104.00	27,639	100.0	26,438	123,205
104.25	29,662	100.0	7,163	130,367
104.50	31,500	100.0	7,645	138,013

Device	Routing	Invert	Outlet Devices
#1	Primary	104.25'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=0.32 cfs @ 23.96 hrs HW=104.29' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 0.32 cfs @ 0.51 fps)

Pond 87P: Gravel Wetland #1 Spillway (04.11.2023)



Summary for Pond 90P: GUSF #4 Spillway (04.11.2023)

Inflow Area = 1.015 ac, 66.73% Impervious, Inflow Depth = 5.27" for 25 Year Saco event
Inflow = 5.46 cfs @ 12.09 hrs, Volume= 0.446 af
Outflow = 1.32 cfs @ 12.51 hrs, Volume= 0.184 af, Atten= 76%, Lag= 25.4 min
Primary = 1.32 cfs @ 12.51 hrs, Volume= 0.184 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.59' @ 12.51 hrs Surf.Area= 4,715 sf Storage= 11,883 cf

Plug-Flow detention time= 288.5 min calculated for 0.184 af (41% of inflow)
Center-of-Mass det. time= 157.8 min (933.0 - 775.3)

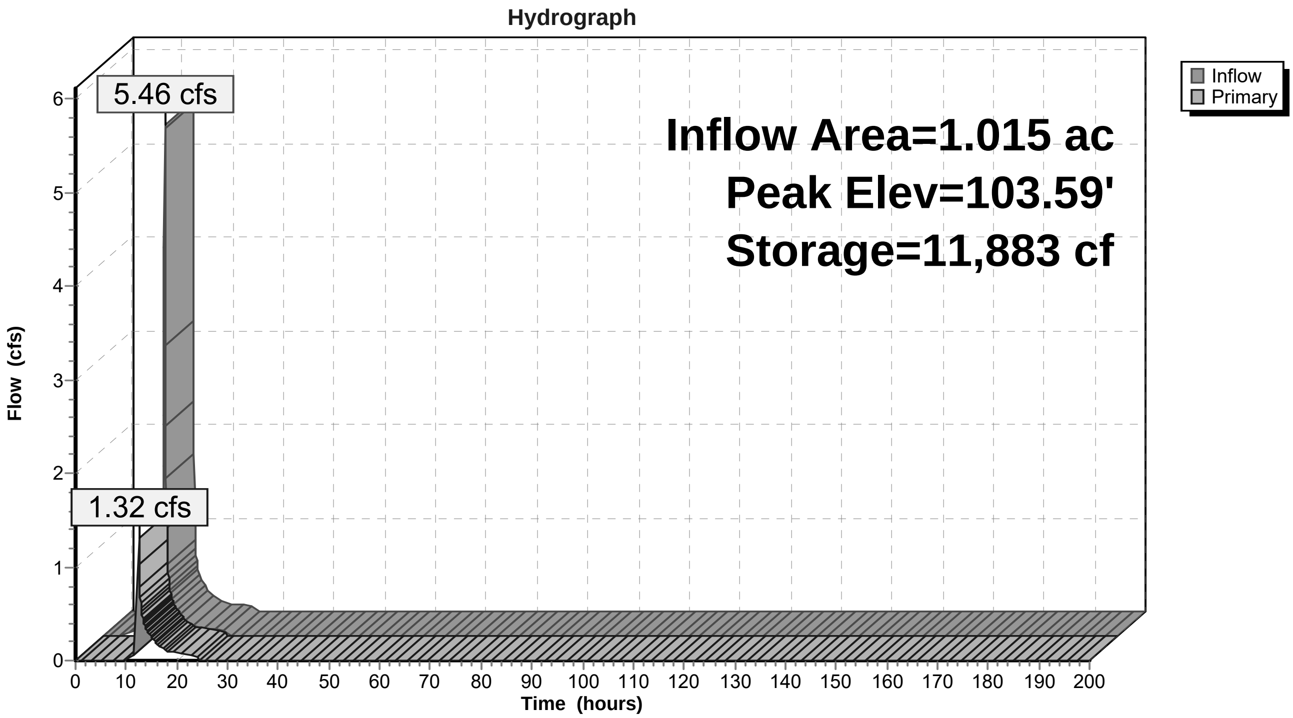
Volume	Invert	Avail.Storage	Storage Description
#1	97.70'	16,672 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.70	1,869	0.0	0	0
99.89	1,869	0.0	0	0
99.90	1,869	100.0	19	19
100.00	1,924	100.0	190	208
101.00	2,446	100.0	2,185	2,393
102.00	3,511	100.0	2,979	5,372
103.00	4,241	100.0	3,876	9,248
104.00	5,047	100.0	4,644	13,892
104.50	6,072	100.0	2,780	16,672

Device	Routing	Invert	Outlet Devices
#1	Primary	103.48'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=1.24 cfs @ 12.51 hrs HW=103.59' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 1.24 cfs @ 0.77 fps)

Pond 90P: GUSF #4 Spillway (04.11.2023)



Time span=0.00-200.00 hrs, dt=0.10 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=13.12 cfs 1.094 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=14.16 cfs 1.145 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=7.86"
Tc=5.0 min CN=93 Runoff=8.01 cfs 0.674 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=7.03 cfs 0.586 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=29.65 cfs 2.473 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=7.85 cfs 0.655 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=90 Runoff=55.56 cfs 4.561 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=3.04"
Tc=5.0 min CN=53 Runoff=5.98 cfs 0.463 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=5.92"
Tc=5.0 min CN=77 Runoff=5.46 cfs 0.419 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=6.16"
Tc=5.0 min CN=79 Runoff=9.29 cfs 0.718 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=15.75 cfs 1.274 af

Pond 39P: GUSF #6 & #7 (SPILLWAY) Peak Elev=101.56' Storage=14,247 cf Inflow=11.43 cfs 0.881 af
Outflow=5.90 cfs 0.599 af

Pond 67P: GUSF #5 Spillway (4.29.22) Peak Elev=104.05' Storage=8,357 cf Inflow=7.03 cfs 0.586 af
Outflow=6.38 cfs 0.427 af

Pond 68P: GUSF #1 Spillway (4.29.22) Peak Elev=104.39' Storage=19,106 cf Inflow=13.12 cfs 1.094 af
Outflow=11.64 cfs 0.728 af

Pond 69P: GUSF #3 Spillway (4.29.22) Peak Elev=103.34' Storage=10,368 cf Inflow=8.01 cfs 0.674 af
Outflow=7.33 cfs 0.472 af

Pond 70P: GUSF #2 Spillway (4.29.22) Peak Elev=105.32' Storage=17,507 cf Inflow=14.16 cfs 1.145 af
Outflow=12.97 cfs 0.811 af

Pond 71P: Gravel Wetland #2 Spillway Peak Elev=102.23' Storage=43,571 cf Inflow=29.65 cfs 2.473 af
Outflow=26.25 cfs 1.636 af

Pond 75P: GUSF #9 Spillway (02/13/2023) Peak Elev=100.52' Storage=23,709 cf Inflow=15.75 cfs 1.274 af
Outflow=11.99 cfs 0.819 af

Pond 84P: GUSF #8 spillway (10.5.2022) Peak Elev=103.21' Storage=11,338 cf Inflow=9.29 cfs 0.718 af
Outflow=7.47 cfs 0.497 af

Pond 87P: Gravel Wetland #1 Spillway Peak Elev=104.48' Storage=137,460 cf Inflow=55.56 cfs 4.561 af
Outflow=4.25 cfs 1.568 af

Pond 90P: GUSF #4 Spillway (04.11.2023) Peak Elev=103.79' Storage=12,827 cf Inflow=7.85 cfs 0.655 af
Outflow=6.22 cfs 0.394 af

Total Runoff Area = 23.867 ac Runoff Volume = 14.062 af Average Runoff Depth = 7.07"
40.35% Pervious = 9.630 ac 59.65% Impervious = 14.237 ac

Summary for Pond 39P: GUSF #6 & #7 (SPILLWAY)

Inflow Area = 2.677 ac, 36.33% Impervious, Inflow Depth = 3.95" for 100 Year Saco event
Inflow = 11.43 cfs @ 12.09 hrs, Volume= 0.881 af
Outflow = 5.90 cfs @ 12.31 hrs, Volume= 0.599 af, Atten= 48%, Lag= 13.1 min
Primary = 5.90 cfs @ 12.31 hrs, Volume= 0.599 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 101.56' @ 12.31 hrs Surf.Area= 8,113 sf Storage= 14,247 cf

Plug-Flow detention time= 177.2 min calculated for 0.599 af (68% of inflow)
Center-of-Mass det. time= 73.4 min (905.8 - 832.3)

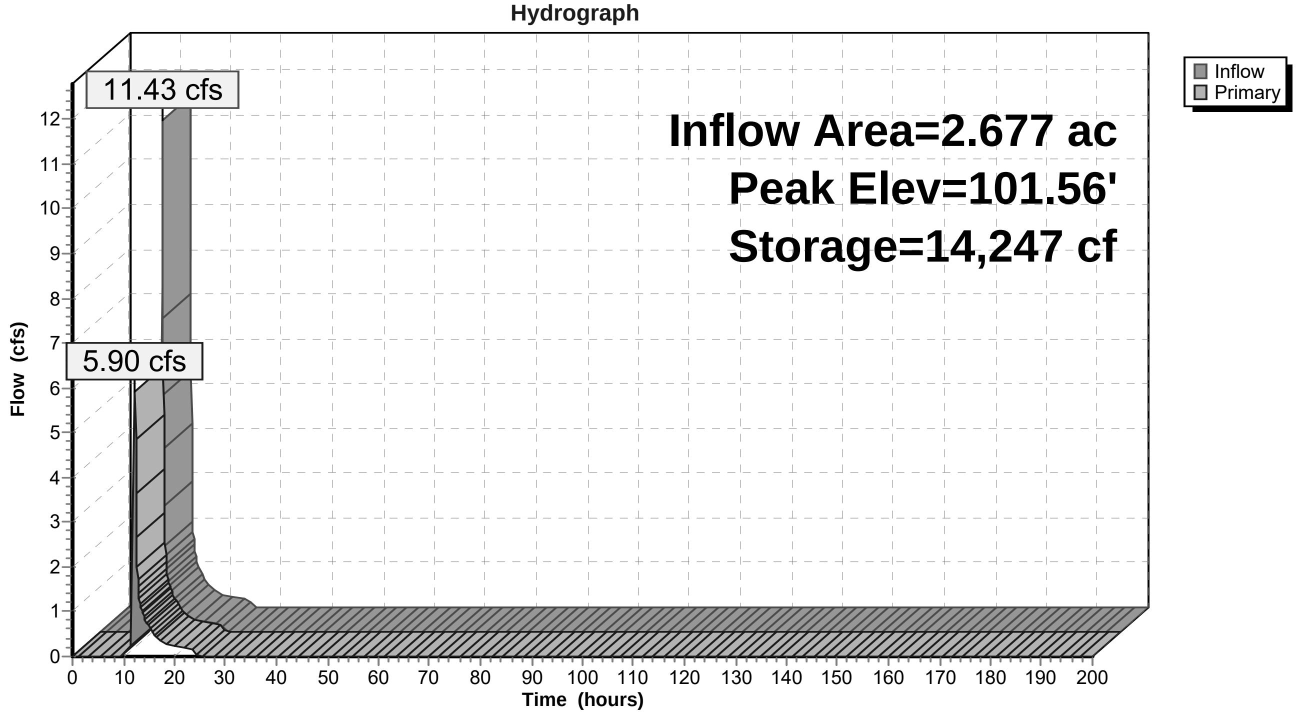
Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	27,139 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	4,024	0.0	0	0
99.19	4,024	0.0	0	0
99.20	4,024	100.0	40	40
100.00	4,989	100.0	3,605	3,645
101.00	7,445	100.0	6,217	9,862
102.00	8,631	100.0	8,038	17,900
103.00	9,847	100.0	9,239	27,139

Device	Routing	Invert	Outlet Devices
#1	Primary	101.32'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=5.73 cfs @ 12.31 hrs HW=101.56' (Free Discharge)
1=Broad-Crested Rectangular Weir (Weir Controls 5.73 cfs @ 1.20 fps)

Pond 39P: GUSF #6 & #7 (SPILLWAY)



Summary for Pond 67P: GUSF #5 Spillway (4.29.22)

Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 7.03 cfs @ 12.08 hrs, Volume= 0.586 af
Outflow = 6.38 cfs @ 12.12 hrs, Volume= 0.427 af, Atten= 9%, Lag= 2.1 min
Primary = 6.38 cfs @ 12.12 hrs, Volume= 0.427 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.05' @ 12.12 hrs Surf.Area= 4,736 sf Storage= 8,357 cf

Plug-Flow detention time= 162.8 min calculated for 0.427 af (73% of inflow)
Center-of-Mass det. time= 74.4 min (840.3 - 766.0)

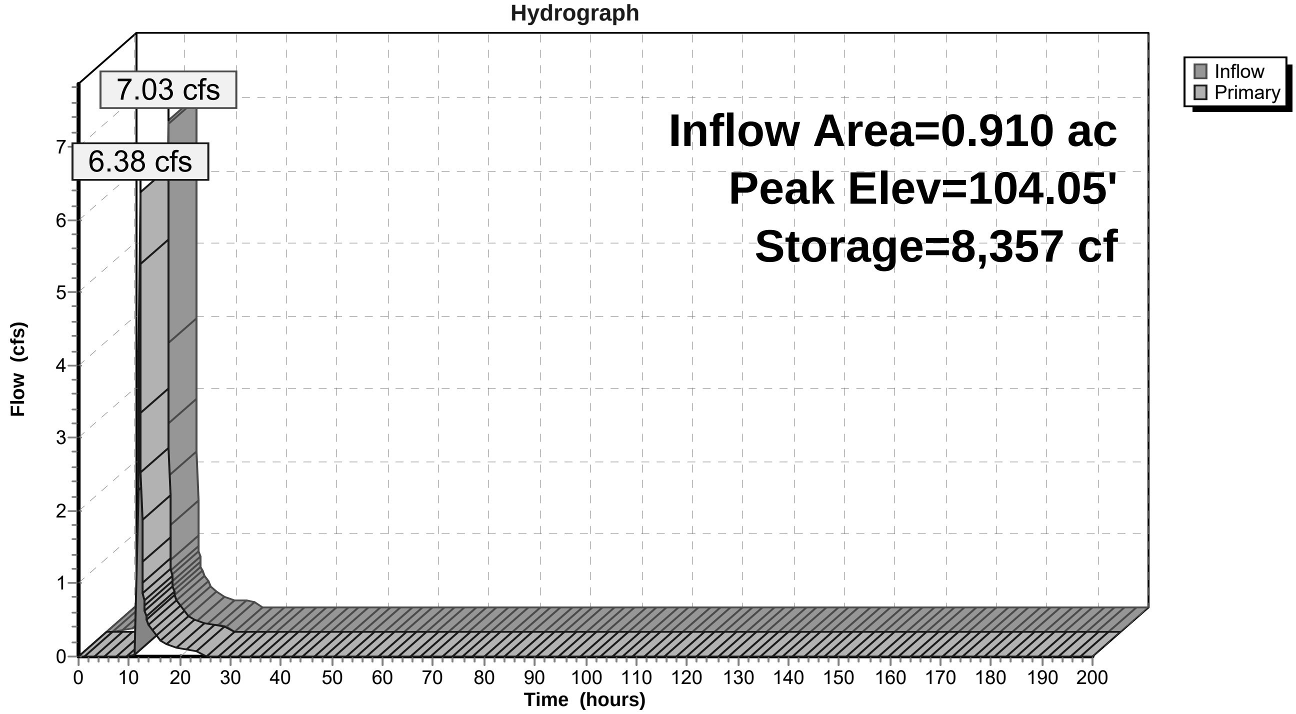
Volume	Invert	Avail.Storage	Storage Description
#1	99.23'	13,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.23	1,763	0.0	0	0
101.42	1,763	0.0	0	0
101.43	1,763	100.0	18	18
102.00	2,135	100.0	1,111	1,129
103.00	3,583	100.0	2,859	3,988
104.00	4,677	100.0	4,130	8,118
105.00	5,828	100.0	5,253	13,370

Device	Routing	Invert	Outlet Devices
#1	Primary	103.74'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=6.11 cfs @ 12.12 hrs HW=104.04' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 6.11 cfs @ 1.34 fps)

Pond 67P: GUSF #5 Spillway (4.29.22)



Summary for Pond 68P: GUSF #1 Spillway (4.29.22)

Inflow Area = 1.697 ac, 67.19% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 13.12 cfs @ 12.08 hrs, Volume= 1.094 af
Outflow = 11.64 cfs @ 12.14 hrs, Volume= 0.728 af, Atten= 11%, Lag= 3.3 min
Primary = 11.64 cfs @ 12.14 hrs, Volume= 0.728 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.39' @ 12.14 hrs Surf.Area= 7,129 sf Storage= 19,106 cf

Plug-Flow detention time= 185.4 min calculated for 0.727 af (66% of inflow)
Center-of-Mass det. time= 88.5 min (854.5 - 766.0)

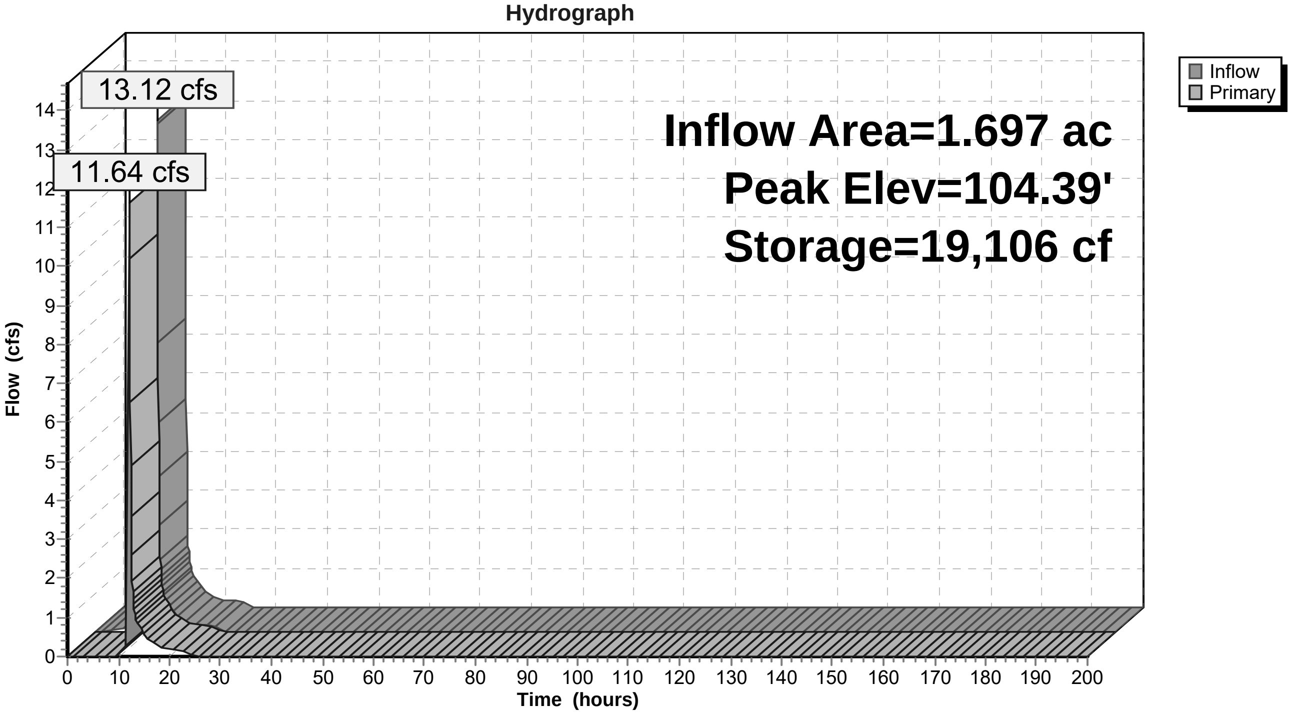
Volume	Invert	Avail.Storage	Storage Description
#1	98.40'	23,689 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.40	3,110	0.0	0	0
100.59	3,110	0.0	0	0
100.60	3,110	100.0	31	31
101.00	3,450	100.0	1,312	1,343
102.00	4,334	100.0	3,892	5,235
103.00	5,677	100.0	5,006	10,241
104.00	6,715	100.0	6,196	16,437
105.00	7,789	100.0	7,252	23,689

Device	Routing	Invert	Outlet Devices
#1	Primary	103.93'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=10.64 cfs @ 12.14 hrs HW=104.36' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 10.64 cfs @ 1.66 fps)

Pond 68P: GUSF #1 Spillway (4.29.22)



Summary for Pond 69P: GUSF #3 Spillway (4.29.22)

Inflow Area = 1.029 ac, 71.91% Impervious, Inflow Depth = 7.86" for 100 Year Saco event
Inflow = 8.01 cfs @ 12.08 hrs, Volume= 0.674 af
Outflow = 7.33 cfs @ 12.12 hrs, Volume= 0.472 af, Atten= 9%, Lag= 2.1 min
Primary = 7.33 cfs @ 12.12 hrs, Volume= 0.472 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.34' @ 12.12 hrs Surf.Area= 4,751 sf Storage= 10,368 cf

Plug-Flow detention time= 174.6 min calculated for 0.472 af (70% of inflow)
Center-of-Mass det. time= 81.7 min (844.1 - 762.4)

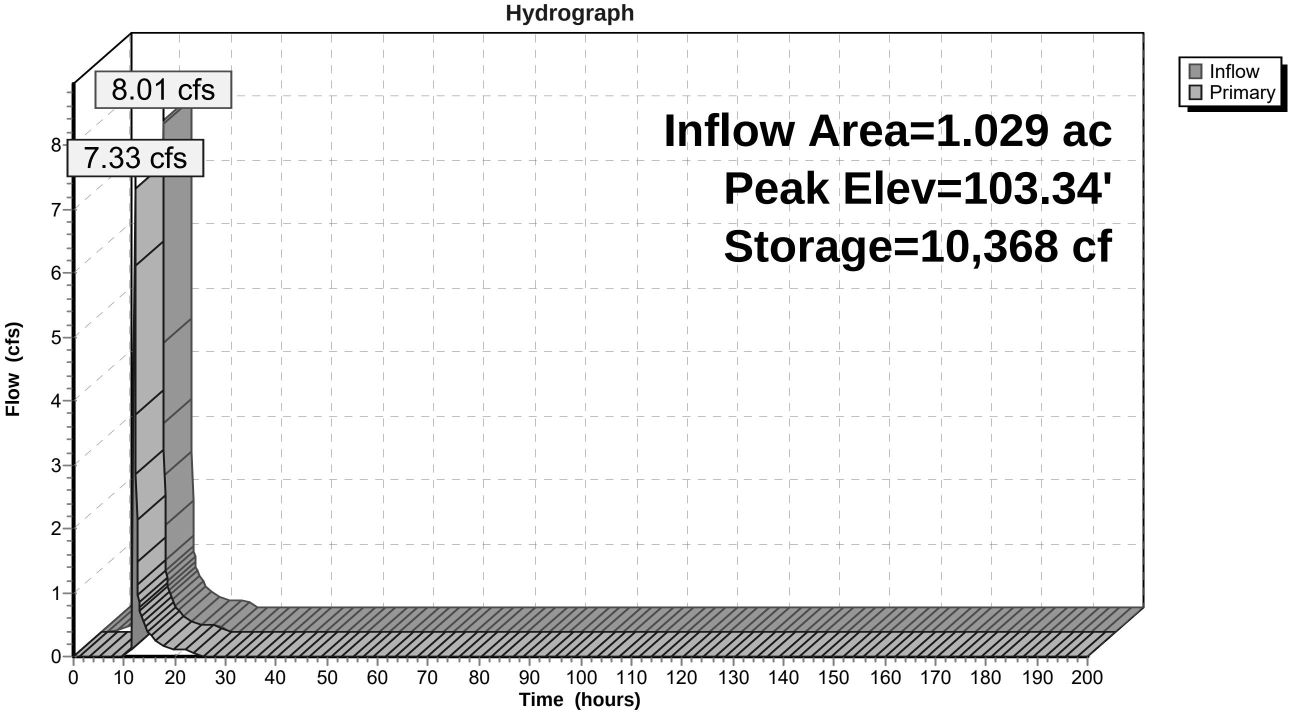
Volume	Invert	Avail.Storage	Storage Description
#1	98.20'	13,683 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.20	2,466	0.0	0	0
100.39	2,466	0.0	0	0
100.40	2,466	100.0	25	25
101.00	2,593	100.0	1,518	1,542
102.00	3,724	100.0	3,159	4,701
103.00	4,479	100.0	4,102	8,802
104.00	5,282	100.0	4,881	13,683

Device	Routing	Invert	Outlet Devices
#1	Primary	103.00'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.01 cfs @ 12.12 hrs HW=103.33' (Free Discharge)
└—**1=Broad-Crested Rectangular Weir** (Weir Controls 7.01 cfs @ 1.41 fps)

Pond 69P: GUSF #3 Spillway (4.29.22)



Summary for Pond 70P: GUSF #2 Spillway (4.29.22)

Inflow Area = 1.895 ac, 47.04% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 14.16 cfs @ 12.09 hrs, Volume= 1.145 af
Outflow = 12.97 cfs @ 12.13 hrs, Volume= 0.811 af, Atten= 8%, Lag= 2.5 min
Primary = 12.97 cfs @ 12.13 hrs, Volume= 0.811 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 105.32' @ 12.13 hrs Surf.Area= 6,349 sf Storage= 17,507 cf

Plug-Flow detention time= 163.8 min calculated for 0.811 af (71% of inflow)
Center-of-Mass det. time= 72.9 min (851.5 - 778.6)

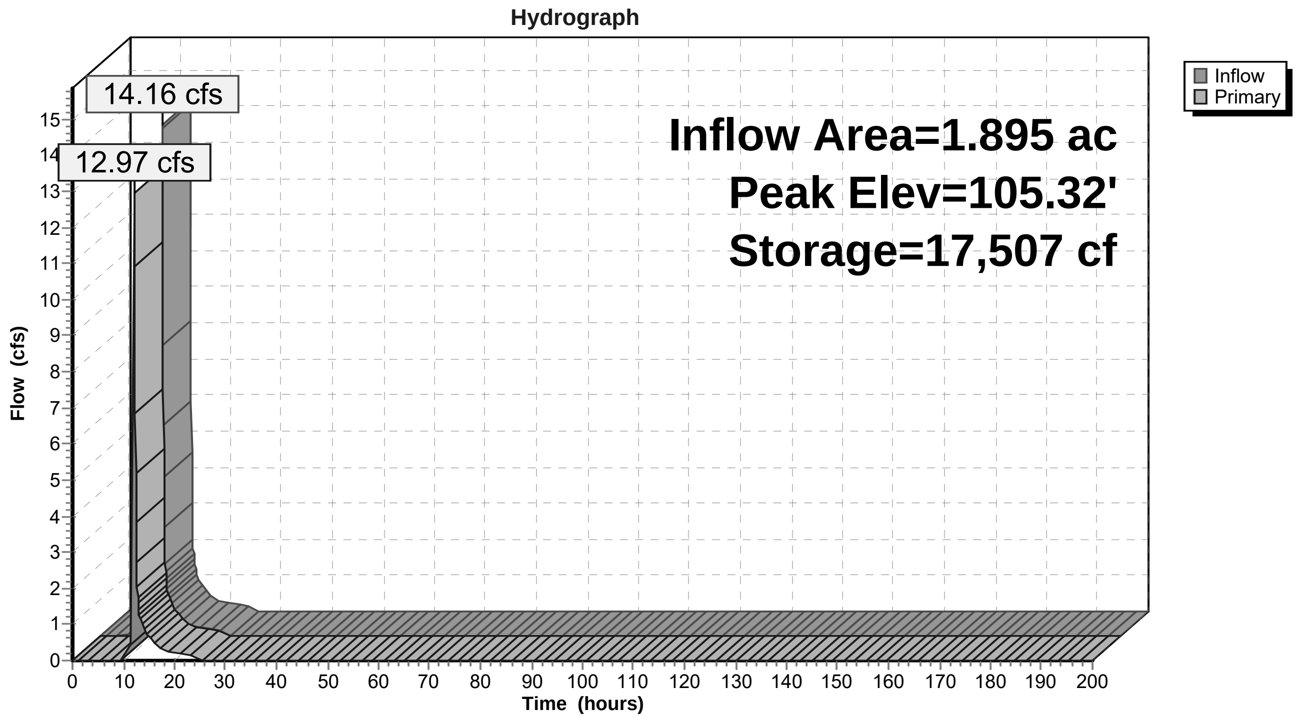
Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	22,037 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	2,848	0.0	0	0
101.49	2,848	0.0	0	0
101.50	2,848	100.0	28	28
102.00	3,087	100.0	1,484	1,512
103.00	4,294	100.0	3,691	5,203
104.00	5,146	100.0	4,720	9,923
105.00	6,046	100.0	5,596	15,519
106.00	6,991	100.0	6,519	22,037

Device	Routing	Invert	Outlet Devices
#1	Primary	104.84'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=12.15 cfs @ 12.13 hrs HW=105.30' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 12.15 cfs @ 1.76 fps)

Pond 70P: GUSF #2 Spillway (4.29.22)



Summary for Pond 71P: Gravel Wetland #2 Spillway (02/13/2023)

Inflow Area = 3.836 ac, 63.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 29.65 cfs @ 12.08 hrs, Volume= 2.473 af
Outflow = 26.25 cfs @ 12.14 hrs, Volume= 1.636 af, Atten= 11%, Lag= 3.4 min
Primary = 26.25 cfs @ 12.14 hrs, Volume= 1.636 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 102.23' @ 12.14 hrs Surf.Area= 14,959 sf Storage= 43,571 cf

Plug-Flow detention time= 186.8 min calculated for 1.636 af (66% of inflow)
Center-of-Mass det. time= 89.6 min (855.5 - 766.0)

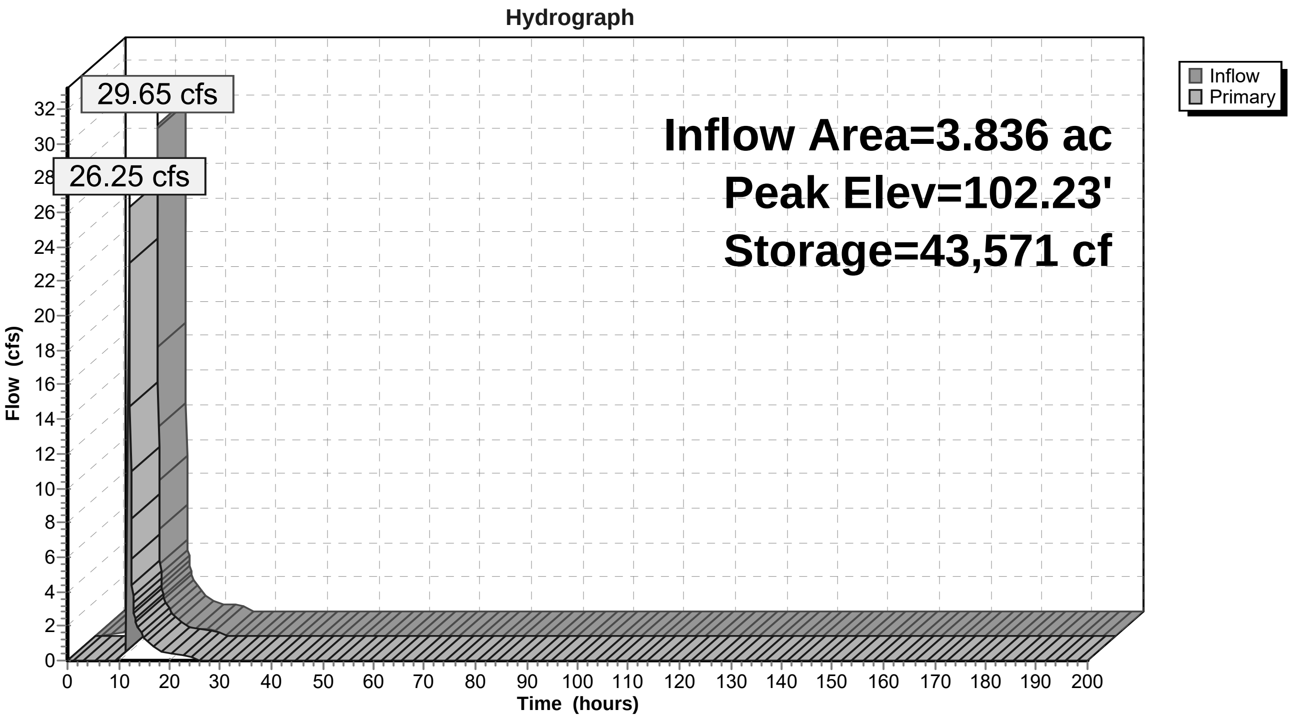
Volume	Invert	Avail.Storage	Storage Description
#1	95.14'	55,660 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.14	6,646	0.0	0	0
97.98	6,646	0.0	0	0
98.30	6,646	0.0	0	0
98.31	6,646	100.0	66	66
99.00	7,763	100.0	4,971	5,038
100.00	11,190	100.0	9,477	14,514
101.00	12,808	100.0	11,999	26,513
102.00	14,501	100.0	13,655	40,168
103.00	16,484	100.0	15,493	55,660

Device	Routing	Invert	Outlet Devices
#1	Primary	101.74'	**30.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=23.97 cfs @ 12.14 hrs HW=102.20' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 23.97 cfs @ 1.74 fps)

Pond 71P: Gravel Wetland #2 Spillway (02/13/2023)



Summary for Pond 75P: GUSF #9 Spillway (02/13/2023)

Inflow Area = 2.108 ac, 70.56% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 15.75 cfs @ 12.09 hrs, Volume= 1.274 af
Outflow = 11.99 cfs @ 12.20 hrs, Volume= 0.819 af, Atten= 24%, Lag= 6.6 min
Primary = 11.99 cfs @ 12.20 hrs, Volume= 0.819 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 100.52' @ 12.20 hrs Surf.Area= 8,742 sf Storage= 23,709 cf

Plug-Flow detention time= 187.7 min calculated for 0.818 af (64% of inflow)
Center-of-Mass det. time= 89.2 min (867.8 - 778.6)

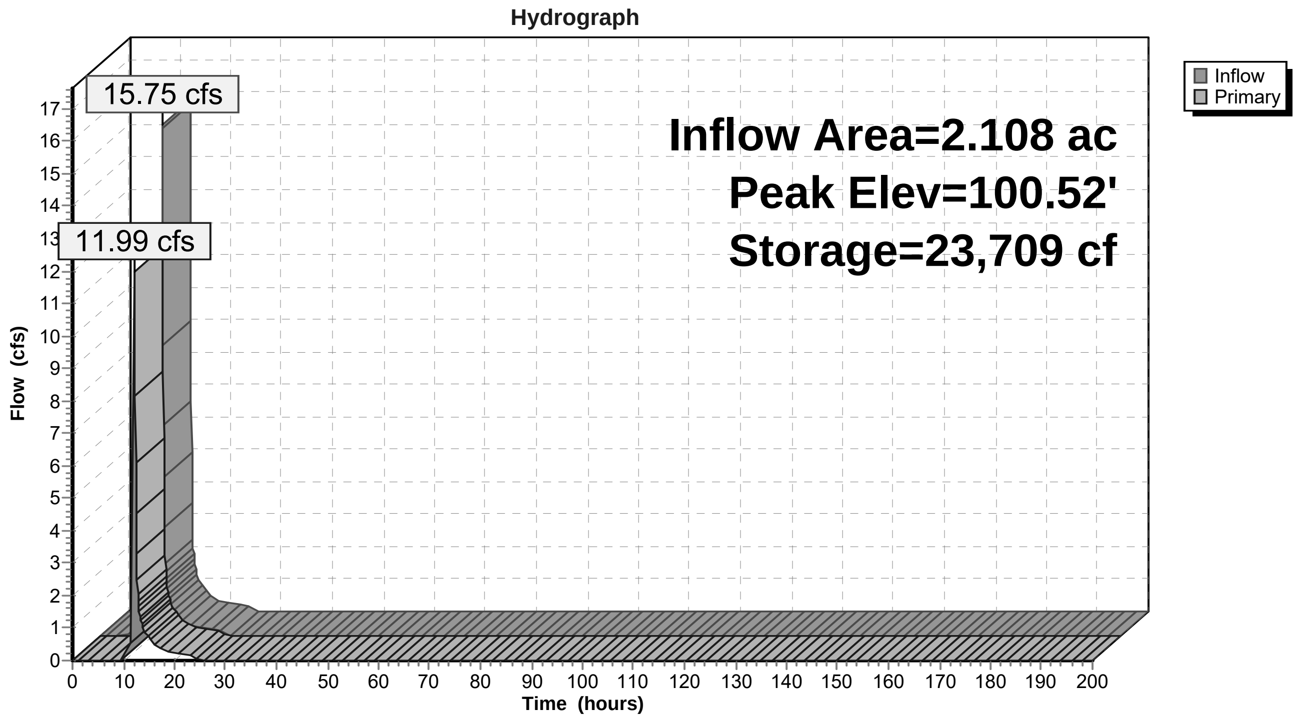
Volume	Invert	Avail.Storage	Storage Description
#1	94.46'	28,068 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.46	3,783	0.0	0	0
96.65	3,783	0.0	0	0
96.66	3,783	100.0	38	38
97.00	4,087	100.0	1,338	1,376
98.00	5,074	100.0	4,581	5,956
99.00	6,824	100.0	5,949	11,905
100.00	8,066	100.0	7,445	19,350
101.00	9,370	100.0	8,718	28,068

Device	Routing	Invert	Outlet Devices
#1	Primary	100.06'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=11.79 cfs @ 12.20 hrs HW=100.51' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 11.79 cfs @ 1.73 fps)

Pond 75P: GUSF #9 Spillway (02/13/2023)



Summary for Pond 84P: GUSF #8 spillway (10.5.2022)

Inflow Area = 1.398 ac, 60.77% Impervious, Inflow Depth = 6.16" for 100 Year Saco event
Inflow = 9.29 cfs @ 12.09 hrs, Volume= 0.718 af
Outflow = 7.47 cfs @ 12.18 hrs, Volume= 0.497 af, Atten= 20%, Lag= 5.8 min
Primary = 7.47 cfs @ 12.18 hrs, Volume= 0.497 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.21' @ 12.18 hrs Surf.Area= 5,191 sf Storage= 11,338 cf

Plug-Flow detention time= 162.0 min calculated for 0.497 af (69% of inflow)
Center-of-Mass det. time= 68.0 min (869.2 - 801.1)

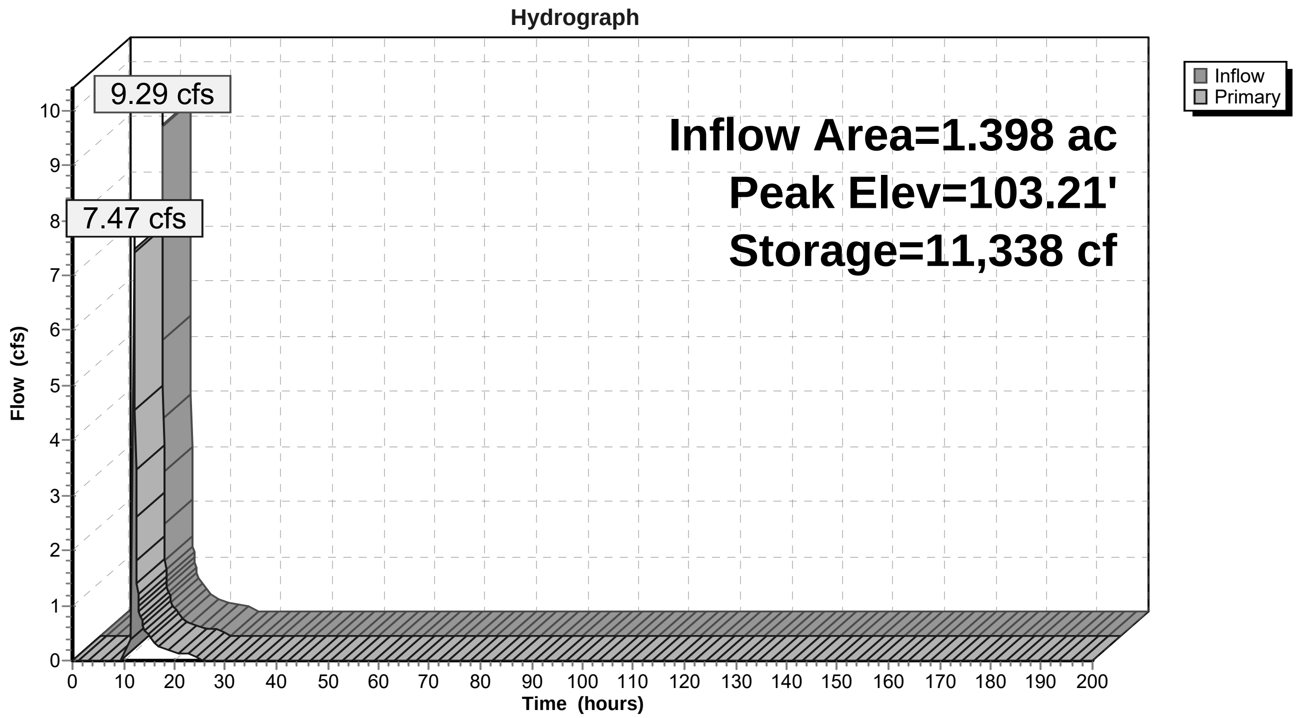
Volume	Invert	Avail.Storage	Storage Description
#1	98.16'	21,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.16	2,918	0.0	0	0
100.35	2,918	0.0	0	0
100.36	2,918	100.0	29	29
101.00	3,108	100.0	1,928	1,958
102.00	4,231	100.0	3,670	5,627
103.00	5,012	100.0	4,622	10,249
104.00	5,850	100.0	5,431	15,680
105.00	6,741	100.0	6,296	21,975

Device	Routing	Invert	Outlet Devices
#1	Primary	102.87'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=7.15 cfs @ 12.18 hrs HW=103.20' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 7.15 cfs @ 1.43 fps)

Pond 84P: GUSF #8 spillway (10.5.2022)



Summary for Pond 87P: Gravel Wetland #1 Spillway (04.11.2023)

Inflow Area = 7.302 ac, 60.35% Impervious, Inflow Depth = 7.50" for 100 Year Saco event
Inflow = 55.56 cfs @ 12.09 hrs, Volume= 4.561 af
Outflow = 4.25 cfs @ 13.30 hrs, Volume= 1.568 af, Atten= 92%, Lag= 72.7 min
Primary = 4.25 cfs @ 13.30 hrs, Volume= 1.568 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 104.48' @ 13.30 hrs Surf.Area= 31,371 sf Storage= 137,460 cf

Plug-Flow detention time= 373.7 min calculated for 1.568 af (34% of inflow)
Center-of-Mass det. time= 222.7 min (995.3 - 772.6)

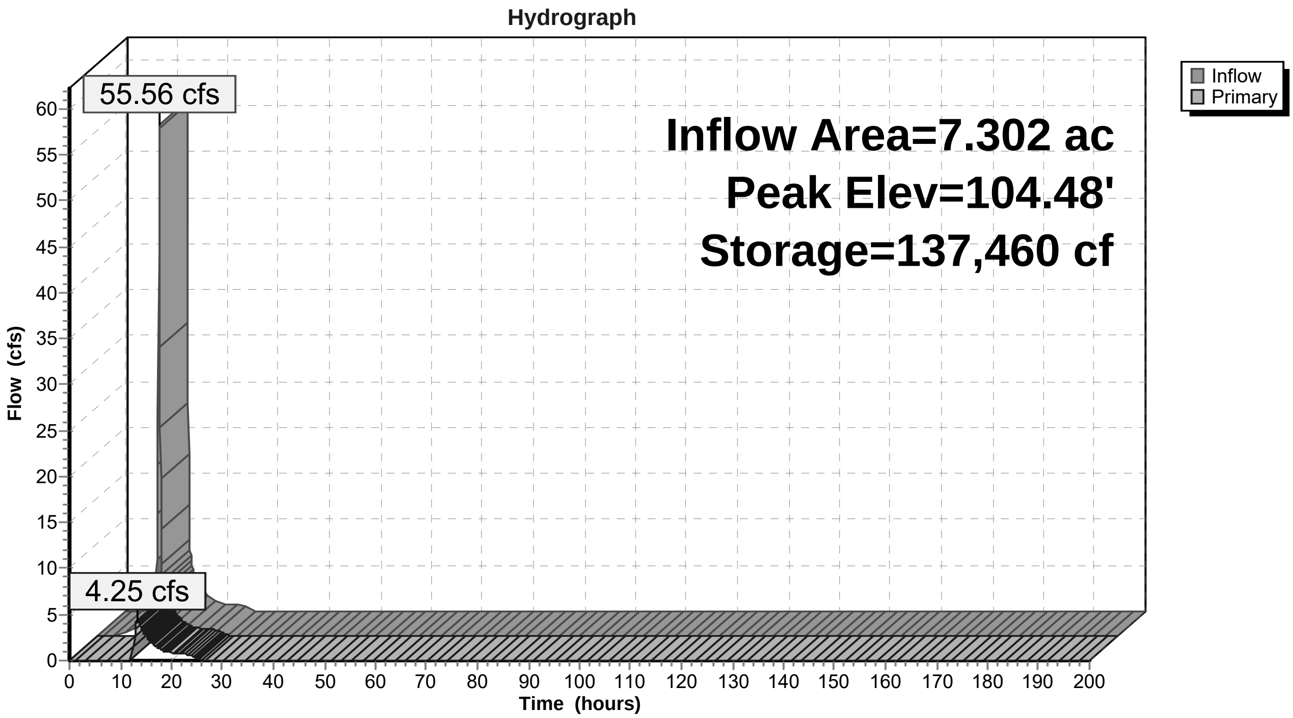
Volume	Invert	Avail.Storage	Storage Description
#1	94.76'	138,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.76	12,121	0.0	0	0
97.60	12,121	0.0	0	0
97.92	12,121	0.0	0	0
97.93	12,121	100.0	121	121
98.00	12,239	100.0	853	974
99.00	14,188	100.0	13,214	14,187
100.00	18,901	100.0	16,545	30,732
101.00	20,916	100.0	19,909	50,640
102.00	23,050	100.0	21,983	72,623
103.00	25,237	100.0	24,144	96,767
104.00	27,639	100.0	26,438	123,205
104.25	29,662	100.0	7,163	130,367
104.50	31,500	100.0	7,645	138,013

Device	Routing	Invert	Outlet Devices
#1	Primary	104.25'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=4.20 cfs @ 13.30 hrs HW=104.48' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 4.20 cfs @ 1.21 fps)

Pond 87P: Gravel Wetland #1 Spillway (04.11.2023)



Summary for Pond 90P: GUSF #4 Spillway (04.11.2023)

Inflow Area = 1.015 ac, 66.73% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 7.85 cfs @ 12.08 hrs, Volume= 0.655 af
Outflow = 6.22 cfs @ 12.19 hrs, Volume= 0.394 af, Atten= 21%, Lag= 6.4 min
Primary = 6.22 cfs @ 12.19 hrs, Volume= 0.394 af

Routing by Stor-Ind method, Time Span= 0.00-200.00 hrs, dt= 0.10 hrs
Peak Elev= 103.79' @ 12.19 hrs Surf.Area= 4,874 sf Storage= 12,827 cf

Plug-Flow detention time= 205.0 min calculated for 0.394 af (60% of inflow)
Center-of-Mass det. time= 99.6 min (865.6 - 766.0)

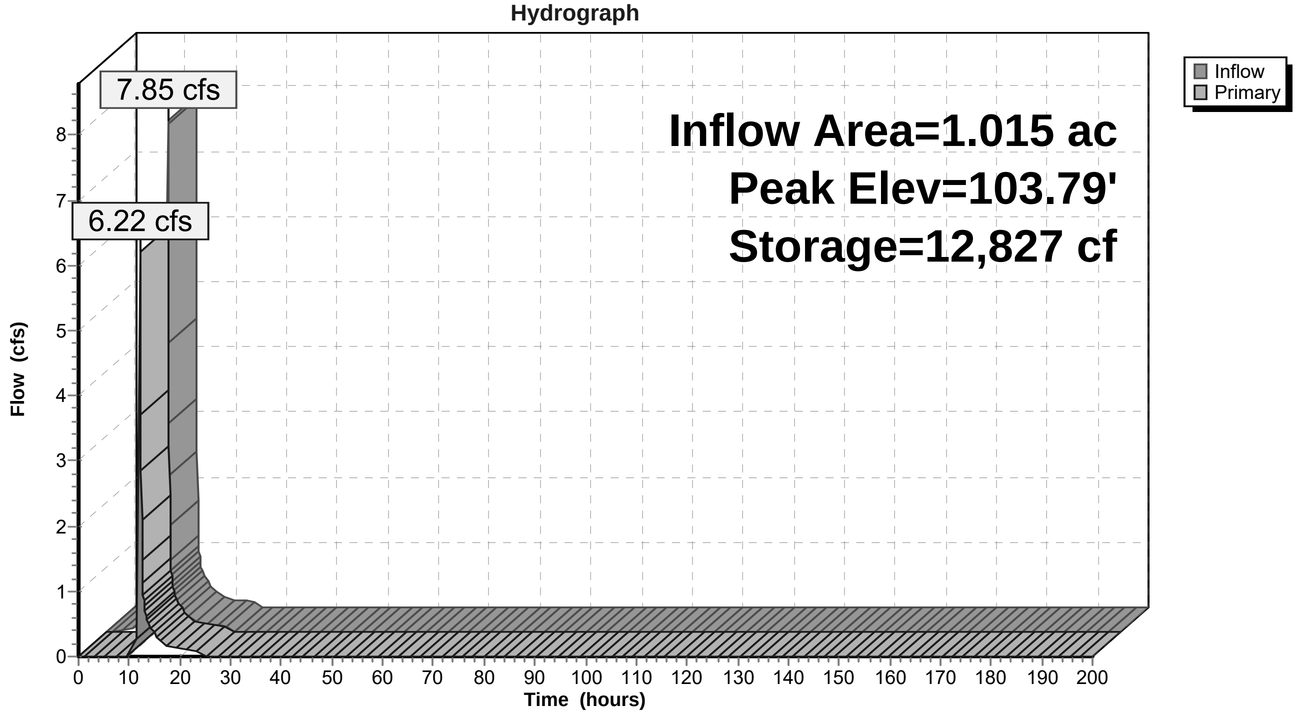
Volume	Invert	Avail.Storage	Storage Description
#1	97.70'	16,672 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.70	1,869	0.0	0	0
99.89	1,869	0.0	0	0
99.90	1,869	100.0	19	19
100.00	1,924	100.0	190	208
101.00	2,446	100.0	2,185	2,393
102.00	3,511	100.0	2,979	5,372
103.00	4,241	100.0	3,876	9,248
104.00	5,047	100.0	4,644	13,892
104.50	6,072	100.0	2,780	16,672

Device	Routing	Invert	Outlet Devices
#1	Primary	103.48'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=6.00 cfs @ 12.19 hrs HW=103.78' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 6.00 cfs @ 1.34 fps)

Pond 90P: GUSF #4 Spillway (04.11.2023)



STAGE STORAGE TABLES

Hydrograph for Pond 88P: Gravel Wetland #1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
0.00	0.00	0	94.76	0.00	0.00	0.00	**0.00**
0.20	0.00	0	94.76	0.00	0.00	0.00	0.00
0.40	0.00	0	94.76	0.00	0.00	0.00	0.00
0.60	0.00	0	94.76	0.00	0.00	0.00	0.00
0.80	0.00	0	94.76	0.00	0.00	0.00	0.00
1.00	0.00	0	94.76	0.00	0.00	0.00	0.00
1.20	0.00	0	94.76	0.00	0.00	0.00	0.00
1.40	0.00	0	94.76	0.00	0.00	0.00	0.00
1.60	0.00	0	94.76	0.00	0.00	0.00	0.00
1.80	0.00	0	94.76	0.00	0.00	0.00	0.00
2.00	0.00	0	94.76	0.00	0.00	0.00	0.00
2.20	0.00	0	94.76	0.00	0.00	0.00	0.00
2.40	0.00	0	94.76	0.00	0.00	0.00	0.00
2.60	0.00	0	94.76	0.00	0.00	0.00	0.00
2.80	0.00	0	94.76	0.00	0.00	0.00	0.00
3.00	0.00	0	94.76	0.00	0.00	0.00	0.00
3.20	0.00	0	94.76	0.00	0.00	0.00	0.00
3.40	0.00	0	94.76	0.00	0.00	0.00	0.00
3.60	0.00	0	94.76	0.00	0.00	0.00	0.00
3.80	0.00	0	94.76	0.00	0.00	0.00	0.00
4.00	0.00	0	94.76	0.00	0.00	0.00	0.00
4.20	0.00	0	94.76	0.00	0.00	0.00	0.00
4.40	0.00	0	94.76	0.00	0.00	0.00	0.00
4.60	0.00	0	94.76	0.00	0.00	0.00	0.00
4.80	0.00	0	94.76	0.00	0.00	0.00	0.00
5.00	0.00	0	94.76	0.00	0.00	0.00	0.00
5.20	0.00	0	94.76	0.00	0.00	0.00	0.00
5.40	0.00	0	94.76	0.00	0.00	0.00	0.00
5.60	0.00	0	94.76	0.00	0.00	0.00	0.00
5.80	0.00	0	97.60	0.00	0.00	0.00	0.00
6.00	0.01	0	97.61	0.01	0.01	0.00	0.00
6.20	0.02	0	97.63	0.02	0.02	0.00	0.00
6.40	0.02	0	97.65	0.02	0.02	0.00	0.00
6.60	0.03	0	97.67	0.03	0.03	0.00	0.00
6.80	0.05	0	97.69	0.05	0.05	0.00	0.00
7.00	0.06	0	97.75	0.06	0.06	0.00	0.00
7.20	0.07	0	97.83	0.07	0.07	0.00	0.00
7.40	0.09	0	97.92	0.09	0.09	0.00	0.00
7.60	0.10	7	97.92	0.09	0.09	0.00	0.00
7.80	0.12	25	97.92	0.09	0.09	0.00	0.00
8.00	0.14	55	97.92	0.09	0.09	0.00	0.00
8.20	0.16	100	97.93	0.09	0.09	0.00	0.00
8.40	0.19	164	97.93	0.09	0.09	0.00	0.00
8.60	0.22	249	97.94	0.09	0.09	0.00	0.00
8.80	0.26	358	97.95	0.09	0.09	0.00	0.00
9.00	0.30	493	97.96	0.09	0.09	0.00	0.00
9.20	0.34	654	97.97	0.09	0.09	0.00	0.00
9.40	0.38	846	97.99	0.09	0.09	0.00	0.00
9.60	0.43	1,068	98.01	0.10	0.10	0.00	0.00
9.80	0.48	1,323	98.03	0.10	0.10	0.00	0.00
10.00	0.53	1,612	98.05	0.10	0.10	0.00	0.00
10.20	0.60	1,942	98.08	0.10	0.10	0.00	0.00
10.40	0.69	2,329	98.11	0.11	0.11	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
10.60	0.78	2,778	98.15	0.11	0.11	0.00	0.00
10.80	0.88	3,295	98.19	0.12	0.12	0.00	0.00
11.00	0.99	3,882	98.23	0.12	0.12	0.00	0.00
11.20	1.22	4,577	98.29	0.13	0.13	0.00	0.00
11.40	1.55	5,481	98.36	0.13	0.13	0.00	0.00
11.60	2.33	6,707	98.45	0.14	0.14	0.00	0.00
11.80	5.38	9,333	98.65	0.15	0.15	0.00	0.00
12.00	**13.18**	15,156	99.07	0.18	0.18	0.00	0.00
12.20	**10.44**	25,639	99.72	0.46	0.46	0.00	0.00
12.40	5.81	30,844	100.01	0.79	0.79	0.00	0.00
12.60	2.67	33,196	100.13	0.89	0.89	0.00	0.00
12.80	2.12	34,238	100.18	0.93	0.93	0.00	0.00
13.00	1.73	34,946	100.22	0.96	0.95	0.00	0.00
13.20	1.52	35,405	100.24	0.98	0.97	0.01	0.00
13.40	1.42	35,753	100.26	0.99	0.98	0.01	0.00
13.60	1.32	36,018	100.28	1.01	0.99	0.02	0.00
13.80	1.22	36,203	100.29	1.02	0.99	0.02	0.00
14.00	1.11	36,309	100.29	1.02	1.00	0.02	0.00
14.20	1.05	**36,348**	**100.29**	**1.02**	**1.00**	**0.02**	0.00
14.40	1.00	**36,346**	**100.29**	**1.02**	**1.00**	**0.02**	0.00
14.60	0.95	36,310	100.29	1.02	1.00	0.02	0.00
14.80	0.90	36,241	100.29	1.02	1.00	0.02	0.00
15.00	0.85	36,139	100.28	1.01	0.99	0.02	0.00
15.20	0.80	36,005	100.27	1.01	0.99	0.02	0.00
15.40	0.75	35,840	100.27	1.00	0.98	0.02	0.00
15.60	0.70	35,645	100.26	0.99	0.98	0.01	0.00
15.80	0.65	35,421	100.24	0.98	0.97	0.01	0.00
16.00	0.60	35,169	100.23	0.97	0.96	0.01	0.00
16.20	0.56	34,895	100.22	0.95	0.95	0.00	0.00
16.40	0.54	34,611	100.20	0.94	0.94	0.00	0.00
16.60	0.52	34,320	100.19	0.93	0.93	0.00	0.00
16.80	0.50	34,021	100.17	0.92	0.92	0.00	0.00
17.00	0.48	33,715	100.16	0.91	0.91	0.00	0.00
17.20	0.46	33,401	100.14	0.90	0.90	0.00	0.00
17.40	0.43	33,080	100.12	0.88	0.88	0.00	0.00
17.60	0.41	32,752	100.11	0.87	0.87	0.00	0.00
17.80	0.39	32,418	100.09	0.86	0.86	0.00	0.00
18.00	0.37	32,078	100.07	0.84	0.84	0.00	0.00
18.20	0.35	31,735	100.05	0.83	0.83	0.00	0.00
18.40	0.35	31,396	100.04	0.81	0.81	0.00	0.00
18.60	0.34	31,063	100.02	0.80	0.80	0.00	0.00
18.80	0.33	30,735	100.00	0.79	0.79	0.00	0.00
19.00	0.33	30,413	99.98	0.77	0.77	0.00	0.00
19.20	0.32	30,098	99.97	0.75	0.75	0.00	0.00
19.40	0.31	29,789	99.95	0.74	0.74	0.00	0.00
19.60	0.31	29,485	99.93	0.72	0.72	0.00	0.00
19.80	0.30	29,188	99.92	0.71	0.71	0.00	0.00
20.00	0.29	28,898	99.90	0.69	0.69	0.00	0.00
20.20	0.29	28,616	99.89	0.68	0.68	0.00	0.00
20.40	0.28	28,343	99.87	0.66	0.66	0.00	0.00
20.60	0.28	28,077	99.86	0.64	0.64	0.00	0.00
20.80	0.27	27,819	99.84	0.63	0.63	0.00	0.00
21.00	0.27	27,568	99.83	0.61	0.61	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
21.20	0.26	27,326	99.82	0.59	0.59	0.00	0.00
21.40	0.26	27,093	99.80	0.58	0.58	0.00	0.00
21.60	0.25	26,869	99.79	0.56	0.56	0.00	0.00
21.80	0.25	26,653	99.78	0.54	0.54	0.00	0.00
22.00	0.24	26,446	99.77	0.53	0.53	0.00	0.00
22.20	0.24	26,247	99.75	0.51	0.51	0.00	0.00
22.40	0.23	26,055	99.74	0.50	0.50	0.00	0.00
22.60	0.23	25,870	99.73	0.48	0.48	0.00	0.00
22.80	0.22	25,691	99.72	0.47	0.47	0.00	0.00
23.00	0.22	25,518	99.71	0.46	0.46	0.00	0.00
23.20	0.21	25,350	99.70	0.44	0.44	0.00	0.00
23.40	0.21	25,188	99.69	0.43	0.43	0.00	0.00
23.60	0.20	25,031	99.69	0.42	0.42	0.00	0.00
23.80	0.20	24,878	99.68	0.41	0.41	0.00	0.00
24.00	0.19	24,728	99.67	0.40	0.40	0.00	0.00
24.20	0.00	24,502	99.66	0.38	0.38	0.00	0.00
24.40	0.00	24,235	99.64	0.36	0.36	0.00	0.00
24.60	0.00	23,982	99.63	0.34	0.34	0.00	0.00
24.80	0.00	23,739	99.61	0.33	0.33	0.00	0.00
25.00	0.00	23,506	99.60	0.32	0.32	0.00	0.00
25.20	0.00	23,282	99.58	0.30	0.30	0.00	0.00
25.40	0.00	23,068	99.57	0.29	0.29	0.00	0.00
25.60	0.00	22,862	99.56	0.28	0.28	0.00	0.00
25.80	0.00	22,664	99.55	0.27	0.27	0.00	0.00
26.00	0.00	22,474	99.54	0.26	0.26	0.00	0.00
26.20	0.00	22,291	99.53	0.25	0.25	0.00	0.00
26.40	0.00	22,112	99.51	0.25	0.25	0.00	0.00
26.60	0.00	21,937	99.50	0.24	0.24	0.00	0.00
26.80	0.00	21,766	99.49	0.24	0.24	0.00	0.00
27.00	0.00	21,598	99.48	0.23	0.23	0.00	0.00
27.20	0.00	21,434	99.47	0.23	0.23	0.00	0.00
27.40	0.00	21,273	99.46	0.22	0.22	0.00	0.00
27.60	0.00	21,116	99.45	0.22	0.22	0.00	0.00
27.80	0.00	20,962	99.44	0.21	0.21	0.00	0.00
28.00	0.00	20,811	99.44	0.21	0.21	0.00	0.00
28.20	0.00	20,663	99.43	0.21	0.21	0.00	0.00
28.40	0.00	20,515	99.42	0.20	0.20	0.00	0.00
28.60	0.00	20,368	99.41	0.20	0.20	0.00	0.00
28.80	0.00	20,222	99.40	0.20	0.20	0.00	0.00
29.00	0.00	20,076	99.39	0.20	0.20	0.00	0.00
29.20	0.00	19,930	99.38	0.20	0.20	0.00	0.00
29.40	0.00	19,785	99.37	0.20	0.20	0.00	0.00
29.60	0.00	19,641	99.36	0.20	0.20	0.00	0.00
29.80	0.00	19,496	99.35	0.20	0.20	0.00	0.00
30.00	0.00	19,352	99.34	0.20	0.20	0.00	0.00
30.20	0.00	19,208	99.34	0.20	0.20	0.00	0.00
30.40	0.00	19,065	99.33	0.20	0.20	0.00	0.00
30.60	0.00	18,922	99.32	0.20	0.20	0.00	0.00
30.80	0.00	18,780	99.31	0.20	0.20	0.00	0.00
31.00	0.00	18,638	99.30	0.20	0.20	0.00	0.00
31.20	0.00	18,496	99.29	0.20	0.20	0.00	0.00
31.40	0.00	18,355	99.28	0.20	0.20	0.00	0.00
31.60	0.00	18,214	99.27	0.20	0.20	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
31.80	0.00	18,073	99.26	0.20	0.20	0.00	0.00
32.00	0.00	17,933	99.25	0.19	0.19	0.00	0.00
32.20	0.00	17,793	99.24	0.19	0.19	0.00	0.00
32.40	0.00	17,653	99.24	0.19	0.19	0.00	0.00
32.60	0.00	17,514	99.23	0.19	0.19	0.00	0.00
32.80	0.00	17,376	99.22	0.19	0.19	0.00	0.00
33.00	0.00	17,237	99.21	0.19	0.19	0.00	0.00
33.20	0.00	17,100	99.20	0.19	0.19	0.00	0.00
33.40	0.00	16,962	99.19	0.19	0.19	0.00	0.00
33.60	0.00	16,825	99.18	0.19	0.19	0.00	0.00
33.80	0.00	16,688	99.17	0.19	0.19	0.00	0.00
34.00	0.00	16,552	99.16	0.19	0.19	0.00	0.00
34.20	0.00	16,416	99.15	0.19	0.19	0.00	0.00
34.40	0.00	16,281	99.14	0.19	0.19	0.00	0.00
34.60	0.00	16,145	99.13	0.19	0.19	0.00	0.00
34.80	0.00	16,011	99.13	0.19	0.19	0.00	0.00
35.00	0.00	15,876	99.12	0.19	0.19	0.00	0.00
35.20	0.00	15,743	99.11	0.19	0.19	0.00	0.00
35.40	0.00	15,609	99.10	0.19	0.19	0.00	0.00
35.60	0.00	15,476	99.09	0.18	0.18	0.00	0.00
35.80	0.00	15,343	99.08	0.18	0.18	0.00	0.00
36.00	0.00	15,211	99.07	0.18	0.18	0.00	0.00
36.20	0.00	15,079	99.06	0.18	0.18	0.00	0.00
36.40	0.00	14,948	99.05	0.18	0.18	0.00	0.00
36.60	0.00	14,817	99.04	0.18	0.18	0.00	0.00
36.80	0.00	14,686	99.03	0.18	0.18	0.00	0.00
37.00	0.00	14,556	99.03	0.18	0.18	0.00	0.00
37.20	0.00	14,426	99.02	0.18	0.18	0.00	0.00
37.40	0.00	14,296	99.01	0.18	0.18	0.00	0.00
37.60	0.00	14,167	99.00	0.18	0.18	0.00	0.00
37.80	0.00	14,039	98.99	0.18	0.18	0.00	0.00
38.00	0.00	13,911	98.98	0.18	0.18	0.00	0.00
38.20	0.00	13,783	98.97	0.18	0.18	0.00	0.00
38.40	0.00	13,656	98.96	0.18	0.18	0.00	0.00
38.60	0.00	13,529	98.95	0.18	0.18	0.00	0.00
38.80	0.00	13,402	98.94	0.18	0.18	0.00	0.00
39.00	0.00	13,276	98.94	0.17	0.17	0.00	0.00
39.20	0.00	13,150	98.93	0.17	0.17	0.00	0.00
39.40	0.00	13,025	98.92	0.17	0.17	0.00	0.00
39.60	0.00	12,900	98.91	0.17	0.17	0.00	0.00
39.80	0.00	12,776	98.90	0.17	0.17	0.00	0.00
40.00	0.00	12,652	98.89	0.17	0.17	0.00	0.00
40.20	0.00	12,529	98.88	0.17	0.17	0.00	0.00
40.40	0.00	12,406	98.87	0.17	0.17	0.00	0.00
40.60	0.00	12,283	98.86	0.17	0.17	0.00	0.00
40.80	0.00	12,161	98.86	0.17	0.17	0.00	0.00
41.00	0.00	12,039	98.85	0.17	0.17	0.00	0.00
41.20	0.00	11,917	98.84	0.17	0.17	0.00	0.00
41.40	0.00	11,796	98.83	0.17	0.17	0.00	0.00
41.60	0.00	11,676	98.82	0.17	0.17	0.00	0.00
41.80	0.00	11,556	98.81	0.17	0.17	0.00	0.00
42.00	0.00	11,436	98.80	0.17	0.17	0.00	0.00
42.20	0.00	11,317	98.79	0.17	0.17	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
42.40	0.00	11,198	98.79	0.16	0.16	0.00	0.00
42.60	0.00	11,080	98.78	0.16	0.16	0.00	0.00
42.80	0.00	10,962	98.77	0.16	0.16	0.00	0.00
43.00	0.00	10,844	98.76	0.16	0.16	0.00	0.00
43.20	0.00	10,727	98.75	0.16	0.16	0.00	0.00
43.40	0.00	10,611	98.74	0.16	0.16	0.00	0.00
43.60	0.00	10,494	98.73	0.16	0.16	0.00	0.00
43.80	0.00	10,379	98.73	0.16	0.16	0.00	0.00
44.00	0.00	10,263	98.72	0.16	0.16	0.00	0.00
44.20	0.00	10,148	98.71	0.16	0.16	0.00	0.00
44.40	0.00	10,034	98.70	0.16	0.16	0.00	0.00
44.60	0.00	9,920	98.69	0.16	0.16	0.00	0.00
44.80	0.00	9,806	98.68	0.16	0.16	0.00	0.00
45.00	0.00	9,693	98.68	0.16	0.16	0.00	0.00
45.20	0.00	9,580	98.67	0.16	0.16	0.00	0.00
45.40	0.00	9,468	98.66	0.16	0.16	0.00	0.00
45.60	0.00	9,356	98.65	0.16	0.16	0.00	0.00
45.80	0.00	9,245	98.64	0.15	0.15	0.00	0.00
46.00	0.00	9,134	98.63	0.15	0.15	0.00	0.00
46.20	0.00	9,023	98.63	0.15	0.15	0.00	0.00
46.40	0.00	8,913	98.62	0.15	0.15	0.00	0.00
46.60	0.00	8,803	98.61	0.15	0.15	0.00	0.00
46.80	0.00	8,694	98.60	0.15	0.15	0.00	0.00
47.00	0.00	8,585	98.59	0.15	0.15	0.00	0.00
47.20	0.00	8,477	98.59	0.15	0.15	0.00	0.00
47.40	0.00	8,369	98.58	0.15	0.15	0.00	0.00
47.60	0.00	8,262	98.57	0.15	0.15	0.00	0.00
47.80	0.00	8,155	98.56	0.15	0.15	0.00	0.00
48.00	0.00	8,048	98.55	0.15	0.15	0.00	0.00
48.20	0.00	7,942	98.55	0.15	0.15	0.00	0.00
48.40	0.00	7,836	98.54	0.15	0.15	0.00	0.00
48.60	0.00	7,731	98.53	0.15	0.15	0.00	0.00
48.80	0.00	7,626	98.52	0.15	0.15	0.00	0.00
49.00	0.00	7,522	98.51	0.14	0.14	0.00	0.00
49.20	0.00	7,418	98.51	0.14	0.14	0.00	0.00
49.40	0.00	7,315	98.50	0.14	0.14	0.00	0.00
49.60	0.00	7,212	98.49	0.14	0.14	0.00	0.00
49.80	0.00	7,109	98.48	0.14	0.14	0.00	0.00
50.00	0.00	7,007	98.47	0.14	0.14	0.00	0.00
50.20	0.00	6,906	98.47	0.14	0.14	0.00	0.00
50.40	0.00	6,805	98.46	0.14	0.14	0.00	0.00
50.60	0.00	6,704	98.45	0.14	0.14	0.00	0.00
50.80	0.00	6,604	98.44	0.14	0.14	0.00	0.00
51.00	0.00	6,504	98.44	0.14	0.14	0.00	0.00
51.20	0.00	6,404	98.43	0.14	0.14	0.00	0.00
51.40	0.00	6,305	98.42	0.14	0.14	0.00	0.00
51.60	0.00	6,207	98.41	0.14	0.14	0.00	0.00
51.80	0.00	6,109	98.41	0.14	0.14	0.00	0.00
52.00	0.00	6,012	98.40	0.14	0.14	0.00	0.00
52.20	0.00	5,914	98.39	0.13	0.13	0.00	0.00
52.40	0.00	5,818	98.38	0.13	0.13	0.00	0.00
52.60	0.00	5,722	98.38	0.13	0.13	0.00	0.00
52.80	0.00	5,626	98.37	0.13	0.13	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
53.00	0.00	5,531	98.36	0.13	0.13	0.00	0.00
53.20	0.00	5,436	98.35	0.13	0.13	0.00	0.00
53.40	0.00	5,341	98.35	0.13	0.13	0.00	0.00
53.60	0.00	5,248	98.34	0.13	0.13	0.00	0.00
53.80	0.00	5,154	98.33	0.13	0.13	0.00	0.00
54.00	0.00	5,061	98.33	0.13	0.13	0.00	0.00
54.20	0.00	4,969	98.32	0.13	0.13	0.00	0.00
54.40	0.00	4,877	98.31	0.13	0.13	0.00	0.00
54.60	0.00	4,785	98.30	0.13	0.13	0.00	0.00
54.80	0.00	4,694	98.30	0.13	0.13	0.00	0.00
55.00	0.00	4,603	98.29	0.13	0.13	0.00	0.00
55.20	0.00	4,513	98.28	0.12	0.12	0.00	0.00
55.40	0.00	4,424	98.28	0.12	0.12	0.00	0.00
55.60	0.00	4,334	98.27	0.12	0.12	0.00	0.00
55.80	0.00	4,245	98.26	0.12	0.12	0.00	0.00
56.00	0.00	4,157	98.25	0.12	0.12	0.00	0.00
56.20	0.00	4,069	98.25	0.12	0.12	0.00	0.00
56.40	0.00	3,982	98.24	0.12	0.12	0.00	0.00
56.60	0.00	3,895	98.23	0.12	0.12	0.00	0.00
56.80	0.00	3,808	98.23	0.12	0.12	0.00	0.00
57.00	0.00	3,723	98.22	0.12	0.12	0.00	0.00
57.20	0.00	3,637	98.21	0.12	0.12	0.00	0.00
57.40	0.00	3,552	98.21	0.12	0.12	0.00	0.00
57.60	0.00	3,467	98.20	0.12	0.12	0.00	0.00
57.80	0.00	3,383	98.19	0.12	0.12	0.00	0.00
58.00	0.00	3,300	98.19	0.12	0.12	0.00	0.00
58.20	0.00	3,217	98.18	0.12	0.12	0.00	0.00
58.40	0.00	3,134	98.17	0.11	0.11	0.00	0.00
58.60	0.00	3,052	98.17	0.11	0.11	0.00	0.00
58.80	0.00	2,970	98.16	0.11	0.11	0.00	0.00
59.00	0.00	2,888	98.15	0.11	0.11	0.00	0.00
59.20	0.00	2,808	98.15	0.11	0.11	0.00	0.00
59.40	0.00	2,727	98.14	0.11	0.11	0.00	0.00
59.60	0.00	2,647	98.14	0.11	0.11	0.00	0.00
59.80	0.00	2,568	98.13	0.11	0.11	0.00	0.00
60.00	0.00	2,489	98.12	0.11	0.11	0.00	0.00
60.20	0.00	2,411	98.12	0.11	0.11	0.00	0.00
60.40	0.00	2,333	98.11	0.11	0.11	0.00	0.00
60.60	0.00	2,255	98.10	0.11	0.11	0.00	0.00
60.80	0.00	2,178	98.10	0.11	0.11	0.00	0.00
61.00	0.00	2,102	98.09	0.11	0.11	0.00	0.00
61.20	0.00	2,026	98.09	0.11	0.11	0.00	0.00
61.40	0.00	1,950	98.08	0.10	0.10	0.00	0.00
61.60	0.00	1,875	98.07	0.10	0.10	0.00	0.00
61.80	0.00	1,800	98.07	0.10	0.10	0.00	0.00
62.00	0.00	1,726	98.06	0.10	0.10	0.00	0.00
62.20	0.00	1,653	98.06	0.10	0.10	0.00	0.00
62.40	0.00	1,579	98.05	0.10	0.10	0.00	0.00
62.60	0.00	1,507	98.04	0.10	0.10	0.00	0.00
62.80	0.00	1,435	98.04	0.10	0.10	0.00	0.00
63.00	0.00	1,363	98.03	0.10	0.10	0.00	0.00
63.20	0.00	1,292	98.03	0.10	0.10	0.00	0.00
63.40	0.00	1,221	98.02	0.10	0.10	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
63.60	0.00	1,150	98.01	0.10	0.10	0.00	0.00
63.80	0.00	1,081	98.01	0.10	0.10	0.00	0.00
64.00	0.00	1,011	98.00	0.10	0.10	0.00	0.00
64.20	0.00	942	98.00	0.10	0.10	0.00	0.00
64.40	0.00	874	97.99	0.09	0.09	0.00	0.00
64.60	0.00	806	97.99	0.09	0.09	0.00	0.00
64.80	0.00	739	97.98	0.09	0.09	0.00	0.00
65.00	0.00	672	97.98	0.09	0.09	0.00	0.00
65.20	0.00	605	97.97	0.09	0.09	0.00	0.00
65.40	0.00	539	97.96	0.09	0.09	0.00	0.00
65.60	0.00	474	97.96	0.09	0.09	0.00	0.00
65.80	0.00	409	97.95	0.09	0.09	0.00	0.00
66.00	0.00	344	97.95	0.09	0.09	0.00	0.00
66.20	0.00	280	97.94	0.09	0.09	0.00	0.00
66.40	0.00	217	97.94	0.09	0.09	0.00	0.00
66.60	0.00	154	97.93	0.09	0.09	0.00	0.00
66.80	0.00	91	97.93	0.09	0.09	0.00	0.00
67.00	0.00	29	97.92	0.09	0.09	0.00	0.00
67.20	0.00	0	97.60	0.00	0.00	0.00	0.00
67.40	0.00	0	97.60	0.00	0.00	0.00	0.00
67.60	0.00	0	97.60	0.00	0.00	0.00	0.00
67.80	0.00	0	97.60	0.00	0.00	0.00	0.00
68.00	0.00	0	97.60	0.00	0.00	0.00	0.00
68.20	0.00	0	97.60	0.00	0.00	0.00	0.00
68.40	0.00	0	97.60	0.00	0.00	0.00	0.00
68.60	0.00	0	97.60	0.00	0.00	0.00	0.00
68.80	0.00	0	97.60	0.00	0.00	0.00	0.00
69.00	0.00	0	97.60	0.00	0.00	0.00	0.00
69.20	0.00	0	97.60	0.00	0.00	0.00	0.00
69.40	0.00	0	97.60	0.00	0.00	0.00	0.00
69.60	0.00	0	97.60	0.00	0.00	0.00	0.00
69.80	0.00	0	97.60	0.00	0.00	0.00	0.00
70.00	0.00	0	97.60	0.00	0.00	0.00	0.00
70.20	0.00	0	97.60	0.00	0.00	0.00	0.00
70.40	0.00	0	97.60	0.00	0.00	0.00	0.00
70.60	0.00	0	97.60	0.00	0.00	0.00	0.00
70.80	0.00	0	97.60	0.00	0.00	0.00	0.00
71.00	0.00	0	97.60	0.00	0.00	0.00	0.00
71.20	0.00	0	97.60	0.00	0.00	0.00	0.00
71.40	0.00	0	97.60	0.00	0.00	0.00	0.00
71.60	0.00	0	97.60	0.00	0.00	0.00	0.00
71.80	0.00	0	97.60	0.00	0.00	0.00	0.00
72.00	0.00	0	97.60	0.00	0.00	0.00	0.00
72.20	0.00	0	97.60	0.00	0.00	0.00	0.00
72.40	0.00	0	97.60	0.00	0.00	0.00	0.00
72.60	0.00	0	97.60	0.00	0.00	0.00	0.00
72.80	0.00	0	97.60	0.00	0.00	0.00	0.00
73.00	0.00	0	97.60	0.00	0.00	0.00	0.00
73.20	0.00	0	97.60	0.00	0.00	0.00	0.00
73.40	0.00	0	97.60	0.00	0.00	0.00	0.00
73.60	0.00	0	97.60	0.00	0.00	0.00	0.00
73.80	0.00	0	97.60	0.00	0.00	0.00	0.00
74.00	0.00	0	97.60	0.00	0.00	0.00	0.00

Hydrograph for Pond 88P: Gravel Wetland #1 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
74.20	0.00	0	97.60	0.00	0.00	0.00	0.00
74.40	0.00	0	97.60	0.00	0.00	0.00	0.00
74.60	0.00	0	97.60	0.00	0.00	0.00	0.00
74.80	0.00	0	97.60	0.00	0.00	0.00	0.00
75.00	0.00	0	97.60	0.00	0.00	0.00	0.00
75.20	0.00	0	97.60	0.00	0.00	0.00	0.00
75.40	0.00	0	97.60	0.00	0.00	0.00	0.00
75.60	0.00	0	97.60	0.00	0.00	0.00	0.00
75.80	0.00	0	97.60	0.00	0.00	0.00	0.00
76.00	0.00	0	97.60	0.00	0.00	0.00	0.00
76.20	0.00	0	97.60	0.00	0.00	0.00	0.00
76.40	0.00	0	97.60	0.00	0.00	0.00	0.00
76.60	0.00	0	97.60	0.00	0.00	0.00	0.00
76.80	0.00	0	97.60	0.00	0.00	0.00	0.00
77.00	0.00	0	97.60	0.00	0.00	0.00	0.00
77.20	0.00	0	97.60	0.00	0.00	0.00	0.00
77.40	0.00	0	97.60	0.00	0.00	0.00	0.00
77.60	0.00	0	97.60	0.00	0.00	0.00	0.00
77.80	0.00	0	97.60	0.00	0.00	0.00	0.00
78.00	0.00	0	97.60	0.00	0.00	0.00	0.00
78.20	0.00	0	97.60	0.00	0.00	0.00	0.00
78.40	0.00	0	97.60	0.00	0.00	0.00	0.00
78.60	0.00	0	97.60	0.00	0.00	0.00	0.00
78.80	0.00	0	97.60	0.00	0.00	0.00	0.00
79.00	0.00	0	97.60	0.00	0.00	0.00	0.00
79.20	0.00	0	97.60	0.00	0.00	0.00	0.00
79.40	0.00	0	97.60	0.00	0.00	0.00	0.00
79.60	0.00	0	97.60	0.00	0.00	0.00	0.00
79.80	0.00	0	97.60	0.00	0.00	0.00	0.00
80.00	0.00	0	97.60	0.00	0.00	0.00	0.00

Hydrograph for Pond 5P: Gravel Wetland #2

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
0.00	0.00	0	95.14	0.00	0.00	0.00	**0.00**
0.20	0.00	0	95.14	0.00	0.00	0.00	0.00
0.40	0.00	0	95.14	0.00	0.00	0.00	0.00
0.60	0.00	0	95.14	0.00	0.00	0.00	0.00
0.80	0.00	0	95.14	0.00	0.00	0.00	0.00
1.00	0.00	0	95.14	0.00	0.00	0.00	0.00
1.20	0.00	0	95.14	0.00	0.00	0.00	0.00
1.40	0.00	0	95.14	0.00	0.00	0.00	0.00
1.60	0.00	0	95.14	0.00	0.00	0.00	0.00
1.80	0.00	0	95.14	0.00	0.00	0.00	0.00
2.00	0.00	0	95.14	0.00	0.00	0.00	0.00
2.20	0.00	0	95.14	0.00	0.00	0.00	0.00
2.40	0.00	0	95.14	0.00	0.00	0.00	0.00
2.60	0.00	0	95.14	0.00	0.00	0.00	0.00
2.80	0.00	0	95.14	0.00	0.00	0.00	0.00
3.00	0.00	0	95.14	0.00	0.00	0.00	0.00
3.20	0.00	0	95.14	0.00	0.00	0.00	0.00
3.40	0.00	0	95.14	0.00	0.00	0.00	0.00
3.60	0.00	0	95.14	0.00	0.00	0.00	0.00
3.80	0.00	0	95.14	0.00	0.00	0.00	0.00
4.00	0.00	0	95.14	0.00	0.00	0.00	0.00
4.20	0.00	0	95.14	0.00	0.00	0.00	0.00
4.40	0.00	0	95.14	0.00	0.00	0.00	0.00
4.60	0.00	0	95.14	0.00	0.00	0.00	0.00
4.80	0.00	0	97.98	0.00	0.00	0.00	0.00
5.00	0.00	0	98.00	0.00	0.00	0.00	0.00
5.20	0.01	0	98.01	0.01	0.01	0.00	0.00
5.40	0.01	0	98.03	0.01	0.01	0.00	0.00
5.60	0.02	0	98.04	0.02	0.02	0.00	0.00
5.80	0.02	0	98.05	0.02	0.02	0.00	0.00
6.00	0.03	0	98.06	0.03	0.03	0.00	0.00
6.20	0.03	0	98.07	0.03	0.03	0.00	0.00
6.40	0.04	0	98.08	0.04	0.04	0.00	0.00
6.60	0.04	0	98.10	0.04	0.04	0.00	0.00
6.80	0.05	0	98.14	0.05	0.05	0.00	0.00
7.00	0.06	0	98.20	0.06	0.06	0.00	0.00
7.20	0.07	0	98.27	0.07	0.07	0.00	0.00
7.40	0.08	2	98.30	0.07	0.07	0.00	0.00
7.60	0.09	9	98.30	0.07	0.07	0.00	0.00
7.80	0.10	24	98.30	0.07	0.07	0.00	0.00
8.00	0.11	47	98.31	0.07	0.07	0.00	0.00
8.20	0.12	78	98.31	0.07	0.07	0.00	0.00
8.40	0.14	121	98.32	0.07	0.07	0.00	0.00
8.60	0.16	178	98.33	0.07	0.07	0.00	0.00
8.80	0.18	248	98.34	0.08	0.08	0.00	0.00
9.00	0.21	335	98.35	0.08	0.08	0.00	0.00
9.20	0.23	437	98.37	0.08	0.08	0.00	0.00
9.40	0.26	556	98.38	0.08	0.08	0.00	0.00
9.60	0.29	693	98.40	0.08	0.08	0.00	0.00
9.80	0.31	848	98.43	0.08	0.08	0.00	0.00
10.00	0.34	1,022	98.45	0.09	0.09	0.00	0.00
10.20	0.38	1,218	98.48	0.09	0.09	0.00	0.00
10.40	0.43	1,447	98.51	0.09	0.09	0.00	0.00

Hydrograph for Pond 5P: Gravel Wetland #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
10.60	0.49	1,712	98.55	0.10	0.10	0.00	0.00
10.80	0.55	2,014	98.59	0.10	0.10	0.00	0.00
11.00	0.60	2,354	98.64	0.10	0.10	0.00	0.00
11.20	0.74	2,755	98.70	0.11	0.11	0.00	0.00
11.40	0.93	3,277	98.77	0.11	0.11	0.00	0.00
11.60	1.38	3,981	98.86	0.12	0.12	0.00	0.00
11.80	3.13	5,492	99.06	0.13	0.13	0.00	0.00
12.00	**7.47**	8,793	99.44	0.15	0.15	0.00	0.00
12.20	**5.78**	14,553	100.00	0.63	0.18	0.45	0.00
12.40	3.19	16,970	100.22	1.29	0.19	1.10	0.00
12.60	1.46	**17,574**	**100.27**	**1.48**	**0.19**	**1.29**	0.00
12.80	1.16	17,445	100.26	1.44	0.19	1.25	0.00
13.00	0.94	17,191	100.24	1.36	0.19	1.17	0.00
13.20	0.83	16,875	100.21	1.26	0.19	1.08	0.00
13.40	0.77	16,574	100.18	1.17	0.19	0.99	0.00
13.60	0.72	16,295	100.16	1.09	0.19	0.90	0.00
13.80	0.66	16,033	100.13	1.02	0.19	0.83	0.00
14.00	0.61	15,784	100.11	0.95	0.19	0.76	0.00
14.20	0.57	15,547	100.09	0.88	0.18	0.70	0.00
14.40	0.54	15,333	100.07	0.82	0.18	0.64	0.00
14.60	0.51	15,137	100.06	0.77	0.18	0.59	0.00
14.80	0.49	14,957	100.04	0.73	0.18	0.55	0.00
15.00	0.46	14,788	100.02	0.69	0.18	0.51	0.00
15.20	0.43	14,628	100.01	0.65	0.18	0.47	0.00
15.40	0.41	14,475	100.00	0.61	0.18	0.43	0.00
15.60	0.38	14,327	99.98	0.58	0.18	0.40	0.00
15.80	0.35	14,182	99.97	0.55	0.18	0.37	0.00
16.00	0.32	14,040	99.96	0.52	0.18	0.34	0.00
16.20	0.31	13,901	99.94	0.49	0.18	0.31	0.00
16.40	0.29	13,772	99.93	0.47	0.18	0.29	0.00
16.60	0.28	13,652	99.92	0.44	0.18	0.27	0.00
16.80	0.27	13,539	99.91	0.42	0.18	0.25	0.00
17.00	0.26	13,431	99.90	0.40	0.18	0.23	0.00
17.20	0.25	13,329	99.89	0.38	0.18	0.21	0.00
17.40	0.23	13,230	99.88	0.37	0.18	0.19	0.00
17.60	0.22	13,134	99.87	0.35	0.17	0.18	0.00
17.80	0.21	13,041	99.87	0.34	0.17	0.16	0.00
18.00	0.20	12,949	99.86	0.32	0.17	0.15	0.00
18.20	0.19	12,860	99.85	0.31	0.17	0.14	0.00
18.40	0.19	12,776	99.84	0.30	0.17	0.13	0.00
18.60	0.18	12,698	99.83	0.29	0.17	0.12	0.00
18.80	0.18	12,624	99.83	0.28	0.17	0.11	0.00
19.00	0.18	12,555	99.82	0.27	0.17	0.10	0.00
19.20	0.17	12,489	99.81	0.26	0.17	0.09	0.00
19.40	0.17	12,426	99.81	0.26	0.17	0.08	0.00
19.60	0.17	12,366	99.80	0.25	0.17	0.08	0.00
19.80	0.16	12,307	99.80	0.24	0.17	0.07	0.00
20.00	0.16	12,250	99.79	0.24	0.17	0.07	0.00
20.20	0.16	12,196	99.79	0.23	0.17	0.06	0.00
20.40	0.15	12,143	99.78	0.22	0.17	0.05	0.00
20.60	0.15	12,092	99.78	0.22	0.17	0.05	0.00
20.80	0.15	12,043	99.77	0.22	0.17	0.05	0.00
21.00	0.15	11,994	99.77	0.21	0.17	0.04	0.00

Hydrograph for Pond 5P: Gravel Wetland #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
21.20	0.14	11,946	99.76	0.21	0.17	0.04	0.00
21.40	0.14	11,899	99.76	0.20	0.17	0.04	0.00
21.60	0.14	11,853	99.75	0.20	0.17	0.03	0.00
21.80	0.13	11,807	99.75	0.20	0.17	0.03	0.00
22.00	0.13	11,762	99.74	0.19	0.17	0.03	0.00
22.20	0.13	11,717	99.74	0.19	0.17	0.02	0.00
22.40	0.13	11,673	99.74	0.19	0.17	0.02	0.00
22.60	0.12	11,628	99.73	0.19	0.17	0.02	0.00
22.80	0.12	11,583	99.73	0.18	0.17	0.02	0.00
23.00	0.12	11,537	99.72	0.18	0.17	0.01	0.00
23.20	0.12	11,491	99.72	0.18	0.17	0.01	0.00
23.40	0.11	11,445	99.71	0.18	0.17	0.01	0.00
23.60	0.11	11,398	99.71	0.18	0.17	0.01	0.00
23.80	0.11	11,351	99.70	0.17	0.17	0.01	0.00
24.00	0.10	11,303	99.70	0.17	0.17	0.00	0.00
24.20	0.00	11,210	99.69	0.17	0.17	0.00	0.00
24.40	0.00	11,090	99.68	0.17	0.17	0.00	0.00
24.60	0.00	10,971	99.67	0.17	0.17	0.00	0.00
24.80	0.00	10,852	99.65	0.16	0.16	0.00	0.00
25.00	0.00	10,734	99.64	0.16	0.16	0.00	0.00
25.20	0.00	10,616	99.63	0.16	0.16	0.00	0.00
25.40	0.00	10,499	99.62	0.16	0.16	0.00	0.00
25.60	0.00	10,382	99.61	0.16	0.16	0.00	0.00
25.80	0.00	10,265	99.60	0.16	0.16	0.00	0.00
26.00	0.00	10,149	99.58	0.16	0.16	0.00	0.00
26.20	0.00	10,033	99.57	0.16	0.16	0.00	0.00
26.40	0.00	9,918	99.56	0.16	0.16	0.00	0.00
26.60	0.00	9,803	99.55	0.16	0.16	0.00	0.00
26.80	0.00	9,689	99.54	0.16	0.16	0.00	0.00
27.00	0.00	9,575	99.52	0.16	0.16	0.00	0.00
27.20	0.00	9,461	99.51	0.16	0.16	0.00	0.00
27.40	0.00	9,348	99.50	0.16	0.16	0.00	0.00
27.60	0.00	9,236	99.49	0.16	0.16	0.00	0.00
27.80	0.00	9,124	99.48	0.16	0.16	0.00	0.00
28.00	0.00	9,012	99.46	0.15	0.15	0.00	0.00
28.20	0.00	8,901	99.45	0.15	0.15	0.00	0.00
28.40	0.00	8,790	99.44	0.15	0.15	0.00	0.00
28.60	0.00	8,679	99.43	0.15	0.15	0.00	0.00
28.80	0.00	8,570	99.42	0.15	0.15	0.00	0.00
29.00	0.00	8,460	99.40	0.15	0.15	0.00	0.00
29.20	0.00	8,351	99.39	0.15	0.15	0.00	0.00
29.40	0.00	8,243	99.38	0.15	0.15	0.00	0.00
29.60	0.00	8,134	99.37	0.15	0.15	0.00	0.00
29.80	0.00	8,027	99.36	0.15	0.15	0.00	0.00
30.00	0.00	7,920	99.34	0.15	0.15	0.00	0.00
30.20	0.00	7,813	99.33	0.15	0.15	0.00	0.00
30.40	0.00	7,707	99.32	0.15	0.15	0.00	0.00
30.60	0.00	7,601	99.31	0.15	0.15	0.00	0.00
30.80	0.00	7,496	99.30	0.15	0.15	0.00	0.00
31.00	0.00	7,391	99.29	0.15	0.15	0.00	0.00
31.20	0.00	7,287	99.27	0.14	0.14	0.00	0.00
31.40	0.00	7,183	99.26	0.14	0.14	0.00	0.00
31.60	0.00	7,080	99.25	0.14	0.14	0.00	0.00

Hydrograph for Pond 5P: Gravel Wetland #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
31.80	0.00	6,977	99.24	0.14	0.14	0.00	0.00
32.00	0.00	6,874	99.23	0.14	0.14	0.00	0.00
32.20	0.00	6,772	99.21	0.14	0.14	0.00	0.00
32.40	0.00	6,671	99.20	0.14	0.14	0.00	0.00
32.60	0.00	6,570	99.19	0.14	0.14	0.00	0.00
32.80	0.00	6,470	99.18	0.14	0.14	0.00	0.00
33.00	0.00	6,370	99.17	0.14	0.14	0.00	0.00
33.20	0.00	6,270	99.15	0.14	0.14	0.00	0.00
33.40	0.00	6,172	99.14	0.14	0.14	0.00	0.00
33.60	0.00	6,073	99.13	0.14	0.14	0.00	0.00
33.80	0.00	5,975	99.12	0.14	0.14	0.00	0.00
34.00	0.00	5,878	99.11	0.13	0.13	0.00	0.00
34.20	0.00	5,781	99.09	0.13	0.13	0.00	0.00
34.40	0.00	5,685	99.08	0.13	0.13	0.00	0.00
34.60	0.00	5,589	99.07	0.13	0.13	0.00	0.00
34.80	0.00	5,494	99.06	0.13	0.13	0.00	0.00
35.00	0.00	5,399	99.05	0.13	0.13	0.00	0.00
35.20	0.00	5,305	99.03	0.13	0.13	0.00	0.00
35.40	0.00	5,211	99.02	0.13	0.13	0.00	0.00
35.60	0.00	5,118	99.01	0.13	0.13	0.00	0.00
35.80	0.00	5,025	99.00	0.13	0.13	0.00	0.00
36.00	0.00	4,933	98.99	0.13	0.13	0.00	0.00
36.20	0.00	4,842	98.97	0.13	0.13	0.00	0.00
36.40	0.00	4,751	98.96	0.13	0.13	0.00	0.00
36.60	0.00	4,660	98.95	0.13	0.13	0.00	0.00
36.80	0.00	4,570	98.94	0.12	0.12	0.00	0.00
37.00	0.00	4,481	98.93	0.12	0.12	0.00	0.00
37.20	0.00	4,392	98.92	0.12	0.12	0.00	0.00
37.40	0.00	4,304	98.90	0.12	0.12	0.00	0.00
37.60	0.00	4,216	98.89	0.12	0.12	0.00	0.00
37.80	0.00	4,129	98.88	0.12	0.12	0.00	0.00
38.00	0.00	4,042	98.87	0.12	0.12	0.00	0.00
38.20	0.00	3,956	98.86	0.12	0.12	0.00	0.00
38.40	0.00	3,871	98.85	0.12	0.12	0.00	0.00
38.60	0.00	3,786	98.84	0.12	0.12	0.00	0.00
38.80	0.00	3,701	98.82	0.12	0.12	0.00	0.00
39.00	0.00	3,618	98.81	0.12	0.12	0.00	0.00
39.20	0.00	3,534	98.80	0.12	0.12	0.00	0.00
39.40	0.00	3,452	98.79	0.11	0.11	0.00	0.00
39.60	0.00	3,370	98.78	0.11	0.11	0.00	0.00
39.80	0.00	3,288	98.77	0.11	0.11	0.00	0.00
40.00	0.00	3,207	98.76	0.11	0.11	0.00	0.00
40.20	0.00	3,127	98.75	0.11	0.11	0.00	0.00
40.40	0.00	3,047	98.74	0.11	0.11	0.00	0.00
40.60	0.00	2,967	98.73	0.11	0.11	0.00	0.00
40.80	0.00	2,889	98.71	0.11	0.11	0.00	0.00
41.00	0.00	2,811	98.70	0.11	0.11	0.00	0.00
41.20	0.00	2,733	98.69	0.11	0.11	0.00	0.00
41.40	0.00	2,656	98.68	0.11	0.11	0.00	0.00
41.60	0.00	2,580	98.67	0.11	0.11	0.00	0.00
41.80	0.00	2,504	98.66	0.10	0.10	0.00	0.00
42.00	0.00	2,428	98.65	0.10	0.10	0.00	0.00
42.20	0.00	2,354	98.64	0.10	0.10	0.00	0.00

Hydrograph for Pond 5P: Gravel Wetland #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
42.40	0.00	2,280	98.63	0.10	0.10	0.00	0.00
42.60	0.00	2,206	98.62	0.10	0.10	0.00	0.00
42.80	0.00	2,133	98.61	0.10	0.10	0.00	0.00
43.00	0.00	2,061	98.60	0.10	0.10	0.00	0.00
43.20	0.00	1,989	98.59	0.10	0.10	0.00	0.00
43.40	0.00	1,918	98.58	0.10	0.10	0.00	0.00
43.60	0.00	1,847	98.57	0.10	0.10	0.00	0.00
43.80	0.00	1,777	98.56	0.10	0.10	0.00	0.00
44.00	0.00	1,708	98.55	0.10	0.10	0.00	0.00
44.20	0.00	1,639	98.54	0.10	0.10	0.00	0.00
44.40	0.00	1,571	98.53	0.09	0.09	0.00	0.00
44.60	0.00	1,503	98.52	0.09	0.09	0.00	0.00
44.80	0.00	1,436	98.51	0.09	0.09	0.00	0.00
45.00	0.00	1,370	98.50	0.09	0.09	0.00	0.00
45.20	0.00	1,304	98.49	0.09	0.09	0.00	0.00
45.40	0.00	1,239	98.48	0.09	0.09	0.00	0.00
45.60	0.00	1,175	98.47	0.09	0.09	0.00	0.00
45.80	0.00	1,111	98.46	0.09	0.09	0.00	0.00
46.00	0.00	1,047	98.45	0.09	0.09	0.00	0.00
46.20	0.00	984	98.45	0.09	0.09	0.00	0.00
46.40	0.00	922	98.44	0.09	0.09	0.00	0.00
46.60	0.00	861	98.43	0.09	0.09	0.00	0.00
46.80	0.00	800	98.42	0.08	0.08	0.00	0.00
47.00	0.00	740	98.41	0.08	0.08	0.00	0.00
47.20	0.00	680	98.40	0.08	0.08	0.00	0.00
47.40	0.00	621	98.39	0.08	0.08	0.00	0.00
47.60	0.00	562	98.38	0.08	0.08	0.00	0.00
47.80	0.00	504	98.38	0.08	0.08	0.00	0.00
48.00	0.00	447	98.37	0.08	0.08	0.00	0.00
48.20	0.00	391	98.36	0.08	0.08	0.00	0.00
48.40	0.00	335	98.35	0.08	0.08	0.00	0.00
48.60	0.00	279	98.34	0.08	0.08	0.00	0.00
48.80	0.00	225	98.33	0.08	0.08	0.00	0.00
49.00	0.00	170	98.33	0.07	0.07	0.00	0.00
49.20	0.00	117	98.32	0.07	0.07	0.00	0.00
49.40	0.00	64	98.31	0.07	0.07	0.00	0.00
49.60	0.00	12	98.30	0.07	0.07	0.00	0.00
49.80	0.00	0	97.98	0.00	0.00	0.00	0.00
50.00	0.00	0	97.98	0.00	0.00	0.00	0.00
50.20	0.00	0	97.98	0.00	0.00	0.00	0.00
50.40	0.00	0	97.98	0.00	0.00	0.00	0.00
50.60	0.00	0	97.98	0.00	0.00	0.00	0.00
50.80	0.00	0	97.98	0.00	0.00	0.00	0.00
51.00	0.00	0	97.98	0.00	0.00	0.00	0.00
51.20	0.00	0	97.98	0.00	0.00	0.00	0.00
51.40	0.00	0	97.98	0.00	0.00	0.00	0.00
51.60	0.00	0	97.98	0.00	0.00	0.00	0.00
51.80	0.00	0	97.98	0.00	0.00	0.00	0.00
52.00	0.00	0	97.98	0.00	0.00	0.00	0.00
52.20	0.00	0	97.98	0.00	0.00	0.00	0.00
52.40	0.00	0	97.98	0.00	0.00	0.00	0.00
52.60	0.00	0	97.98	0.00	0.00	0.00	0.00
52.80	0.00	0	97.98	0.00	0.00	0.00	0.00

Hydrograph for Pond 5P: Gravel Wetland #2 (continued)

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
53.00	0.00	0	97.98	0.00	0.00	0.00	0.00

ATTACHMENT C

PIPE CAPACITY CALCULATIONS

Project Description

File Name	3831 CB Analysis.SPF

Project Options

Flow Units	CFS
Elevation Type	Elevation
Hydrology Method	Rational
Time of Concentration (TOC) Method	SCS TR-55
Link Routing Method	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	Jul 27, 2017	00:00:00
End Analysis On	Jul 28, 2017	00:00:00
Start Reporting On	Jul 27, 2017	00:00:00
Antecedent Dry Days	0	days
Runoff (Dry Weather) Time Step	0 01:00:00	days hh:mm:ss
Runoff (Wet Weather) Time Step	0 00:05:00	days hh:mm:ss
Reporting Time Step	0 00:05:00	days hh:mm:ss
Routing Time Step	30	seconds

Number of Elements

	Qty
Rain Gages	0
Subbasins	67
Nodes	86
Junctions	5
Outfalls	14
Flow Diversions	0
Inlets	67
Storage Nodes	0
Links	72
Channels	0
Pipes	72
Pumps	0
Orifices	0
Weirs	0
Outlets	0
Pollutants	0
Land Uses	0

Rainfall Details

Return Period	50 year(s)

Subbasin Summary

SN	Subbasin ID	Area (ft²)	Weighted Runoff Coefficient	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	Sub-CB1	12191.49	0.8000	0.61	0.49	0.14	1.64	0 00:05:00
2	Sub-CB2	5191.66	0.7300	0.61	0.45	0.05	0.64	0 00:05:00
3	Sub-CB8	3613.26	0.7400	0.61	0.45	0.04	0.45	0 00:05:00
4	Sub-to-47	15715.97	0.0000	0.61	0.00	0.00	0.00	0 00:05:00
5	Sub-to-CB10	6599.21	0.5900	0.61	0.36	0.05	0.65	0 00:05:00
6	Sub-to-CB11	8642.96	0.6800	0.61	0.41	0.08	0.99	0 00:05:00
7	Sub-to-CB12	9447.77	0.7700	0.61	0.47	0.10	1.22	0 00:05:00
8	Sub-to-CB13	25505.60	0.7200	0.61	0.44	0.26	3.08	0 00:05:00
9	Sub-to-CB14	24284.26	0.4200	0.61	0.26	0.14	1.71	0 00:05:00
10	Sub-to-CB15	5174.58	0.6400	0.61	0.39	0.05	0.56	0 00:05:00
11	Sub-to-CB16	7053.24	0.7100	0.61	0.43	0.07	0.84	0 00:05:00
12	Sub-to-CB17	6134.86	0.8200	0.61	0.50	0.07	0.84	0 00:05:00
13	Sub-to-CB18	5327.13	0.7300	0.61	0.45	0.05	0.65	0 00:05:00
14	Sub-to-CB19	12501.37	0.7500	0.61	0.46	0.13	1.57	0 00:05:00
15	Sub-to-CB20	19900.60	0.7100	0.61	0.43	0.20	2.37	0 00:05:00
16	Sub-to-CB21	28465.24	0.6800	0.61	0.41	0.27	3.25	0 00:05:00
17	Sub-to-CB22	9249.92	0.2700	0.61	0.16	0.03	0.42	0 00:05:00
18	Sub-to-CB23	25755.50	0.8300	0.61	0.51	0.30	3.59	0 00:05:00
19	Sub-to-CB24	12311.84	0.7700	0.61	0.47	0.13	1.59	0 00:05:00
20	Sub-to-CB26	11608.74	0.7500	0.61	0.46	0.12	1.46	0 00:05:00
21	Sub-to-CB27	8884.50	0.6200	0.61	0.38	0.08	0.92	0 00:05:00
22	Sub-to-CB28	12887.62	0.7400	0.61	0.45	0.13	1.60	0 00:05:00
23	Sub-to-CB29	18358.32	0.7500	0.61	0.46	0.19	2.31	0 00:05:00
24	Sub-to-CB3	3149.61	0.8500	0.61	0.52	0.04	0.45	0 00:05:00
25	Sub-to-CB30	11256.91	0.7300	0.61	0.45	0.11	1.38	0 00:05:00
26	Sub-to-CB31	6933.88	0.8100	0.61	0.49	0.08	0.94	0 00:05:00
27	Sub-to-CB32	14367.35	0.3400	0.61	0.21	0.07	0.82	0 00:05:00
28	Sub-to-CB33	8821.29	0.6300	0.61	0.38	0.08	0.93	0 00:05:00
29	Sub-to-CB34	36279.08	0.7300	0.61	0.45	0.37	4.44	0 00:05:00
30	Sub-to-CB35	6950.04	0.7600	0.61	0.46	0.07	0.89	0 00:05:00
31	Sub-to-CB36	25892.19	0.1900	0.61	0.12	0.07	0.83	0 00:05:00
32	Sub-to-CB37	10071.81	0.7500	0.61	0.46	0.11	1.27	0 00:05:00
33	Sub-to-CB38	13963.51	0.5000	0.61	0.31	0.10	1.17	0 00:05:00
34	Sub-to-CB39	14870.77	0.7300	0.61	0.45	0.15	1.82	0 00:05:00
35	Sub-to-CB4	6348.87	0.6900	0.61	0.42	0.06	0.74	0 00:05:00
36	Sub-to-CB40	17324.03	0.7500	0.61	0.46	0.18	2.18	0 00:05:00
37	Sub-to-CB41	11122.04	0.6500	0.61	0.40	0.10	1.21	0 00:05:00
38	Sub-to-CB42	6558.70	0.7400	0.61	0.45	0.07	0.81	0 00:05:00
39	Sub-to-CB43	8368.40	0.8500	0.61	0.52	0.10	1.19	0 00:05:00
40	Sub-to-CB44	695.39	0.8500	0.61	0.52	0.01	0.10	0 00:05:00
41	Sub-to-CB45	1142.06	0.7500	0.61	0.46	0.01	0.14	0 00:05:00
42	Sub-to-CB46	5721.61	0.7800	0.61	0.48	0.06	0.75	0 00:05:00
43	Sub-to-CB48	5728.62	0.7000	0.61	0.43	0.06	0.67	0 00:05:00
44	Sub-to-CB49	13801.90	0.7500	0.61	0.46	0.14	1.74	0 00:05:00
45	Sub-to-CB5	25877.95	0.7800	0.61	0.48	0.28	3.39	0 00:05:00
46	Sub-to-CB50	10331.17	0.7200	0.61	0.44	0.10	1.25	0 00:05:00
47	Sub-to-CB51	4247.93	0.8200	0.61	0.50	0.05	0.59	0 00:05:00
48	Sub-to-CB52	3763.71	0.7600	0.61	0.46	0.04	0.48	0 00:05:00
49	Sub-to-CB53	52051.93	0.1800	0.61	0.11	0.13	1.57	0 00:05:00
50	Sub-to-CB54	16141.29	0.7700	0.61	0.47	0.17	2.09	0 00:05:00
51	Sub-to-CB55	5060.93	0.6400	0.61	0.39	0.05	0.54	0 00:05:00
52	Sub-to-CB56	23156.71	0.7200	0.61	0.44	0.23	2.80	0 00:05:00
53	Sub-to-CB57	6404.45	0.6700	0.61	0.41	0.06	0.72	0 00:05:00
54	Sub-to-CB58	16765.76	0.7800	0.61	0.48	0.18	2.20	0 00:05:00
55	Sub-to-CB59	8285.07	0.6800	0.61	0.41	0.08	0.95	0 00:05:00
56	Sub-to-CB6	13701.28	0.8000	0.61	0.49	0.15	1.84	0 00:05:00
57	Sub-to-CB60	4703.17	0.5900	0.61	0.36	0.04	0.47	0 00:05:00
58	Sub-to-CB61	21199.87	0.6900	0.61	0.42	0.20	2.46	0 00:05:00
59	Sub-to-CB62	29673.42	0.7300	0.61	0.45	0.30	3.64	0 00:05:00
60	Sub-to-CB63	12337.28	0.7600	0.61	0.46	0.13	1.57	0 00:05:00
61	Sub-to-CB64	28285.82	0.7400	0.61	0.45	0.29	3.51	0 00:05:00
62	Sub-to-CB7	17692.29	0.7100	0.61	0.43	0.18	2.11	0 00:05:00
63	Sub-to-CB9	3066.14	0.6900	0.61	0.42	0.03	0.36	0 00:05:00
64	Sub-to-CBA	6703.93	0.6700	0.61	0.41	0.06	0.75	0 00:05:00
65	Sub-to-CBB	5543.23	0.5600	0.61	0.34	0.04	0.52	0 00:05:00
66	Sub-to-CBC	11177.67	0.6900	0.61	0.42	0.11	1.29	0 00:05:00
67	Sub-to-help-CB34	5566.45	0.7600	0.61	0.46	0.06	0.71	0 00:05:00

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft²)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	DMH-1	Junction	100.66	104.50	0.00	0.00	0.00	4.03	101.74	0.00	2.76	0 00:00	0.00	0.00
2	DMH-2	Junction	100.76	106.25	0.00	0.00	0.00	6.30	102.11	0.00	4.14	0 00:00	0.00	0.00
3	DMH-7	Junction	98.46	109.90	0.00	0.00	0.00	21.21	100.43	0.00	9.47	0 00:00	0.00	0.00
4	DMH-8	Junction	99.43	103.81	0.00	0.00	0.00	2.49	100.21	0.00	3.60	0 00:00	0.00	0.00
5	DMH-9	Junction	100.80	105.17	0.00	6.00	0.00	4.92	101.84	0.00	3.33	0 00:00	0.00	0.00
6	to-GUSF1	Outfall	100.60					6.29	101.65					
7	to-GUSF2	Outfall	101.48					5.27	102.32					
8	to-GUSF3	Outfall	100.40					4.00	101.26					
9	to-GUSF4	Outfall	99.90					2.42	100.23					
10	to-GUSF-4	Outfall	99.90					1.81	100.22					
11	to-GUSF5	Outfall	101.43					3.63	102.33					
12	to-GUSF6	Outfall	99.20					1.56	99.66					
13	to-GUSF-6	Outfall	99.20					2.46	99.85					
14	to-GUSF7	Outfall	99.20					3.30	99.98					
15	to-GUSF8	Outfall	100.36					4.79	101.24					
16	to-GUSF9	Outfall	96.66					8.62	97.65					
17	to-GW#1	Outfall	97.93					21.21	99.50					
18	to-GW2	Outfall	98.31					12.93	99.38					
19	Wetland	Outfall	105.75					0.73	106.08					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length (ft)	Inlet Invert Elevation (ft)	Outlet Invert Elevation (ft)	Average Slope (%)	Diameter or Height (in)	Manning's Roughness	Peak Flow (cfs)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Reported Condition
1	CB10-to-CB11	Pipe	CB-10	CB-11	139.00	100.57	100.01	0.4000	24.000	0.0130	7.41	14.36	0.52	3.54	1.28	0.64	0.00	Calculated
2	CB11-to-CB12	Pipe	CB-11	CB-12	71.00	99.91	99.63	0.3900	24.000	0.0130	8.48	14.21	0.60	3.62	1.40	0.70	0.00	Calculated
3	CB12-to-CB13	Pipe	CB-12	CB-13	79.00	99.53	99.21	0.4100	24.000	0.0130	9.39	14.40	0.65	4.29	1.34	0.67	0.00	Calculated
4	CB13-to-GW2	Pipe	CB-13	to-GW2	77.00	99.11	98.31	1.0400	24.000	0.0130	12.93	23.06	0.56	6.56	1.20	0.60	0.00	Calculated
5	CB14-to-CB13	Pipe	CB-14	CB-13	84.00	99.75	99.21	0.6400	15.000	0.0130	1.51	5.18	0.29	2.35	0.98	0.79	0.00	Calculated
6	CB15-to-CB11	Pipe	CB-15	CB-11	18.00	100.60	100.45	0.8300	12.000	0.0130	0.48	3.25	0.15	2.42	0.83	0.83	0.00	Calculated
7	CB16-to-CB10	Pipe	CB-16	CB-10	26.00	101.40	101.04	1.3800	18.000	0.0130	6.52	12.36	0.53	5.81	0.91	0.61	0.00	Calculated
8	CB17-to-CB16	Pipe	CB-17	CB-16	128.00	102.16	101.50	0.5200	15.000	0.0130	1.43	4.64	0.31	2.11	0.71	0.57	0.00	Calculated
9	CB18-to-CB17	Pipe	CB-18	CB-17	18.00	102.35	102.26	0.5000	12.000	0.0130	0.64	2.52	0.25	2.21	0.40	0.40	0.00	Calculated
10	CB19-to-CB20	Pipe	CB-19	CB-20	153.00	102.79	102.01	0.5100	15.000	0.0130	1.55	4.61	0.34	2.77	0.59	0.47	0.00	Calculated
11	CB1-to-CB2	Pipe	CB-1	CB-2	14.00	102.37	102.20	1.2100	12.000	0.0130	1.62	3.93	0.41	3.99	0.51	0.51	0.00	Calculated
12	CB21-to-DMH2	Pipe	CB-21	DMH-2	34.00	101.04	100.86	0.5300	18.000	0.0130	6.30	7.64	0.82	3.78	1.35	0.90	0.00	Calculated
13	CB22-to-CB24	Pipe	CB-22	CB-24	113.00	103.07	102.49	0.5100	15.000	0.0130	0.40	4.63	0.09	1.41	0.35	0.28	0.00	Calculated
14	CB23-to-GUSF2	Pipe	CB-23	to-GUSF2	23.00	101.64	101.48	0.7000	18.000	0.0130	5.27	8.76	0.60	4.37	0.97	0.65	0.00	Calculated
15	CB24-to-CB23	Pipe	CB-24	CB-23	129.00	102.39	101.74	0.5000	15.000	0.0130	1.86	4.59	0.41	2.35	0.78	0.62	0.00	Calculated
16	CB26-to-DMH7	Pipe	CB-26	DMH-7	48.00	98.80	98.56	0.5000	30.000	0.0130	21.21	29.00	0.73	4.93	2.05	0.82	0.00	Calculated
17	CB27-to-CB26	Pipe	CB-27	CB-26	23.00	99.04	98.90	0.6100	30.000	0.0130	7.63	32.00	0.24	2.44	2.09	0.83	0.00	Calculated
18	CB28-to-CB27	Pipe	CB-28	CB-27	118.00	99.74	99.14	0.5100	24.000	0.0130	6.46	16.13	0.40	3.30	1.70	0.85	0.00	Calculated
19	CB29-to-CB28	Pipe	CB-29	CB-28	103.00	100.36	99.84	0.5000	24.000	0.0130	5.58	16.07	0.35	3.57	1.14	0.57	0.00	Calculated
20	CB2-to-GUSF4	Pipe	CB-2	to-GUSF4	37.00	102.10	99.90	5.9500	15.000	0.0130	2.42	15.75	0.15	8.26	0.36	0.29	0.00	Calculated
21	CB30-to-CB29	Pipe	CB-30	CB-29	69.00	100.81	100.46	0.5100	15.000	0.0130	2.21	4.60	0.48	2.68	0.79	0.64	0.00	Calculated
22	CB31-to-CB30	Pipe	CB-31	CB-30	52.00	101.46	100.91	1.0600	15.000	0.0130	0.93	6.64	0.14	2.28	0.47	0.38	0.00	Calculated
23	CB32-to-CB26	Pipe	CB-32	CB-26	50.00	103.05	102.54	1.0200	15.000	0.0130	1.71	6.52	0.26	4.08	0.47	0.38	0.00	Calculated
24	CB33-to-CB32	Pipe	CB-33	CB-32	95.00	106.80	103.15	3.8400	12.000	0.0130	0.92	6.98	0.13	4.31	0.32	0.32	0.00	Calculated
25	CB34HELP-to-CB26	Pipe	CB-34-HELP	CB-26	157.00	99.58	98.90	0.4300	30.000	0.0130	11.37	26.99	0.42	3.02	1.90	0.76	0.00	Calculated
26	CB34-to-CB34HELP	Pipe	CB-34	CB-34-HELP	37.00	99.86	99.68	0.4900	24.000	0.0130	11.20	15.78	0.71	4.52	1.66	0.83	0.00	Calculated
27	CB35-to-CB34	Pipe	CB-35	CB-34	207.00	101.00	99.96	0.5000	18.000	0.0130	5.66	7.45	0.76	3.49	1.39	0.92	0.00	Calculated
28	CB36-to-CB35	Pipe	CB-36	CB-35	139.00	101.80	101.10	0.5000	15.000	0.0130	0.89	4.58	0.19	1.79	0.83	0.67	0.00	Calculated
29	CB37-to-CB34	Pipe	CB-37	CB-34	117.00	106.61	106.00	0.5200	15.000	0.0130	2.23	4.66	0.48	3.58	0.63	0.51	0.00	Calculated
30	CB38-to-CB37	Pipe	CB-38	CB-37	112.00	107.25	106.71	0.4800	15.000	0.0130	1.15	4.49	0.26	2.49	0.50	0.40	0.00	Calculated
31	CB39-to-GUSF4	Pipe	CB-39	to-GUSF-4	39.00	101.90	99.90	5.1300	12.000	0.0130	1.81	8.07	0.22	7.47	0.35	0.35	0.00	Calculated
32	CB3-to-CB4	Pipe	CB-3	CB-4	30.00	101.83	101.68	0.5000	15.000	0.0130	0.41	4.57	0.09	1.80	0.48	0.38	0.00	Calculated
33	CB40-to-CB35	Pipe	CB-40	CB-35	127.00	103.13	102.50	0.5000	18.000	0.0130	4.87	7.40	0.66	4.24	0.93	0.62	0.00	Calculated
34	CB41-to-CB40	Pipe	CB-41	CB-40	94.00	103.70	103.23	0.5000	15.000	0.0130	3.01	4.57	0.66	3.23	0.89	0.71	0.00	Calculated
35	CB42-CB41	Pipe	CB-42	CB-41	61.00	104.11	103.80	0.5100	15.000	0.0130	1.93	4.61	0.42	2.64	0.72	0.58	0.00	Calculated
36	CB43-CB42	Pipe	CB-43	CB-42	15.00	104.30	104.21	0.6000	15.000	0.0130	1.17	5.00	0.23	2.26	0.58	0.46	0.00	Calculated
37	CB44-to-CB45	Pipe	CB-44	CB-45	14.00	109.07	108.90	1.2100	12.000	0.0130	0.10	3.93	0.02	1.90	0.12	0.12	0.00	Calculated
38	CB45-to-CB2	Pipe	CB-45	CB-2	243.00	108.80	102.20	2.7200	12.000	0.0130	0.22	5.87	0.04	2.62	0.21	0.21	0.00	Calculated
39	CB46-to-CB47	Pipe	CB-46	CB-47	14.00	106.27	106.20	0.5000	12.000	0.0130	0.74	2.52	0.29	2.50	0.40	0.40	0.00	Calculated
40	CB47-to-Wetland	Pipe	CB-47	Wetland	63.00	106.10	105.75	0.5600	15.000	0.0130	0.73	4.81	0.15	2.68	0.34	0.28	0.00	Calculated
41	CB48-to-CB16	Pipe	CB-48	CB-16	30.00	101.70	101.50	0.6700	18.000	0.0130	4.41	8.58	0.51	3.54	1.00	0.67	0.00	Calculated
42	CB49-to-CB48	Pipe	CB-49	CB-48	57.00	102.69	101.80	1.5600	18.000	0.0130	3.84	13.13	0.29	4.01	0.80	0.53	0.00	Calculated
43	CB4-to-CB5	Pipe	CB-4	CB-5	93.00	101.58	101.12	0.4900	15.000	0.0130	1.13	4.54	0.25	1.62	0.84	0.68	0.00	Calculated
44	CB50-to-CB49	Pipe	CB-50	CB-49	18.00	102.88	102.79	0.5000	12.000	0.0130	1.23	2.52	0.49	2.56	0.59	0.59	0.00	Calculated
45	CB51-to-CB49	Pipe	CB-51	CB-49	218.00	104.72	102.79	0.8900	15.000	0.0130	1.00	6.08	0.16	2.55	0.45	0.36	0.00	Calculated
46	CB52-to-CB51	Pipe	CB-52	CB-51	20.00	105.00	104.82	0.9000	12.000	0.0130	0.47	3.38	0.14	2.73	0.27	0.27	0.00	Calculated
47	CB53-to-GUSF6	Pipe	CB-53	to-GUSF6	39.00	99.40	99.20	0.5100	18.000	0.0130	1.56	7.52	0.21	3.02	0.50	0.33	0.00	Calculated
48	CB54-to-DMH8	Pipe	CB-54	DMH-8	48.00	99.77	99.53	0.5000	15.000	0.0130	2.49	4.57	0.54	3.34	0.73	0.59	0.00	Calculated
49	CB55-to-CB54	Pipe	CB-55	CB-54	76.00	100.27	99.87	0.5300	12.000	0.0130	0.51	2.58	0.20	1.39	0.51	0.51	0.00	Calculated
50	CB56-to-GUSF7	Pipe	CB-56	to-GUSF7	67.00	99.54	99.20	0.5100	15.000	0.0130	3.30	4.60	0.72	3.67	0.86	0.69	0.00	Calculated
51	CB57-to-CB56	Pipe	CB-57	CB-56	73.00	100.01	99.64	0.5100	12.000	0.0130	0.70	2.54	0.28	1.46	0.68	0.68	0.00	Calculated
52	CB58-to-GUSF9	Pipe	CB-58	to-GUSF9	79.00	97.13	96.66	0.5900	24.000	0.0130	8.62	17.45	0.49	4.92	1.09	0.55	0.00	Calculated
53	CB59-to-CB58	Pipe	CB-59	CB-58	82.00	97.64	97.23	0.5000	18.000	0.0130	6.69	7.43	0.90	4.35	1.23	0.82	0.00	Calculated
54	CB5-to-DMH1	Pipe	CB-5	DMH-1	51.00	101.02	100.76	0.5100	15.000	0.0130	4.03	4.61	0.87	3.66	1.06	0.85	0.00	Calculated
55	CB60-to-CB59	Pipe	CB-60	CB-59	74.00	98.11	97.74	0.5000	15.000	0.0130	0.53	4.57	0.12	1.08	1.09	0.88	0.00	Calculated
56	CB61-to-CB59	Pipe	CB-61	CB-59	81.00	98.15	97.74	0.5100	18.000	0.0130	5.66	7.47	0.76	3.68	1.26	0.84	0.00	Calculated
57	CB62-to-CB61	Pipe	CB-62	CB-61	87.00	98.69	98.25	0.5100	15.000	0.0130	3.47	4.59	0.76	3.07	1.10	0.88	0.00	Calculated
58	CB63-to-DMH9	Pipe	CB-63	DMH-9	38.00	101.09	100.90	0.5000	15.000	0.0130	1.50	4.57	0.33	2.00	0.86	0.69	0.00	Calculated
59	CB64-to-DMH9	Pipe	CB-64	DMH-9	85.00	101.33	100.90	0.5100	15.000	0.0130	3.42	4.59	0.75	3.44	0.95	0.76	0.00	Calculated
60	CB6-to-CB7	Pipe	CB6	CB7	88.00	102.26	101.80	0.5200	15.000	0.0130	1.69	4.67	0.36	2.21	0.81	0.65	0.00	Calculated
61	CB7-to-GUSF5	Pipe	CB7	to-GUSF5	65.00	101.70	101.43	0.4200	15.000	0.0130	3.63	4.16	0.87	3.47	0.99	0.80	0.00	Calculated
62	CB8-to-CB9	Pipe	CB-8	CB-9	18.00	101.54	101.45	0.5000	12.000	0.0130	0.44	2.52	0.17	2.21	0.35	0.35	0.00	Calculated
63	CB9-to-CB10	Pipe	CB-9	CB-10	124.00	101.29	100.67	0.5000	15.000	0.0130	0.73	4.57	0.16	1.58	0.82	0.66	0.00	Calculated
64	CBA-to-CB27	Pipe	CB-A	CB-27	67.00	103.90	103.23	1.0000	12.000	0.0130	0.73	3.56	0.20	3.38	0.32	0.32	0.00	Calculated
65	CBB-to-CB28	Pipe	CB-B	CB-28	52.00	103.20	102.68	1.0000	12.000	0.0130	0.51	3.56	0.14	3.04	0.26	0.26	0.00	Calculated
66	CBC-to-CB29	Pipe	CB-C	CB-29	106.00	102.41	101.35	1.0000	12.000	0.0130	1.24	3.56	0.35	3.94	0.42	0.42	0.00	Calculated
67	DMH1-to-GUSF3	Pipe	DMH-1	to-GUSF3	45.00	100.66	100.40	0.5800	15.000	0.0130	4.00	4.91	0.81	3.92	0.97	0.77	0.00	Calculated
68	DMH7-to-GW1	Pipe	DMH-7	to-GW#1	102.00	98.46	97.93	0.5200	30.000	0.0130	21.21	29.57	0.72	5.72	1.77	0.71	0.00	Calculated
69	DMH8-to-GUSF6	Pipe	DMH-8	to-GUSF-6	46.00	99.43	99.20	0.5000	15.000	0.0130	2.46	4.57	0.54	3.38	0.72	0.57	0.00	Calculated
70	DMH9-to-GUSF8	Pipe	DMH-9	to-GUSF8	88.00	100.80	100.36	0.5000	18.000	0.0130	4.79	7.43	0.64	4.04	0.96	0.64	0.00	Calculated
71	Link:CB20-CB21	Pipe	CB-20	CB-21	150.00	101.91	101.14	0.5100	18.000	0.0130	3.41	7.53	0.45	2.74	1.07	0.71	0.00	Calculated
72	Link-DMH2-GUSF1	Pipe	DMH-2	to-GUSF1	31.00	100.76	100.60	0.5200	18.000	0.0130	6.29	7.55	0.83	4.15	1.20	0.80	0.00	Calculated

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	CB10-to-CB11	139.00	100.57	0.00	100.01	0.10	0.56	0.4000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
2	CB11-to-CB12	71.00	99.91	0.00	99.63	0.10	0.28	0.3900	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
3	CB12-to-CB13	79.00	99.53	0.00	99.21	0.10	0.32	0.4100	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
4	CB13-to-GW2	77.00	99.11	0.00	98.31	0.00	0.80	1.0400	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
5	CB14-to-CB13	84.00	99.75	0.00	99.21	0.10	0.54	0.6400	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
6	CB15-to-CB11	18.00	100.60	0.00	100.45	0.54	0.15	0.8300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
7	CB16-to-CB10	26.00	101.40	0.00	101.04	0.47	0.36	1.3800	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
8	CB17-to-CB16	128.00	102.16	0.00	101.50	0.10	0.66	0.5200	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
9	CB18-to-CB17	18.00	102.35	0.00	102.26	0.10	0.09	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
10	CB19-to-CB20	153.00	102.79	0.00	102.01	0.10	0.78	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
11	CB1-to-CB2	14.00	102.37	0.00	102.20	0.10	0.17	1.2100	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
12	CB21-to-DMH2	34.00	101.04	0.00	100.86	0.10	0.18	0.5300	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
13	CB22-to-CB24	113.00	103.07	0.00	102.49	0.10	0.58	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
14	CB23-to-GUSF2	23.00	101.64	0.00	101.48	0.00	0.16	0.7000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
15	CB24-to-CB23	129.00	102.39	0.00	101.74	0.10	0.65	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
16	CB26-to-DMH7	48.00	98.80	0.00	98.56	0.10	0.24	0.5000	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
17	CB27-to-CB26	23.00	99.04	0.00	98.90	0.10	0.14	0.6100	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
18	CB28-to-CB27	118.00	99.74	0.00	99.14	0.10	0.60	0.5100	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
19	CB29-to-CB28	103.00	100.36	0.00	99.84	0.10	0.52	0.5000	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
20	CB2-to-GUSF4	37.00	102.10	0.00	99.90	0.00	2.20	5.9500	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
21	CB30-to-CB29	69.00	100.81	0.00	100.46	0.10	0.35	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
22	CB31-to-CB30	52.00	101.46	0.00	100.91	0.10	0.55	1.0600	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
23	CB32-to-CB26	50.00	103.05	0.00	102.54	3.74	0.51	1.0200	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
24	CB33-to-CB32	95.00	106.80	0.00	103.15	0.10	3.65	3.8400	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
25	CB34HELP-to-CB26	157.00	99.58	0.00	98.90	0.10	0.68	0.4300	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
26	CB34-to-CB34HELP	37.00	99.86	0.00	99.68	0.10	0.18	0.4900	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
27	CB35-to-CB34	207.00	101.00	0.00	99.96	0.10	1.04	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
28	CB36-to-CB35	139.00	101.80	0.00	101.10	0.10	0.70	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
29	CB37-to-CB34	117.00	106.61	0.00	106.00	6.14	0.61	0.5200	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
30	CB38-to-CB37	112.00	107.25	0.00	106.71	0.10	0.54	0.4800	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
31	CB39-to-GUSF4	39.00	101.90	0.00	99.90	0.00	2.00	5.1300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
32	CB3-to-CB4	30.00	101.83	0.00	101.68	0.10	0.15	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
33	CB40-to-CB35	127.00	103.13	0.00	102.50	1.50	0.63	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
34	CB41-to-CB40	94.00	103.70	0.00	103.23	0.10	0.47	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
35	CB42-CB41	61.00	104.11	0.00	103.80	0.10	0.31	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
36	CB43-CB42	15.00	104.30	0.00	104.21	0.10	0.09	0.6000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
37	CB44-to-CB45	14.00	109.07	0.00	108.90	0.10	0.17	1.2100	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
38	CB45-to-CB2	243.00	108.80	0.00	102.20	0.10	6.60	2.7200	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
39	CB46-to-CB47	14.00	106.27	0.00	106.20	0.10	0.07	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
40	CB47-to-Wetland	63.00	106.10	0.00	105.75	0.00	0.35	0.5600	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
41	CB48-to-CB16	30.00	101.70	0.00	101.50	0.10	0.20	0.6700	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
42	CB49-to-CB48	57.00	102.69	0.00	101.80	0.10	0.89	1.5600	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
43	CB4-to-CB5	93.00	101.58	0.00	101.12	0.10	0.46	0.4900	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
44	CB50-to-CB49	18.00	102.88	0.00	102.79	0.10	0.09	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
45	CB51-to-CB49	218.00	104.72	0.00	102.79	0.10	1.93	0.8900	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
46	CB52-to-CB51	20.00	105.00	0.00	104.82	0.10	0.18	0.9000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
47	CB53-to-GUSF6	39.00	99.40	0.00	99.20	0.00	0.20	0.5100	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
48	CB54-to-DMH8	48.00	99.77	0.00	99.53	0.10	0.24	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
49	CB55-to-CB54	76.00	100.27	0.00	99.87	0.10	0.40	0.5300	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
50	CB56-to-GUSF7	67.00	99.54	0.00	99.20	0.00	0.34	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
51	CB57-to-CB56	73.00	100.01	0.00	99.64	0.10	0.37	0.5100	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
52	CB58-to-GUSF9	79.00	97.13	0.00	96.66	0.00	0.47	0.5900	CIRCULAR	24.000	24.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
53	CB59-to-CB58	82.00	97.64	0.00	97.23	0.10	0.41	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
54	CB5-to-DMH1	51.00	101.02	0.00	100.76	0.10	0.26	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
55	CB60-to-CB59	74.00	98.11	0.00	97.74	0.10	0.37	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
56	CB61-to-CB59	81.00	98.15	0.00	97.74	0.10	0.41	0.5100	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
57	CB62-to-CB61	87.00	98.69	0.00	98.25	0.10	0.44	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
58	CB63-to-DMH9	38.00	101.09	0.00	100.90	0.10	0.19	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
59	CB64-to-DMH9	85.00	101.33	0.00	100.90	0.10	0.43	0.5100	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
60	CB6-to-CB7	88.00	102.26	0.00	101.80	0.10	0.46	0.5200	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
61	CB7-to-GUSF5	65.00	101.70	0.00	101.43	0.00	0.27	0.4200	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
62	CB8-to-CB9	18.00	101.54	0.00	101.45	0.16	0.09	0.5000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
63	CB9-to-CB10	124.00	101.29	0.00	100.67	0.10	0.62	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
64	CBA-to-CB27	67.00	103.90	0.00	103.23	4.19	0.67	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
65	CBB-to-CB28	52.00	103.20	0.00	102.68	2.94	0.52	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
66	CBC-to-CB29	106.00	102.41	0.00	101.35	0.99	1.06	1.0000	CIRCULAR	12.000	12.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
67	DMH1-to-GUSF3	45.00	100.66	0.00	100.40	0.00	0.26	0.5800	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
68	DMH7-to-GW1	102.00	98.46	0.00	97.93	0.00	0.53	0.5200	CIRCULAR	30.000	30.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
69	DMH8-to-GUSF6	46.00	99.43	0.00	99.20	0.00	0.23	0.5000	CIRCULAR	15.000	15.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
70	DMH9-to-GUSF8	88.00	100.80	0.00	100.36	0.00	0.44	0.5000	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
71	Link:CB20-CB21	150.00	101.91	0.00	101.14	0.10	0.77	0.5100	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1
72	Link-DMH2-GUSF1	31.00	100.76	0.00	100.60	0.00	0.16	0.5200	CIRCULAR	18.000	18.000	0.0130	0.5000	0.5000	0.0000	0.00	No	1

Pipe Results

SN	Element ID	Peak Flow (cfs)	Time of Peak Flow Occurrence (days hh:mm)	Design Flow Capacity (cfs)	Peak Flow/ Design Flow Ratio	Peak Flow Velocity (ft/sec)	Travel Time (min)	Peak Flow Depth (ft)	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged (min)	Froude Number	Reported Condition
1	CB10-to-CB11	7.41	0 00:06	14.36	0.52	3.54	0.65	1.28	0.64	0.00		Calculated
2	CB11-to-CB12	8.48	0 00:06	14.21	0.60	3.62	0.33	1.40	0.70	0.00		Calculated
3	CB12-to-CB13	9.39	0 00:06	14.40	0.65	4.29	0.31	1.34	0.67	0.00		Calculated
4	CB13-to-GW2	12.93	0 00:06	23.06	0.56	6.56	0.20	1.20	0.60	0.00		Calculated
5	CB14-to-CB13	1.51	0 00:05	5.18	0.29	2.35	0.60	0.98	0.79	0.00		Calculated
6	CB15-to-CB11	0.48	0 00:05	3.25	0.15	2.42	0.12	0.83	0.83	0.00		Calculated
7	CB16-to-CB10	6.52	0 00:05	12.36	0.53	5.81	0.07	0.91	0.61	0.00		Calculated
8	CB17-to-CB16	1.43	0 00:05	4.64	0.31	2.11	1.01	0.71	0.57	0.00		Calculated
9	CB18-to-CB17	0.64	0 00:05	2.52	0.25	2.21	0.14	0.40	0.40	0.00		Calculated
10	CB19-to-CB20	1.55	0 00:05	4.61	0.34	2.77	0.92	0.59	0.47	0.00		Calculated
11	CB1-to-CB2	1.62	0 00:05	3.93	0.41	3.99	0.06	0.51	0.51	0.00		Calculated
12	CB21-to-DMH2	6.30	0 00:05	7.64	0.82	3.78	0.15	1.35	0.90	0.00		Calculated
13	CB22-to-CB24	0.40	0 00:05	4.63	0.09	1.41	1.34	0.35	0.28	0.00		Calculated
14	CB23-to-GUSF2	5.27	0 00:05	8.76	0.60	4.37	0.09	0.97	0.65	0.00		Calculated
15	CB24-to-CB23	1.86	0 00:05	4.59	0.41	2.35	0.91	0.78	0.62	0.00		Calculated
16	CB26-to-DMH7	21.21	0 00:06	29.00	0.73	4.93	0.16	2.05	0.82	0.00		Calculated
17	CB27-to-CB26	7.63	0 00:06	32.00	0.24	2.44	0.16	2.09	0.83	0.00		Calculated
18	CB28-to-CB27	6.46	0 00:06	16.13	0.40	3.30	0.60	1.70	0.85	0.00		Calculated
19	CB29-to-CB28	5.58	0 00:05	16.07	0.35	3.57	0.48	1.14	0.57	0.00		Calculated
20	CB2-to-GUSF4	2.42	0 00:05	15.75	0.15	8.26	0.07	0.36	0.29	0.00		Calculated
21	CB30-to-CB29	2.21	0 00:05	4.60	0.48	2.68	0.43	0.79	0.64	0.00		Calculated
22	CB31-to-CB30	0.93	0 00:05	6.64	0.14	2.28	0.38	0.47	0.38	0.00		Calculated
23	CB32-to-CB26	1.71	0 00:05	6.52	0.26	4.08	0.20	0.47	0.38	0.00		Calculated
24	CB33-to-CB32	0.92	0 00:05	6.98	0.13	4.31	0.37	0.32	0.32	0.00		Calculated
25	CB34HELP-to-CB26	11.37	0 00:06	26.99	0.42	3.02	0.87	1.90	0.76	0.00		Calculated
26	CB34-to-CB34HELP	11.20	0 00:06	15.78	0.71	4.52	0.14	1.66	0.83	0.00		Calculated
27	CB35-to-CB34	5.66	0 00:07	7.45	0.76	3.49	0.99	1.39	0.92	0.00		Calculated
28	CB36-to-CB35	0.89	0 00:07	4.58	0.19	1.79	1.29	0.83	0.67	0.00		Calculated
29	CB37-to-CB34	2.23	0 00:05	4.66	0.48	3.58	0.54	0.63	0.51	0.00		Calculated
30	CB38-to-CB37	1.15	0 00:05	4.49	0.26	2.49	0.75	0.50	0.40	0.00		Calculated
31	CB39-to-GUSF4	1.81	0 00:05	8.07	0.22	7.47	0.09	0.35	0.35	0.00		Calculated
32	CB3-to-CB4	0.41	0 00:06	4.57	0.09	1.80	0.28	0.48	0.38	0.00		Calculated
33	CB40-to-CB35	4.87	0 00:06	7.40	0.66	4.24	0.50	0.93	0.62	0.00		Calculated
34	CB41-to-CB40	3.01	0 00:05	4.57	0.66	3.23	0.49	0.89	0.71	0.00		Calculated
35	CB42-CB41	1.93	0 00:05	4.61	0.42	2.64	0.39	0.72	0.58	0.00		Calculated
36	CB43-CB42	1.17	0 00:05	5.00	0.23	2.26	0.11	0.58	0.46	0.00		Calculated
37	CB44-to-CB45	0.10	0 00:05	3.93	0.02	1.90	0.12	0.12	0.12	0.00		Calculated
38	CB45-to-CB2	0.22	0 00:05	5.87	0.04	2.62	1.55	0.21	0.21	0.00		Calculated
39	CB46-to-CB47	0.74	0 00:05	2.52	0.29	2.50	0.09	0.40	0.40	0.00		Calculated
40	CB47-to-Wetland	0.73	0 00:05	4.81	0.15	2.68	0.39	0.34	0.28	0.00		Calculated
41	CB48-to-CB16	4.41	0 00:05	8.58	0.51	3.54	0.14	1.00	0.67	0.00		Calculated
42	CB49-to-CB48	3.84	0 00:05	13.13	0.29	4.01	0.24	0.80	0.53	0.00		Calculated
43	CB4-to-CB5	1.13	0 00:06	4.54	0.25	1.62	0.96	0.84	0.68	0.00		Calculated
44	CB50-to-CB49	1.23	0 00:05	2.52	0.49	2.56	0.12	0.59	0.59	0.00		Calculated
45	CB51-to-CB49	1.00	0 00:05	6.08	0.16	2.55	1.42	0.45	0.36	0.00		Calculated
46	CB52-to-CB51	0.47	0 00:05	3.38	0.14	2.73	0.12	0.27	0.27	0.00		Calculated
47	CB53-to-GUSF6	1.56	0 00:05	7.52	0.21	3.02	0.22	0.50	0.33	0.00		Calculated
48	CB54-to-DMH8	2.49	0 00:05	4.57	0.54	3.34	0.24	0.73	0.59	0.00		Calculated
49	CB55-to-CB54	0.51	0 00:06	2.58	0.20	1.39	0.91	0.51	0.51	0.00		Calculated
50	CB56-to-GUSF7	3.30	0 00:05	4.60	0.72	3.67	0.30	0.86	0.69	0.00		Calculated
51	CB57-to-CB56	0.70	0 00:05	2.54	0.28	1.46	0.83	0.68	0.68	0.00		Calculated
52	CB58-to-GUSF9	8.62	0 00:05	17.45	0.49	4.92	0.27	1.09	0.55	0.00		Calculated
53	CB59-to-CB58	6.69	0 00:06	7.43	0.90	4.35	0.31	1.23	0.82	0.00		Calculated
54	CB5-to-DMH1	4.03	0 00:05	4.61	0.87	3.66	0.23	1.06	0.85	0.00		Calculated
55	CB60-to-CB59	0.53	0 00:06	4.57	0.12	1.08	1.14	1.09	0.88	0.00		Calculated
56	CB61-to-CB59	5.66	0 00:05	7.47	0.76	3.68	0.37	1.26	0.84	0.00		Calculated
57	CB62-to-CB61	3.47	0 00:05	4.59	0.76	3.07	0.47	1.10	0.88	0.00		Calculated
58	CB63-to-DMH9	1.50	0 00:05	4.57	0.33	2.00	0.32	0.86	0.69	0.00		Calculated
59	CB64-to-DMH9	3.42	0 00:05	4.59	0.75	3.44	0.41	0.95	0.76	0.00		Calculated
60	CB6-to-CB7	1.69	0 00:05	4.67	0.36	2.21	0.66	0.81	0.65	0.00		Calculated
61	CB7-to-GUSF5	3.63	0 00:05	4.16	0.87	3.47	0.31	0.99	0.80	0.00		Calculated
62	CB8-to-CB9	0.44	0 00:05	2.52	0.17	2.21	0.14	0.35	0.35	0.00		Calculated
63	CB9-to-CB10	0.73	0 00:07	4.57	0.16	1.58	1.31	0.82	0.66	0.00		Calculated
64	CBA-to-CB27	0.73	0 00:05	3.56	0.20	3.38	0.33	0.32	0.32	0.00		Calculated
65	CBB-to-CB28	0.51	0 00:05	3.56	0.14	3.04	0.29	0.26	0.26	0.00		Calculated
66	CBC-to-CB29	1.24	0 00:05	3.56	0.35	3.94	0.45	0.42	0.42	0.00		Calculated
67	DMH1-to-GUSF3	4.00	0 00:05	4.91	0.81	3.92	0.19	0.97	0.77	0.00		Calculated
68	DMH7-to-GW1	21.21	0 00:06	29.57	0.72	5.72	0.30	1.77	0.71	0.00		Calculated
69	DMH8-to-GUSF6	2.46	0 00:05	4.57	0.54	3.38	0.23	0.72	0.57	0.00		Calculated
70	DMH9-to-GUSF8	4.79	0 00:05	7.43	0.64	4.04	0.36	0.96	0.64	0.00		Calculated
71	Link:CB20-CB21	3.41	0 00:06	7.53	0.45	2.74	0.91	1.07	0.71	0.00		Calculated
72	Link-DMH2-GUSF1	6.29	0 00:05	7.55	0.83	4.15	0.12	1.20	0.80	0.00		Calculated

Inlet Input

SN	Element ID	Inlet Manufacturer	Manufacturer Part Number	Inlet Location	Number of Inlets	Catchbasin Invert Elevation (ft)	Max (Rim) Elevation (ft)	Inlet Depth (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Ponded Area (ft²)	Grate Clogging Factor (%)
1	CB-1	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.37	106.21	3.84	102.37	0.00	1.00	0.00
2	CB-10	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.57	105.55	4.98	100.57	0.00	1.00	0.00
3	CB-11	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.91	104.20	4.29	99.91	0.00	1.00	0.00
4	CB-12	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.53	104.65	5.12	99.53	0.00	1.00	0.00
5	CB-13	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.11	104.20	5.09	99.11	0.00	1.00	0.00
6	CB-14	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.75	103.50	3.75	99.75	0.00	1.00	0.00
7	CB-15	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.60	104.20	3.60	100.60	0.00	1.00	0.00
8	CB-16	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.40	105.50	4.10	101.40	0.00	1.00	0.00
9	CB-17	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.16	105.35	3.19	102.16	0.00	1.00	0.00
10	CB-18	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.35	105.35	3.00	102.35	0.00	1.00	0.00
11	CB-19	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.79	108.95	6.16	102.79	0.00	1.00	0.00
12	CB-2	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.10	106.21	4.11	102.10	0.00	1.00	0.00
13	CB-20	NEENAH FOUNDRY	R-3405-A	On Sag	2	101.91	106.05	4.14	101.91	0.00	1.00	0.00
14	CB-21	NEENAH FOUNDRY	R-3405-A	On Sag	2	101.04	105.55	4.51	101.04	0.00	1.00	0.00
15	CB-22	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.07	108.25	5.18	103.07	0.00	1.00	0.00
16	CB-23	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.64	105.50	3.86	101.64	0.00	1.00	0.00
17	CB-24	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.39	106.76	4.37	102.39	0.00	1.00	0.00
18	CB-26	NEENAH FOUNDRY	R-3405-A	On Sag	1	98.80	108.80	10.00	98.80	0.00	1.00	0.00
19	CB-27	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.04	108.50	9.46	99.04	0.00	1.00	0.00
20	CB-28	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.74	107.50	7.76	99.74	0.00	1.00	0.00
21	CB-29	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.36	106.50	6.14	100.36	0.00	1.00	0.00
22	CB-3	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.83	107.00	5.17	101.83	0.00	1.00	0.00
23	CB-30	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.81	104.95	4.14	100.81	0.00	1.00	0.00
24	CB-31	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.46	105.50	4.04	101.46	0.00	1.00	0.00
25	CB-32	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.05	106.90	3.85	103.05	0.00	1.00	0.00
26	CB-33	NEENAH FOUNDRY	R-3405-A	On Sag	1	106.80	111.07	4.27	106.80	0.00	1.00	0.00
27	CB-34	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.86	110.27	10.41	99.86	0.00	1.00	0.00
28	CB-34-HELP	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.58	110.10	10.52	99.58	0.00	1.00	0.00
29	CB-35	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.00	110.95	9.95	101.00	0.00	1.00	0.00
30	CB-36	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.80	105.60	3.80	101.80	0.00	1.00	0.00
31	CB-37	NEENAH FOUNDRY	R-3405-A	On Sag	1	106.61	112.40	5.79	106.61	0.00	1.00	0.00
32	CB-38	NEENAH FOUNDRY	R-3405-A	On Sag	1	107.25	111.25	4.00	107.25	0.00	1.00	0.00
33	CB-39	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.90	110.25	8.35	101.90	0.00	1.00	0.00
34	CB-4	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.58	107.00	5.42	101.58	0.00	1.00	0.00
35	CB-40	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.13	110.45	7.32	103.13	0.00	1.00	0.00
36	CB-41	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.70	108.80	5.10	103.70	0.00	1.00	0.00
37	CB-42	NEENAH FOUNDRY	R-3405-A	On Sag	1	104.11	108.06	3.95	104.11	0.00	1.00	0.00
38	CB-43	NEENAH FOUNDRY	R-3405-A	On Sag	1	104.30	108.06	3.76	104.30	0.00	1.00	0.00
39	CB-44	NEENAH FOUNDRY	R-3405-A	On Sag	1	109.07	112.81	3.74	109.07	0.00	1.00	0.00
40	CB-45	NEENAH FOUNDRY	R-3405-A	On Sag	1	108.80	112.81	4.01	108.80	0.00	1.00	0.00
41	CB-46	NEENAH FOUNDRY	R-3405-A	On Sag	1	106.27	109.52	3.25	106.27	0.00	1.00	0.00
42	CB-47	NEENAH FOUNDRY	R-3405-A	On Sag	1	106.10	109.52	3.42	106.10	0.00	1.00	0.00
43	CB-48	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.70	105.80	4.10	101.70	0.00	1.00	0.00
44	CB-49	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.69	106.38	3.69	102.69	0.00	1.00	0.00
45	CB-5	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.02	105.35	4.33	101.02	0.00	1.00	0.00
46	CB-50	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.88	106.38	3.50	102.88	0.00	1.00	0.00
47	CB-51	NEENAH FOUNDRY	R-3405-A	On Sag	1	104.72	108.50	3.78	104.72	0.00	1.00	0.00
48	CB-52	NEENAH FOUNDRY	R-3405-A	On Sag	1	105.00	108.60	3.60	105.00	0.00	1.00	0.00
49	CB-53	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.40	103.40	4.00	99.40	0.00	1.00	0.00
50	CB-54	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.77	104.07	4.30	99.77	0.00	1.00	0.00
51	CB-55	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.27	104.25	3.98	100.27	0.00	1.00	0.00
52	CB-56	NEENAH FOUNDRY	R-3405-A	On Sag	1	99.54	103.73	4.19	99.54	0.00	1.00	0.00
53	CB-57	NEENAH FOUNDRY	R-3405-A	On Sag	1	100.01	105.03	5.02	100.01	0.00	1.00	0.00
54	CB-58	NEENAH FOUNDRY	R-3405-A	On Sag	1	97.13	100.96	3.83	97.13	0.00	1.00	0.00
55	CB-59	NEENAH FOUNDRY	R-3405-A	On Sag	1	97.64	101.72	4.08	97.64	0.00	1.00	0.00
56	CB6	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.26	107.14	4.88	102.26	0.00	1.00	0.00
57	CB-60	NEENAH FOUNDRY	R-3405-A	On Sag	1	98.11	101.85	3.74	98.11	0.00	1.00	0.00
58	CB-61	NEENAH FOUNDRY	R-3405-A	On Sag	1	98.15	101.86	3.71	98.15	0.00	1.00	0.00
59	CB-62	NEENAH FOUNDRY	R-3405-A	On Sag	1	98.69	102.41	3.72	98.69	0.00	1.00	0.00
60	CB-63	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.09	104.80	3.71	101.09	0.00	1.00	0.00
61	CB-64	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.33	105.60	4.27	101.33	0.00	1.00	0.00
62	CB7	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.70	106.24	4.54	101.70	0.00	1.00	0.00
63	CB-8	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.54	104.54	3.00	101.54	0.00	1.00	0.00
64	CB-9	NEENAH FOUNDRY	R-3405-A	On Sag	1	101.29	104.54	3.25	101.29	0.00	1.00	0.00
65	CB-A	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.90	107.90	4.00	103.90	0.00	1.00	0.00
66	CB-B	NEENAH FOUNDRY	R-3405-A	On Sag	1	103.20	107.20	4.00	103.20	0.00	1.00	0.00
67	CB-C	NEENAH FOUNDRY	R-3405-A	On Sag	1	102.41	106.41	4.00	102.41	0.00	1.00	0.00

Roadway & Gutter Input

SN	Element ID	Roadway Longitudinal Slope (ft/ft)	Roadway Cross Slope (ft/ft)	Roadway Manning's Roughness	Gutter Cross Slope (ft/ft)	Gutter Width (ft)	Gutter Depression (in)	Allowable Spread (ft)
1	CB-1	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
2	CB-10	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
3	CB-11	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
4	CB-12	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
5	CB-13	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
6	CB-14	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
7	CB-15	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
8	CB-16	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
9	CB-17	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
10	CB-18	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
11	CB-19	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
12	CB-2	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
13	CB-20	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
14	CB-21	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
15	CB-22	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
16	CB-23	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
17	CB-24	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
18	CB-26	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
19	CB-27	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
20	CB-28	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
21	CB-29	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
22	CB-3	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
23	CB-30	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
24	CB-31	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
25	CB-32	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
26	CB-33	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
27	CB-34	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
28	CB-34-HELP	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
29	CB-35	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
30	CB-36	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
31	CB-37	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
32	CB-38	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
33	CB-39	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
34	CB-4	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
35	CB-40	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
36	CB-41	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
37	CB-42	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
38	CB-43	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
39	CB-44	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
40	CB-45	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
41	CB-46	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
42	CB-47	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
43	CB-48	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
44	CB-49	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
45	CB-5	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
46	CB-50	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
47	CB-51	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
48	CB-52	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
49	CB-53	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
50	CB-54	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
51	CB-55	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
52	CB-56	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
53	CB-57	N/A	0.0200	0.0160	0.0620	2.00	0.0657	7.00
54	CB-58	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
55	CB-59	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
56	CB6	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
57	CB-60	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
58	CB-61	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
59	CB-62	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
60	CB-63	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
61	CB-64	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
62	CB7	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
63	CB-8	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
64	CB-9	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
65	CB-A	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
66	CB-B	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00
67	CB-C	N/A	0.0200	0.0160	0.0620	2.00	0.0656	7.00

Inlet Results

SN	Element ID	Peak Flow (cfs)	Peak Lateral Inflow (cfs)	Peak Flow Intercepted by Inlet (cfs)	Peak Flow Bypassing Inlet (cfs)	Inlet Efficiency during Peak Flow (%)	Max Gutter Spread during Peak Flow (ft)	Max Gutter Water Elev. during Peak Flow (ft)	Max Gutter Water Depth during Peak Flow (ft)	Time of Max Depth Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	CB-1	1.63	1.63	N/A	N/A	N/A	5.61	106.43	0.22	0 00:05	0.00	0.00
2	CB-10	0.65	0.65	N/A	N/A	N/A	4.87	105.75	0.20	0 00:06	0.00	0.00
3	CB-11	0.98	0.98	N/A	N/A	N/A	5.15	104.41	0.21	0 00:06	0.00	0.00
4	CB-12	1.22	1.22	N/A	N/A	N/A	5.32	104.86	0.21	0 00:06	0.00	0.00
5	CB-13	3.08	3.08	N/A	N/A	N/A	15.79	104.62	0.42	0 00:06	0.00	0.00
6	CB-14	1.71	1.71	N/A	N/A	N/A	5.65	103.72	0.22	0 00:06	0.00	0.00
7	CB-15	0.55	0.55	N/A	N/A	N/A	4.78	104.40	0.20	0 00:06	0.00	0.00
8	CB-16	0.84	0.84	N/A	N/A	N/A	5.03	105.71	0.21	0 00:05	0.00	0.00
9	CB-17	0.84	0.84	N/A	N/A	N/A	5.03	105.56	0.21	0 00:05	0.00	0.00
10	CB-18	0.65	0.65	N/A	N/A	N/A	4.87	105.55	0.20	0 00:05	0.00	0.00
11	CB-19	1.57	1.57	N/A	N/A	N/A	5.56	109.17	0.22	0 00:05	0.00	0.00
12	CB-2	0.63	0.63	N/A	N/A	N/A	4.86	106.41	0.20	0 00:05	0.00	0.00
13	CB-20	2.37	2.37	N/A	N/A	N/A	14.58	106.45	0.40	0 00:06	0.00	0.00
14	CB-21	3.24	3.24	N/A	N/A	N/A	16.07	105.98	0.43	0 00:05	0.00	0.00
15	CB-22	0.42	0.42	N/A	N/A	N/A	4.65	108.45	0.20	0 00:05	0.00	0.00
16	CB-23	3.58	3.58	N/A	N/A	N/A	16.60	105.94	0.44	0 00:05	0.00	0.00
17	CB-24	1.59	1.59	N/A	N/A	N/A	5.58	106.98	0.22	0 00:05	0.00	0.00
18	CB-26	1.46	1.46	N/A	N/A	N/A	5.49	109.02	0.22	0 00:06	0.00	0.00
19	CB-27	0.92	0.92	N/A	N/A	N/A	5.10	108.71	0.21	0 00:06	0.00	0.00
20	CB-28	1.60	1.60	N/A	N/A	N/A	5.58	107.72	0.22	0 00:06	0.00	0.00
21	CB-29	2.31	2.31	N/A	N/A	N/A	14.47	106.89	0.39	0 00:05	0.00	0.00
22	CB-3	0.45	0.45	N/A	N/A	N/A	4.68	107.20	0.20	0 00:05	0.00	0.00
23	CB-30	1.38	1.38	N/A	N/A	N/A	5.43	105.16	0.21	0 00:05	0.00	0.00
24	CB-31	0.94	0.94	N/A	N/A	N/A	5.11	105.71	0.21	0 00:05	0.00	0.00
25	CB-32	0.82	0.82	N/A	N/A	N/A	5.01	107.11	0.21	0 00:05	0.00	0.00
26	CB-33	0.93	0.93	N/A	N/A	N/A	5.10	111.28	0.21	0 00:05	0.00	0.00
27	CB-34	4.44	4.44	N/A	N/A	N/A	17.90	110.73	0.46	0 00:06	0.00	0.00
28	CB-34-HELP	0.71	0.71	N/A	N/A	N/A	4.92	110.30	0.20	0 00:06	0.00	0.00
29	CB-35	0.88	0.88	N/A	N/A	N/A	5.07	111.16	0.21	0 00:06	0.00	0.00
30	CB-36	0.82	0.82	N/A	N/A	N/A	5.02	105.81	0.21	0 00:07	0.00	0.00
31	CB-37	1.27	1.27	N/A	N/A	N/A	5.35	112.61	0.21	0 00:05	0.00	0.00
32	CB-38	1.17	1.17	N/A	N/A	N/A	5.29	111.46	0.21	0 00:05	0.00	0.00
33	CB-39	1.82	1.82	N/A	N/A	N/A	5.73	110.47	0.22	0 00:05	0.00	0.00
34	CB-4	0.73	0.73	N/A	N/A	N/A	4.94	107.20	0.20	0 00:05	0.00	0.00
35	CB-40	2.18	2.18	N/A	N/A	N/A	5.94	110.67	0.22	0 00:05	0.00	0.00
36	CB-41	1.21	1.21	N/A	N/A	N/A	5.32	109.01	0.21	0 00:05	0.00	0.00
37	CB-42	0.81	0.81	N/A	N/A	N/A	5.01	108.27	0.21	0 00:05	0.00	0.00
38	CB-43	1.19	1.19	N/A	N/A	N/A	5.30	108.27	0.21	0 00:05	0.00	0.00
39	CB-44	0.10	0.10	N/A	N/A	N/A	4.25	113.00	0.19	0 00:05	0.00	0.00
40	CB-45	0.14	0.14	N/A	N/A	N/A	4.32	113.00	0.19	0 00:05	0.00	0.00
41	CB-46	0.75	0.75	N/A	N/A	N/A	4.95	109.72	0.20	0 00:05	0.00	0.00
42	CB-47	0.00	0.00	N/A	N/A	N/A	5.16	109.73	0.21	0 00:05	0.00	0.00
43	CB-48	0.67	0.67	N/A	N/A	N/A	4.89	106.00	0.20	0 00:05	0.00	0.00
44	CB-49	1.73	1.73	N/A	N/A	N/A	5.67	106.60	0.22	0 00:05	0.00	0.00
45	CB-5	3.38	3.38	N/A	N/A	N/A	16.29	105.78	0.43	0 00:05	0.00	0.00
46	CB-50	1.25	1.25	N/A	N/A	N/A	5.34	106.59	0.21	0 00:05	0.00	0.00
47	CB-51	0.58	0.58	N/A	N/A	N/A	4.81	108.70	0.20	0 00:05	0.00	0.00
48	CB-52	0.48	0.48	N/A	N/A	N/A	4.71	108.80	0.20	0 00:05	0.00	0.00
49	CB-53	1.57	1.57	N/A	N/A	N/A	5.56	103.62	0.22	0 00:05	0.00	0.00
50	CB-54	2.08	2.08	N/A	N/A	N/A	5.89	104.29	0.22	0 00:05	0.00	0.00
51	CB-55	0.54	0.54	N/A	N/A	N/A	4.77	104.45	0.20	0 00:05	0.00	0.00
52	CB-56	2.79	2.79	N/A	N/A	N/A	15.32	104.14	0.41	0 00:05	0.00	0.00
53	CB-57	0.72	0.72	N/A	N/A	N/A	4.93	105.23	0.20	0 00:05	0.00	0.00
54	CB-58	2.19	2.19	N/A	N/A	N/A	5.95	101.18	0.22	0 00:05	0.00	0.00
55	CB-59	0.94	0.94	N/A	N/A	N/A	5.11	101.93	0.21	0 00:06	0.00	0.00
56	CB6	1.84	1.84	N/A	N/A	N/A	5.74	107.36	0.22	0 00:05	0.00	0.00
57	CB-60	0.46	0.46	N/A	N/A	N/A	4.69	102.05	0.20	0 00:05	0.00	0.00
58	CB-61	2.45	2.45	N/A	N/A	N/A	14.73	102.26	0.40	0 00:05	0.00	0.00
59	CB-62	3.63	3.63	N/A	N/A	N/A	16.68	102.85	0.44	0 00:05	0.00	0.00
60	CB-63	1.57	1.57	N/A	N/A	N/A	5.56	105.02	0.22	0 00:05	0.00	0.00
61	CB-64	3.51	3.51	N/A	N/A	N/A	16.49	106.04	0.44	0 00:05	0.00	0.00
62	CB7	2.10	2.10	N/A	N/A	N/A	5.90	106.46	0.22	0 00:05	0.00	0.00
63	CB-8	0.45	0.45	N/A	N/A	N/A	4.68	104.74	0.20	0 00:05	0.00	0.00
64	CB-9	0.35	0.35	N/A	N/A	N/A	4.58	104.74	0.20	0 00:06	0.00	0.00
65	CB-A	0.75	0.75	N/A	N/A	N/A	4.96	108.10	0.20	0 00:05	0.00	0.00
66	CB-B	0.52	0.52	N/A	N/A	N/A	4.75	107.40	0.20	0 00:05	0.00	0.00
67	CB-C	1.29	1.29	N/A	N/A	N/A	5.37	106.62	0.21	0 00:05	0.00	0.00

ATTACHMENT D

ORIFICE CALCULATIONS

ORIFICE SIZING CALCULATIONS
Gorrill-Palmer Consulting Engineers, Inc.

JOB DATA

Client:	321 Lincoln Street Development, LLC
Project:	Lincoln Village
Location:	Saco, ME
Calc. by:	LEL
Date:	11/4/2022

EQUATIONS:

Q = A * Cd * SQRT (2 * g * h)   where   Q = Flow
Cd = Coef. of discharge
h = Head
A = Cross-sectional flow area
g = Gravitational Acceleration

Gravel Wetland 1

INPUT:

Orifice Diameter (d) =	2.40	inches	
Head (h) =	1.47	feet	(channel protection elev. to permanent pool
Coef. Discharge (C)=	0.61		

OUTPUT:

Orifice/flow Area (A) =	4.52	square inches
Velocity (V) =	5.94	feet per second
Flowrate (Q) =	83.68	gallons per minute
	0.19	cubic feet per second

Gravel Wetland 2

INPUT:

Orifice Diameter (d) =	2.20	inches	
Head (h) =	1.36	feet	(channel protection elev. to permanent pool
Coef. Discharge (C)=	0.61		

OUTPUT:

Orifice/flow Area (A) =	3.80	square inches
Velocity (V) =	5.71	feet per second
Flowrate (Q) =	67.63	gallons per minute
	0.15	cubic feet per second

ATTACHMENT E

FOCALPOINT MANUFACTURER APPROVAL LETTER

Ferguson Waterworks
94 Pleasant Ave
South Portland, ME 04106

Drew Gagnon, P.E.
Project Manager
Gorrill Palmer
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

May 9, 2022

SUBJECT: Lincoln Village – Saco, ME
Design Review – FocalPoint Biofiltration Systems and SWM Systems

Dear Drew,

Thank you for forwarding the Plans, HydroCAD modeling and design details for the proposed Lincoln Village development project in Saco, Maine to Ferguson Waterworks for review. Our team has reviewed the plans with most recent revision date of April 18, 2022, which shows the following FocalPoint systems:

- FocalPoint #1 – 64 SF footprint with
  - 24" dia. domed overflow structure with filter insert
  - Rain Guardian Bunker Pretreatment Device
- FocalPoint #2 – 24 SF footprint with
  - 18" dia. domed overflow structure with filter insert
  - Rain Guardian Foxhole Pretreatment Device
- FocalPoint #3 – 76 SF footprint with
  - 24" dia. domed overflow structure with filter insert
  - Rain Guardian Bunker Pretreatment Device
- FocalPoint #4 – 32 SF footprint with
  - 24" dia. domed overflow structure with filter insert
  - Rain Guardian Foxhole Pretreatment Device

System Review:

- The FocalPoint systems are set in a recessed vegetated 'bowl' areas.
- Runoff flows from the surrounding pavement and developed areas to Rain Guardian Pretreatment devices at curb openings and then enters each FocalPoint system mulch bed area.

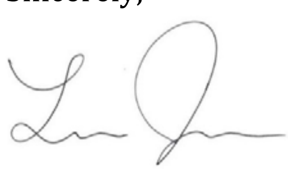
- The typical FocalPoint section appears to consist of 3” mulch, 18” biofilter media, 6” bridging stone and 9.45” modular underdrain.
- Domed overflow risers with filter inserts are specified to convey larger storm events – essentially as a bypass.
- Each FocalPoint system is placed in-line with a subsurface Cultec Treatment Isolator Row and additional downstream storage and overflow control is provided as required by MEDEP.
- A landscape plan should be prepared with the final plan set specifying approved FocalPoint plantings. Please reach out to Ferguson Waterworks for approved FocalPoint plantings list and installation guidelines.

Overall, Ferguson takes no exceptions to the location and application of the FocalPoint system for this project to provide WQ treatment and detention.

With regard to the installation, Ferguson Waterworks will host a preconstruction meeting with the site contractor and will be on-site during installation to ensure that the installation is being conducted in accordance with our standard installation procedures. Ferguson Waterworks will also provide maintenance consultation for the first year following install consisting of typical maintenance procedures and overview of system condition.

Please review and contact me with any questions from your office. We look forward to working with you on this project.

Sincerely,



Loren Joyce,
Stormwater Engineer
Ferguson Waterworks

Cc: Robert J Woodman, Ferguson Waterworks

ATTACHMENT F

BRADLEY STREET RUNOFF CALCULATIONS

NOTE: THIS PLAN SET IS ISSUED FOR PERMITTING PURPOSES AND SHALL NOT BE USED FOR CONSTRUCTION.

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Rev.	Date	Revision

Issued For	Date	By
PRELIMINARY PRICING SET	6/8/22	DJG
MAINE DOT APPLICATION	4/18/22	DJG

Design: TPG	Draft: CEH	Date: SEPT 2021
Checked: DJG	Scale: 1"=20'	Job No.: 3831
File Name: 3831-WS-BRADLEY ST.dwg		

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Drawing Name: Water Quality Plan – Bradley Street Runoff

Project: Lincoln Village
Saco, Maine

Client: 321 Lincoln Street Development, LLC
40 Farm Gate Road, Falmouth, Maine 04105

Drawing No. WQ2

GORRILL PALMER	JOB	3831		
	SHEET NO.	1	OF	1
	CALCULATED BY	LEL	DATE	8/5/2022
	CHECKED BY	DJG	DATE	8/5/2022

Task: Demonstrate pipe can convey the 10-year, 24 hour storm using the Rational Method and Mannings Equation

Note: Pipe information obtained from Owen Haskell boundary and survey plan dated 5/9/2022. 12" plastic storm drain at 0.0039 ft/ft slope

Assumptions:

i =	4.9	10 year
C paved =	0.95	
C lawn =	0.25	
n plastic =	0.011	

Calculations: See Below

Conclusion:

Based on the rational method, the flow is **1.7** cfs

Based on Mannings Equation, the calculated pipe capacity is **2.7** cfs

RATIONAL METHOD Q=CiA		
Area paved	14,085	SF
Area lawn	5,241	SF
Area paved	0.323	ac
Area lawn	0.120	ac
Area Total	0.444	ac
C paved	0.95	
C lawn	0.25	
C avg	0.760	
i	4.9	in/hr
Q=	**1.65**	**CFS**

MANNINGS EQUATION Q=(1.5/n)AR^(2/3)S^(1/2)		
D	12	in
A	0.785	SF
R	0.250	FT
n	0.011	
S	0.0039	ft/ft
Q=	**2.65**	**CFS**

	Impervious (SF)	Vegetated (SF)
Area from Proposed Project	10,960	5,241
Area from Existing Conditions	3,125	0

Slope Calcs			
		Lengths	Slope
Inv Out	103.88	226	0.0039
Inv In	103.00		
Inv Out	104.96	1.5	0.52
Inv In	104.18		

ATTACHMENT G

SEDIMENT FOREBAY STORAGE CALCULATIONS

Lincoln Village
Saco, ME

Sediment Forebay Storage Calculations
Notes: GW Sediment Forebay Storage = 10% of Channel Protection Volume GUSF Sediment Forebay Storage = 10 Storms per Year x Sanded Area (acres) x 500 lbs/per acre-storm : 90lbs/cf

	Channel Protection Volume	Sanded Area (acres)	Storms per Year	Conversion	Required Sediment Forebay Storage Volume (cf)	Proposed Storage Volume (cf)
Gravel Wetland 1	20201			10%	2024	2811
Gravel Wetland 2	10912			10%	1101	1561
GUSF 1		0.57	10	5.56	32	228
GUSF 2		0.36	10	5.56	20	262
GUSF 3		0.43	10	5.56	24	331
GUSF 4		0.37	10	5.56	21	240
GUSF 5		0.26	10	5.56	15	246
GUSF 6		0.23	10	5.56	13	258
GUSF 7		0.23	10	5.56	13	339
GUSF 8		0.43	10	5.56	24	282
GUSF 9		0.73	10	5.56	41	415

Approximate Road & Sidewalk Areas being Salted/Sanded (SF)	
GUSF 1	25038
GUSF 2	15665
GUSF 3	18538
GUSF 4	16292
GUSF 5	11484
GUSF 6	9851
GUSF 7	10044
GUSF 8	18899
GUSF 9	31882

SUPPLEMENTAL STORMWATER ANALYSIS – BASED ON PEER REVIEW REQUEST

JOB	3831 Lincoln Village		
SHEET NO.	1	OF	1
CALCULATED BY	DJG	DATE	4/3/2023
CHECKED BY	DJG	DATE	4/3/2023
SCALE	None		

Task: Determine headwater and capacity of culverts downstream of Lincoln Village POIs

Note: Pipe information obtained from Owen Haskell boundary and survey, GIS, field reconnaissance or record drawings where available

Assumption 1) Syline Drive Culvert assumed to be a 36" concrete culvert at approxmaitely 4% slope. This was based on a field visit on 11-4

2) Lincoln Street Culvert assumed to be a 12" CMP culvert at 1.34%. This was based on a field survey by Owen Haskell

3) Maple Ave culverts assumed to be twin 36" concrete culverts at 0.002%. This is based on record drawings by Deluca Hoffman dated August 1992 and GIS where absent.

4) Analysis performed from HydroCAD. Culverts were modeled as an outlet to a pond node.

Downstream Culvert Analysis

	POI 1 - 36" concrete @ Skyline			POI 2 - 12" @ Lincoln			POI 3 - Twin 36" culverts @ Maple		
Storm Event	Pre Elevation	Post Elevation	Difference (in)	Pre Elevation	Post Elevation	Difference (in)	Pre Elevation	Post Elevation	Difference (in)
2 year	85.49	85.14	-4.2	95.59	95.30	-3.5	85.65	85.47	-2.2
10 year	86.29	85.79	-6.0	96.60	96.42	-2.2	87.17	86.67	-6.0
25 year	87.1	86.31	-9.5	97.11	96.97	-1.7	89.11	87.99	-13.4
50 year	88.06	86.76	-15.6	97.47	97.37	-1.2	90.77	89.50	-15.2
100 year	89.53	87.35	-26.2	97.88	97.88	0.0	92.29	91.10	-14.3

Roadway Grade/Storage	90 (GIS)	99 (GIS)	92-93 (GIS)
Culvert Info	Inv = approx 84.0 Slope = approx 4%	Survey inv = 93.1 Slope = 1.34%	(2) inv @ 83.45 Slope = 1% min

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Rev.	Date	Revision

Issued For	Date	By
SITE & SUBDIVISION RESUBMISSION	11/03/22	DJG
UTILITY ABILITY TO SERVE REQUESTS	8/30/22	DJG
NRPA TIER II SUBMISSION	8/24/22	DJG
CITY OF SACO SITE PLAN/SUBDIVISION REVIEW	8/15/22	DJG
PRELIMINARY PRICING SET	6/8/22	DJG
MAINE DOT APPLICATION	4/18/22	DJG

Design: TPG | Draft: CEH | Date: SEPT 2021
Checked: DJG | Scale: 1"=150' | Job No.: 3831
File Name: 3831-WS-PRE – DRAFT.dwg

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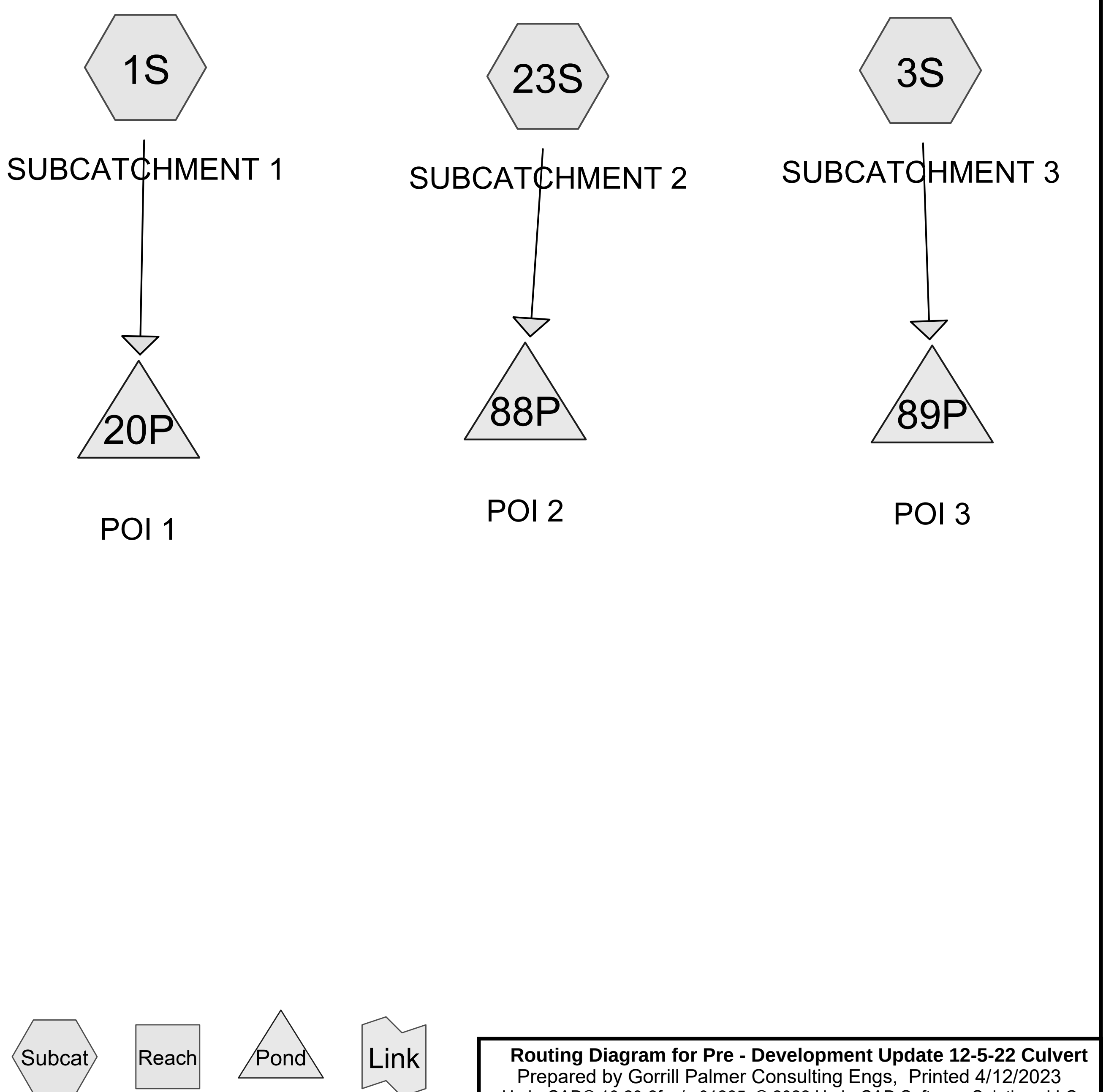
Drawing Name: Pre Development Watershed Map
Project: Lincoln Village, Saco, Maine
Client: 321 Lincoln Street Development, LLC, 40 Farm Gate Road, Falmouth, Maine 04105

Drawing No. W1

TR-20 CALCULATIONS

PRE DEVELOPMENT



Routing Diagram for Pre - Development Update 12-5-22 Culvert
Prepared by Gorrill Palmer Consulting Engs, Printed 4/12/2023

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year Saco	Type III 24-hr		Default	24.00	1	3.30	2
2	10 Year Saco	Type III 24-hr		Default	24.00	1	4.90	2
3	25 Year Saco	Type III 24-hr		Default	24.00	1	6.20	2
4	50 Year Saco	Type III 24-hr		Default	24.00	1	7.30	2
5	100 Year Saco	Type III 24-hr		Default	24.00	1	8.70	2

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT 1 Runoff Area=33.575 ac 11.40% Impervious Runoff Depth=1.28"
Flow Length=1,826' Tc=92.7 min CN=77 Runoff=14.60 cfs 3.592 af

Subcatchment 3S: SUBCATCHMENT 3 Runoff Area=63.399 ac 10.26% Impervious Runoff Depth=1.16"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=36.21 cfs 6.140 af

Subcatchment 23S: SUBCATCHMENT 2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=1.35"
Flow Length=583' Tc=46.5 min CN=78 Runoff=5.40 cfs 0.860 af

Pond 20P: POI 1 Peak Elev=85.49' Storage=28 cf Inflow=14.60 cfs 3.592 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=14.60 cfs 3.592 af

Pond 88P: POI 2 Peak Elev=95.59' Storage=4,281 cf Inflow=5.40 cfs 0.860 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=3.55 cfs 0.860 af

Pond 89P: POI 3 Peak Elev=85.65' Storage=901 cf Inflow=36.21 cfs 6.140 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=36.19 cfs 6.140 af

Total Runoff Area = 104.635 ac Runoff Volume = 10.592 af Average Runoff Depth = 1.21"
89.73% Pervious = 93.884 ac 10.27% Impervious = 10.751 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT 1 Runoff Area=33.575 ac 11.40% Impervious Runoff Depth=2.54"
Flow Length=1,826' Tc=92.7 min CN=77 Runoff=29.78 cfs 7.105 af

Subcatchment 3S: SUBCATCHMENT 3 Runoff Area=63.399 ac 10.26% Impervious Runoff Depth=2.37"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=76.79 cfs 12.513 af

Subcatchment 23S: SUBCATCHMENT 2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=2.63"
Flow Length=583' Tc=46.5 min CN=78 Runoff=10.75 cfs 1.677 af

Pond 20P: POI 1 Peak Elev=86.29' Storage=77 cf Inflow=29.78 cfs 7.105 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=29.79 cfs 7.105 af

Pond 88P: POI 2 Peak Elev=96.60' Storage=17,162 cf Inflow=10.75 cfs 1.677 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.35 cfs 1.677 af

Pond 89P: POI 3 Peak Elev=87.17' Storage=1,990 cf Inflow=76.79 cfs 12.513 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=76.66 cfs 12.513 af

Total Runoff Area = 104.635 ac Runoff Volume = 21.296 af Average Runoff Depth = 2.44"
89.73% Pervious = 93.884 ac 10.27% Impervious = 10.751 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: SUBCATCHMENT1 Runoff Area=33.575 ac 11.40% Impervious Runoff Depth=3.65"
Flow Length=1,826' Tc=92.7 min CN=77 Runoff=43.02 cfs 10.224 af

Subcatchment3S: SUBCATCHMENT3 Runoff Area=63.399 ac 10.26% Impervious Runoff Depth=3.45"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=112.61 cfs 18.244 af

Subcatchment23S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=3.76"
Flow Length=583' Tc=46.5 min CN=78 Runoff=15.35 cfs 2.398 af

Pond 20P: POI 1 Peak Elev=87.10' Storage=288 cf Inflow=43.02 cfs 10.224 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=43.01 cfs 10.224 af

Pond 88P: POI 2 Peak Elev=97.11' Storage=31,189 cf Inflow=15.35 cfs 2.398 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.71 cfs 2.398 af

Pond 89P: POI 3 Peak Elev=89.11' Storage=7,238 cf Inflow=112.61 cfs 18.244 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=109.61 cfs 18.244 af

Total Runoff Area = 104.635 ac Runoff Volume = 30.866 af Average Runoff Depth = 3.54"
89.73% Pervious = 93.884 ac 10.27% Impervious = 10.751 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT 1 Runoff Area=33.575 ac 11.40% Impervious Runoff Depth=4.64"
Flow Length=1,826' Tc=92.7 min CN=77 Runoff=54.51 cfs 12.972 af

Subcatchment 3S: SUBCATCHMENT 3 Runoff Area=63.399 ac 10.26% Impervious Runoff Depth=4.41"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=143.86 cfs 23.325 af

Subcatchment 23S: SUBCATCHMENT 2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=4.75"
Flow Length=583' Tc=46.5 min CN=78 Runoff=19.34 cfs 3.031 af

Pond 20P: POI 1 Peak Elev=88.06' Storage=1,046 cf Inflow=54.51 cfs 12.972 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=54.46 cfs 12.972 af

Pond 88P: POI 2 Peak Elev=97.47' Storage=44,575 cf Inflow=19.34 cfs 3.031 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.94 cfs 3.031 af

Pond 89P: POI 3 Peak Elev=90.77' Storage=27,226 cf Inflow=143.86 cfs 23.325 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=129.64 cfs 23.325 af

Total Runoff Area = 104.635 ac Runoff Volume = 39.328 af Average Runoff Depth = 4.51"
89.73% Pervious = 93.884 ac 10.27% Impervious = 10.751 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: SUBCATCHMENT1 Runoff Area=33.575 ac 11.40% Impervious Runoff Depth=5.92"
Flow Length=1,826' Tc=92.7 min CN=77 Runoff=69.32 cfs 16.564 af

Subcatchment 3S: SUBCATCHMENT3 Runoff Area=63.399 ac 10.26% Impervious Runoff Depth=5.68"
Flow Length=2,998' Tc=49.9 min CN=75 Runoff=184.33 cfs 29.996 af

Subcatchment 23S: SUBCATCHMENT2 Runoff Area=7.661 ac 5.45% Impervious Runoff Depth=6.04"
Flow Length=583' Tc=46.5 min CN=78 Runoff=24.45 cfs 3.857 af

Pond 20P: POI 1 Peak Elev=89.53' Storage=5,289 cf Inflow=69.32 cfs 16.564 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=68.30 cfs 16.564 af

Pond 88P: POI 2 Peak Elev=97.88' Storage=63,098 cf Inflow=24.45 cfs 3.857 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=5.19 cfs 3.857 af

Pond 89P: POI 3 Peak Elev=92.29' Storage=76,804 cf Inflow=184.33 cfs 29.996 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=145.64 cfs 29.996 af

Total Runoff Area = 104.635 ac Runoff Volume = 50.417 af Average Runoff Depth = 5.78"
89.73% Pervious = 93.884 ac 10.27% Impervious = 10.751 ac

Summary for Subcatchment 1S: SUBCATCHMENT 1

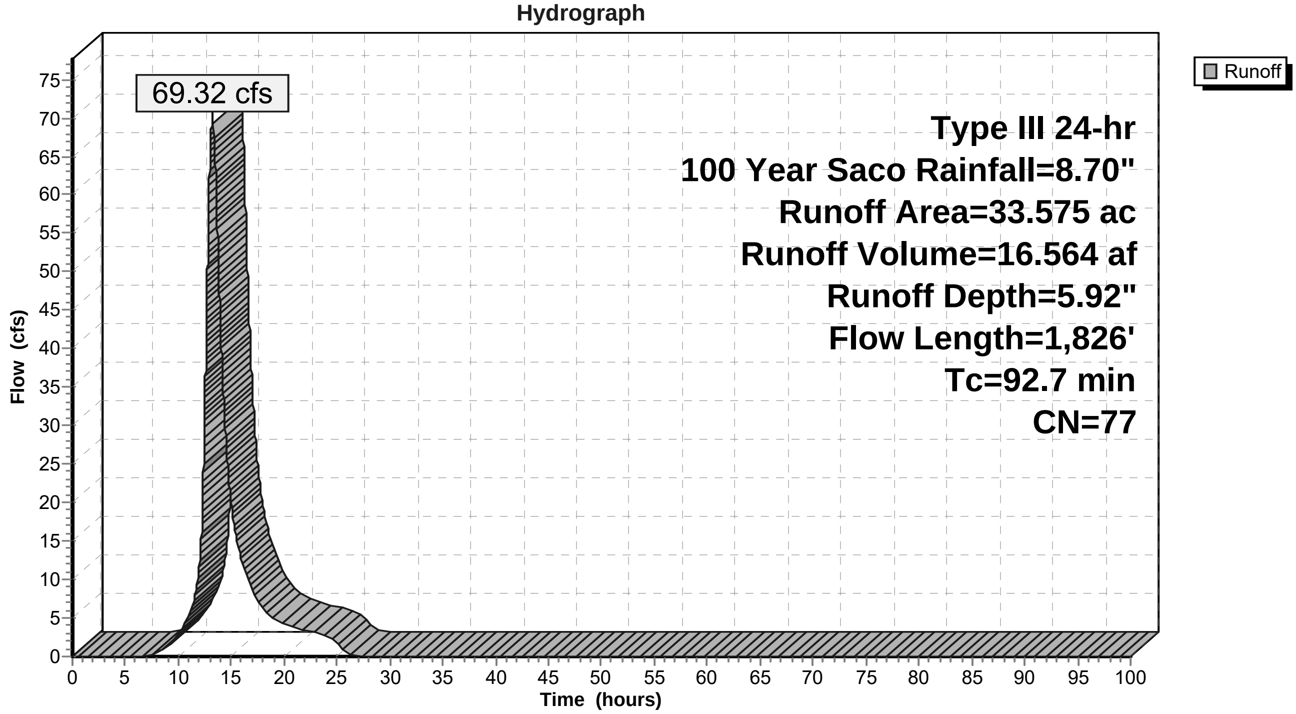
Runoff = 69.32 cfs @ 13.28 hrs, Volume= 16.564 af, Depth= 5.92"
Routed to Pond 20P : POI 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
1.765	30	Woods, Good, HSG A
21.887	77	Woods, Good, HSG D
0.113	98	Roofs, HSG D
0.446	98	Paved parking, HSG D
0.841	85	1/8 acre lots, 65% imp, HSG B
0.129	81	1/3 acre lots, 30% imp, HSG C
1.120	86	1/3 acre lots, 30% imp, HSG D
0.183	92	1/8 acre lots, 65% imp, HSG D
0.262	98	Paved roads w/curbs & sewers, HSG D
1.424	80	1/2 acre lots, 25% imp, HSG C
0.978	85	1/2 acre lots, 25% imp, HSG D
1.607	95	Urban commercial, 85% imp, HSG D
2.820	77	Woods, Good, HSG D
33.575	77	Weighted Average
29.747		88.60% Pervious Area
3.828		11.40% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.2	145	0.0173	0.08		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
20.6	424	0.0047	0.34		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
11.6	292	0.0070	0.42		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
28.4	408	0.0023	0.24		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
1.9	557	0.0083	4.89	29.32	**Channel Flow, E - F** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.025 Earth, clean & winding
92.7	1,826	Total			

Subcatchment 1S: SUBCATCHMENT 1



Summary for Subcatchment 3S: SUBCATCHMENT 3

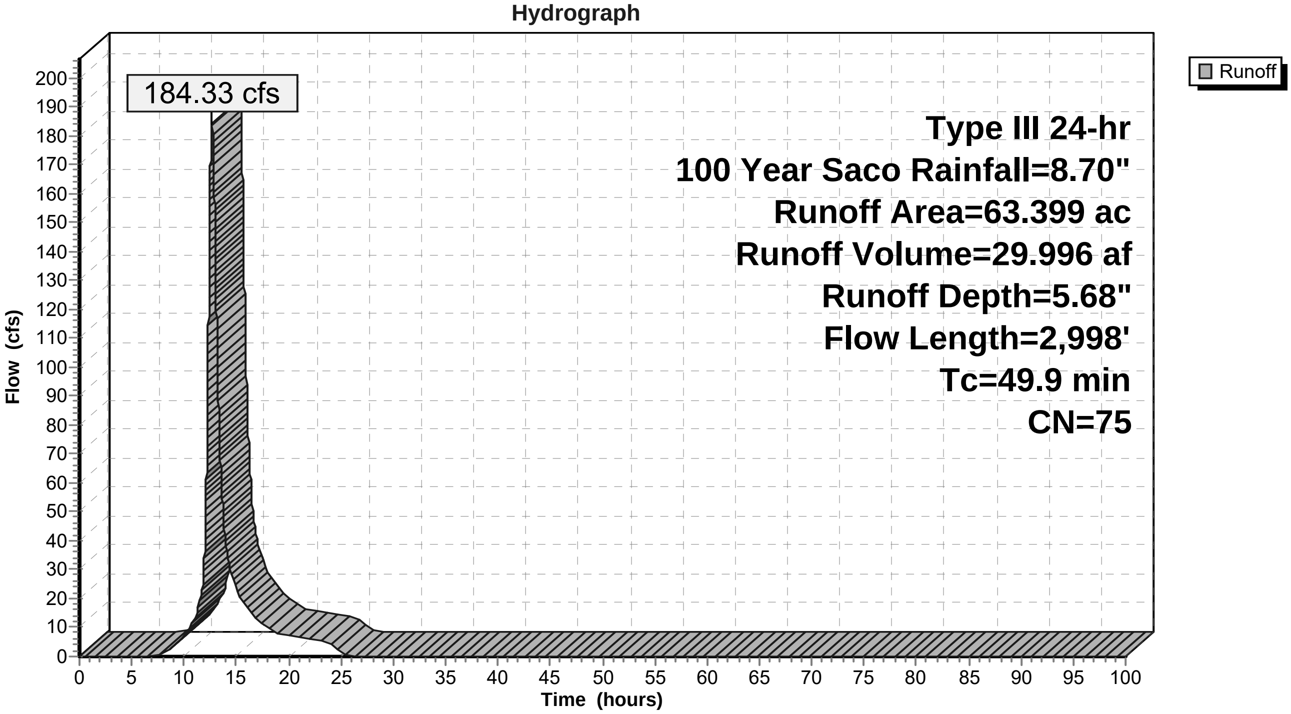
Runoff = 184.33 cfs @ 12.69 hrs, Volume= 29.996 af, Depth= 5.68"
Routed to Pond 89P : POI 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
3.238	30	Woods, Good, HSG A
34.441	77	Woods, Good, HSG D
2.735	87	1/4 acre lots, 38% imp, HSG D
4.813	54	1/2 acre lots, 25% imp, HSG A
13.337	85	1/2 acre lots, 25% imp, HSG D
1.154	85	1/2 acre lots, 25% imp, HSG D
0.753	95	Urban commercial, 85% imp, HSG D
2.928	77	Woods, Good, HSG D
63.399	75	Weighted Average
56.894		89.74% Pervious Area
6.505		10.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	125	0.0161	0.17		**Sheet Flow, A - B** Grass: Short n= 0.150 P2= 3.30"
3.2	380	0.0172	1.97		**Shallow Concentrated Flow, B - C** Grassed Waterway Kv= 15.0 fps
0.1	40	0.0373	11.48	20.29	**Pipe Channel, C - D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
24.8	721	0.0094	0.48		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
3.3	584	0.0062	2.93	23.40	**Channel Flow, E - F** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
2.5	540	0.0095	3.62	28.97	**Channel Flow, F - G** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
3.4	608	0.0066	3.02	24.14	**Channel Flow, G - H** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
49.9	2,998	Total			

Subcatchment 3S: SUBCATCHMENT 3



Summary for Subcatchment 23S: SUBCATCHMENT 2

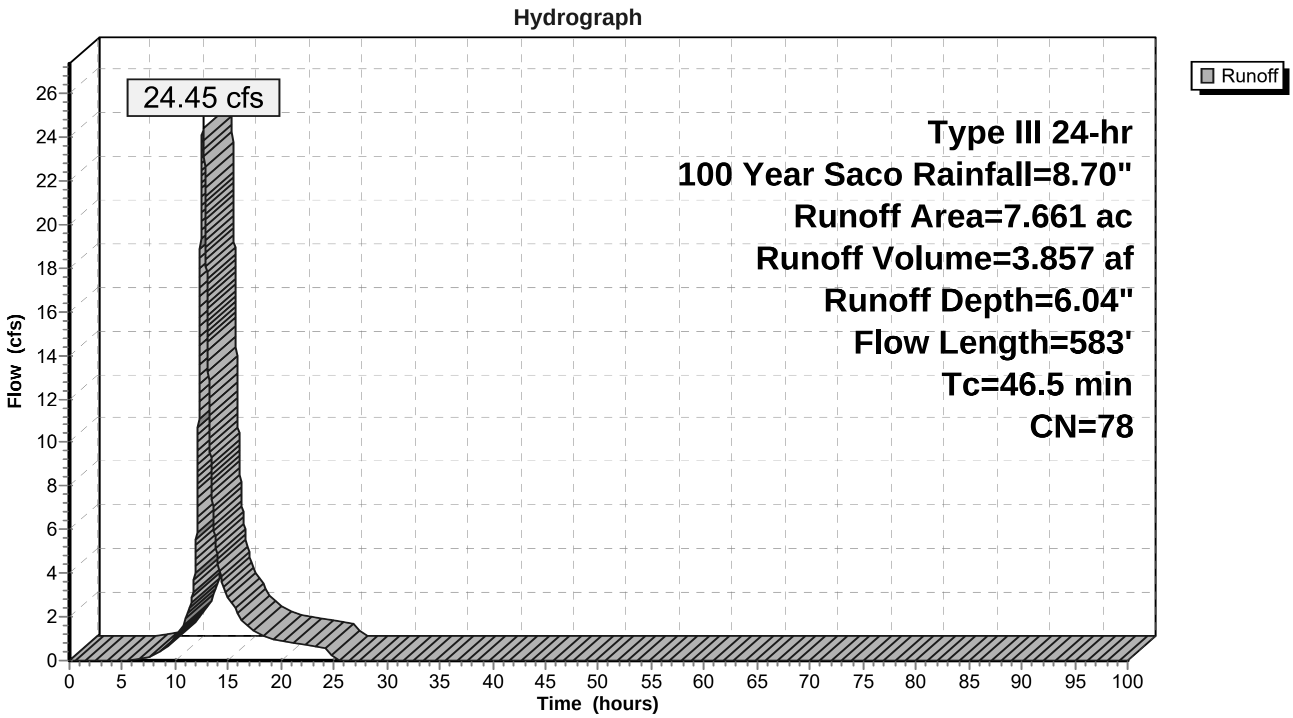
Runoff = 24.45 cfs @ 12.65 hrs, Volume= 3.857 af, Depth= 6.04"
Routed to Pond 88P : POI 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (ac)	CN	Description
6.562	77	Woods, Good, HSG D
1.099	87	1/4 acre lots, 38% imp, HSG D
7.661	78	Weighted Average
7.243		94.55% Pervious Area
0.418		5.45% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	125	0.0280	0.05		**Sheet Flow, A - B** Woods: Dense underbrush n= 0.800 P2= 3.30"
1.8	126	0.0556	1.18		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
1.2	93	0.0645	1.27		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
3.3	157	0.0255	0.80		**Shallow Concentrated Flow, D-E** Woodland Kv= 5.0 fps
1.7	82	0.0244	0.78		**Shallow Concentrated Flow, E-F** Woodland Kv= 5.0 fps
46.5	583	Total			

Subcatchment 23S: SUBCATCHMENT 2



Summary for Pond 20P: POI 1

Inflow Area = 33.575 ac, 11.40% Impervious, Inflow Depth = 5.92" for 100 Year Saco event
Inflow = 69.32 cfs @ 13.28 hrs, Volume= 16.564 af
Outflow = 68.30 cfs @ 13.34 hrs, Volume= 16.564 af, Atten= 1%, Lag= 3.4 min
Primary = 68.30 cfs @ 13.34 hrs, Volume= 16.564 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 89.53' @ 13.34 hrs Surf.Area= 4,848 sf Storage= 5,289 cf

Plug-Flow detention time= 0.3 min calculated for 16.562 af (100% of inflow)
Center-of-Mass det. time= 0.3 min (887.3 - 887.0)

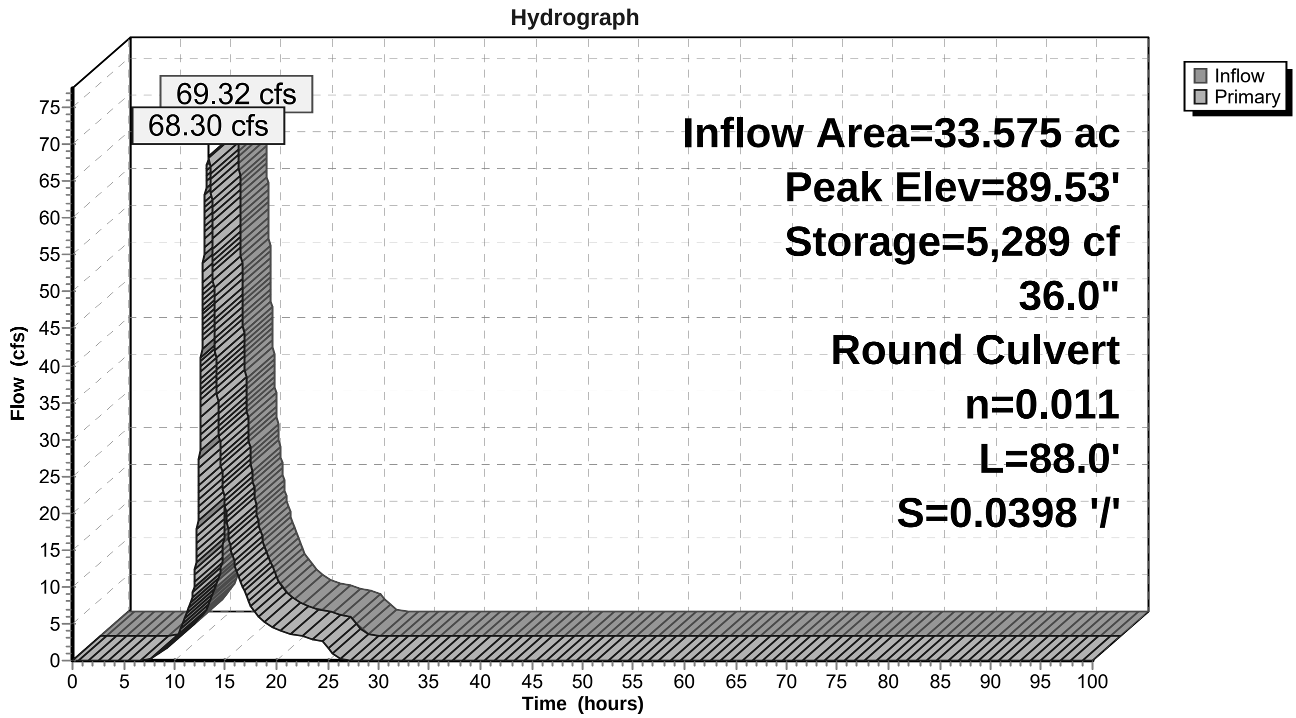
Volume	Invert	Avail.Storage	Storage Description
#1	84.00'	7,922 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
84.00	10	0	0
85.00	20	15	15
86.00	50	35	50
87.00	350	200	250
88.00	1,101	726	976
89.00	3,257	2,179	3,155
90.00	6,278	4,768	7,922

Device	Routing	Invert	Outlet Devices
#1	Primary	84.00'	**36.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.00' / 80.50' S= 0.0398 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=68.29 cfs @ 13.34 hrs HW=89.53' (Free Discharge)
└─**1=Culvert** (Inlet Controls 68.29 cfs @ 9.66 fps)

Pond 20P: POI 1



Summary for Pond 88P: POI 2

Inflow Area = 7.661 ac, 5.45% Impervious, Inflow Depth = 6.04" for 100 Year Saco event
Inflow = 24.45 cfs @ 12.65 hrs, Volume= 3.857 af
Outflow = 5.19 cfs @ 13.84 hrs, Volume= 3.857 af, Atten= 79%, Lag= 71.3 min
Primary = 5.19 cfs @ 13.84 hrs, Volume= 3.857 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 97.88' @ 13.84 hrs Surf.Area= 50,537 sf Storage= 63,098 cf

Plug-Flow detention time= 105.9 min calculated for 3.857 af (100% of inflow)
Center-of-Mass det. time= 105.8 min (947.7 - 841.8)

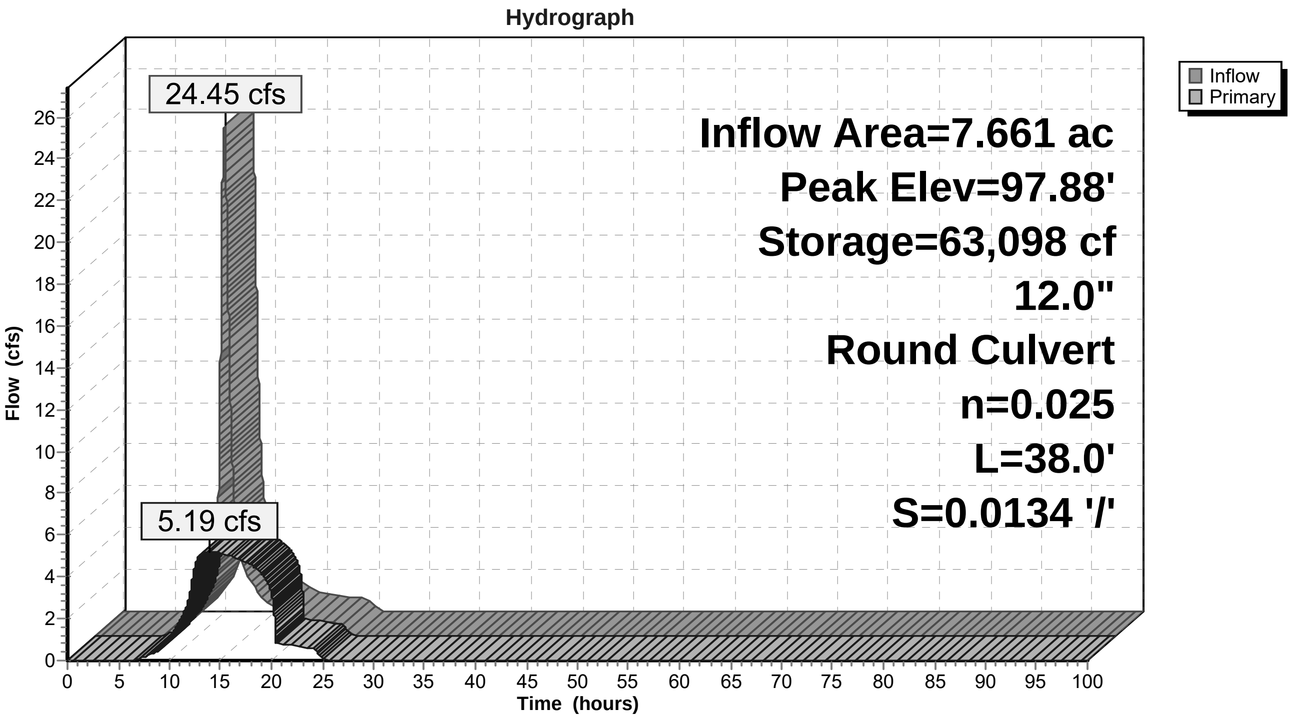
Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	134,293 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	20	0	0
94.00	359	190	190
95.00	2,426	1,393	1,582
96.00	9,638	6,032	7,614
97.00	30,333	19,986	27,600
99.00	76,360	106,693	134,293

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 38.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.10' / 92.59' S= 0.0134 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=5.19 cfs @ 13.84 hrs HW=97.88' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.19 cfs @ 6.61 fps)

Pond 88P: POI 2



Summary for Pond 89P: POI 3

Inflow Area = 63.399 ac, 10.26% Impervious, Inflow Depth = 5.68" for 100 Year Saco event
Inflow = 184.33 cfs @ 12.69 hrs, Volume= 29.996 af
Outflow = 145.64 cfs @ 12.96 hrs, Volume= 29.996 af, Atten= 21%, Lag= 16.2 min
Primary = 145.64 cfs @ 12.96 hrs, Volume= 29.996 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 92.29' @ 12.96 hrs Surf.Area= 43,409 sf Storage= 76,804 cf

Plug-Flow detention time= 2.7 min calculated for 29.993 af (100% of inflow)
Center-of-Mass det. time= 2.7 min (854.2 - 851.5)

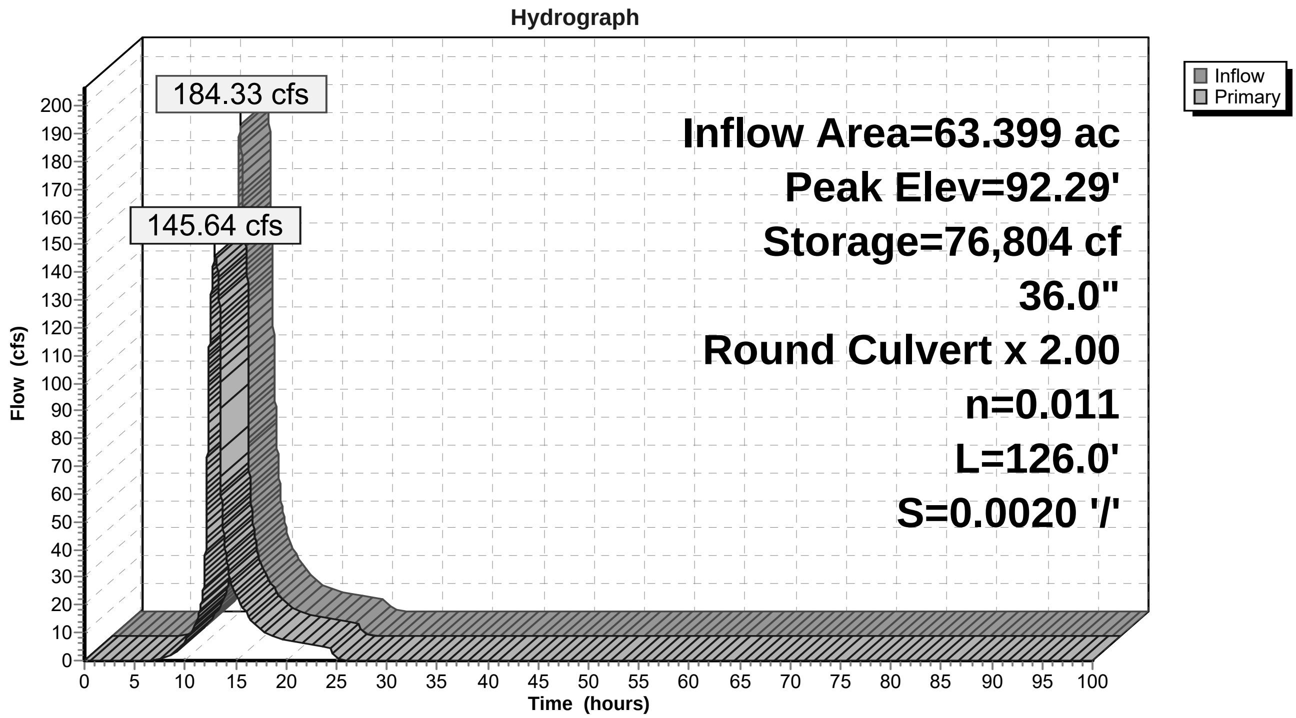
Volume	Invert	Avail.Storage	Storage Description
#1	83.45'	86,017 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
83.45	200	0	0
85.00	500	542	542
87.00	800	1,300	1,842
88.00	1,325	1,063	2,905
90.00	10,603	11,928	14,833
92.50	46,344	71,184	86,017

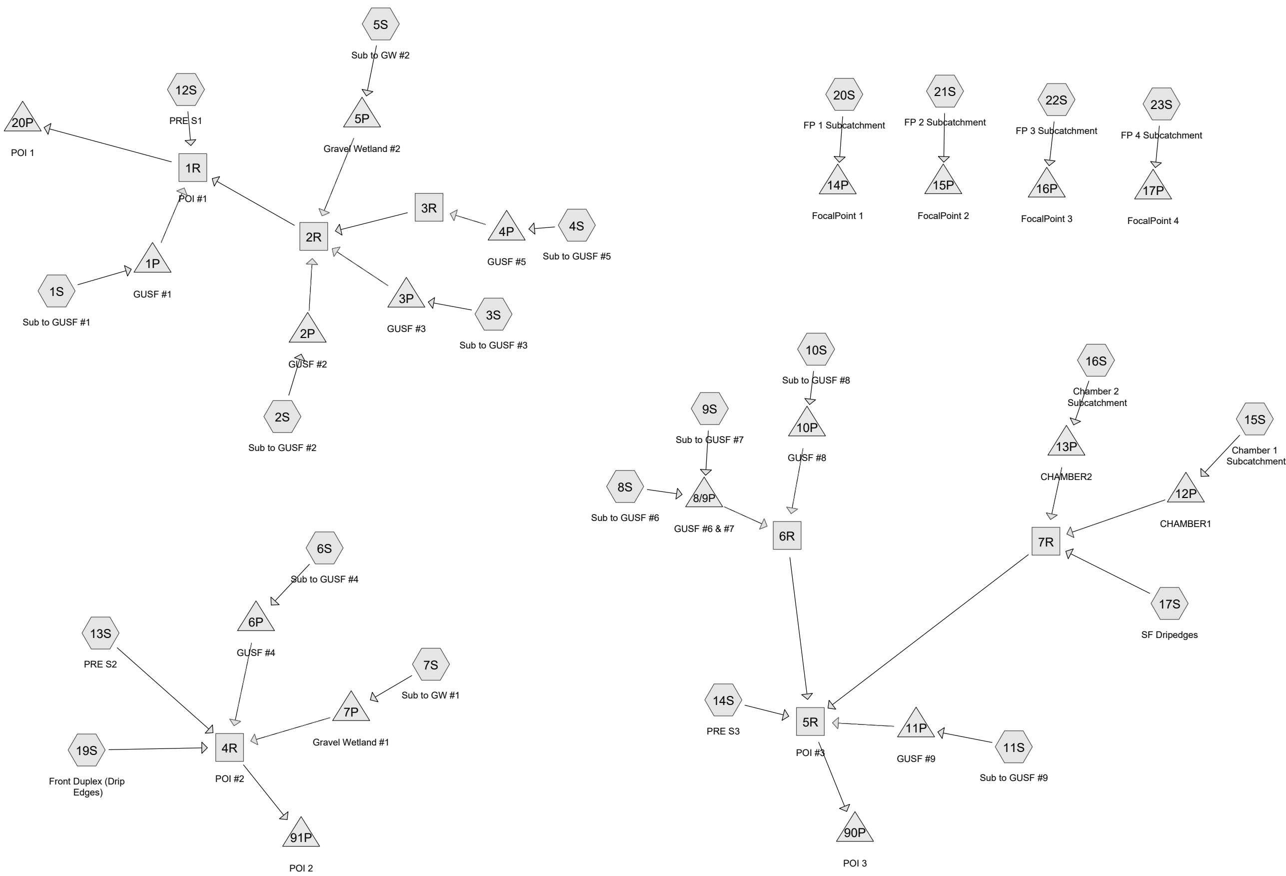
Device	Routing	Invert	Outlet Devices
#1	Primary	83.45'	**36.0" Round Culvert X 2.00** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 83.45' / 83.20' S= 0.0020 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

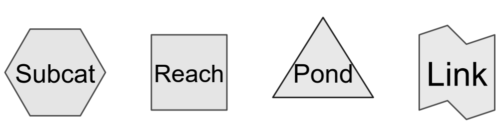
Primary OutFlow Max=145.64 cfs @ 12.96 hrs HW=92.29' (Free Discharge)
└─**1=Culvert** (Inlet Controls 145.64 cfs @ 10.30 fps)

Pond 89P: POI 3



POST DEVELOPMENT





Routing Diagram for Post - Development Update - Feb 2023 w POI Culvert Crossing

Prepared by Gorrill Palmer Consulting Engs, Printed 4/10/2023

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2 Year Saco	Type III 24-hr		Default	24.00	1	3.30	2
2	10 Year Saco	Type III 24-hr		Default	24.00	1	4.90	2
3	25 Year Saco	Type III 24-hr		Default	24.00	1	6.20	2
4	50 Year Saco	Type III 24-hr		Default	24.00	1	7.30	2
5	100 Year Saco	Type III 24-hr		Default	24.00	1	8.70	2

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=4.92 cfs 0.346 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=2.09"
Tc=5.0 min CN=88 Runoff=4.79 cfs 0.330 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=93 Runoff=3.07 cfs 0.218 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=2.64 cfs 0.185 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=11.11 cfs 0.782 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=2.45"
Tc=5.0 min CN=92 Runoff=2.94 cfs 0.207 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=2.26"
Tc=5.0 min CN=90 Runoff=19.82 cfs 1.376 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=0.22"
Tc=5.0 min CN=53 Runoff=0.15 cfs 0.034 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=1.28"
Tc=5.0 min CN=77 Runoff=1.29 cfs 0.091 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=1.41"
Tc=5.0 min CN=79 Runoff=2.37 cfs 0.165 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=2.09"
Tc=5.0 min CN=88 Runoff=5.32 cfs 0.367 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=1.16"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=5.87 cfs 1.452 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=1.48"
Flow Length=740' Tc=34.4 min CN=80 Runoff=3.60 cfs 0.487 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=1.22"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=29.36 cfs 4.936 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=1.63 cfs 0.118 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=2.85"
Tc=5.0 min CN=96 Runoff=1.91 cfs 0.141 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=0.82 cfs 0.059 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=3.07"
Tc=5.0 min CN=98 Runoff=0.20 cfs 0.015 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=2.64"
Tc=5.0 min CN=94 Runoff=1.20 cfs 0.086 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=2.96"
Tc=5.0 min CN=97 Runoff=0.41 cfs 0.031 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=2.74"
Tc=5.0 min CN=95 Runoff=1.44 cfs 0.105 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=2.96"
Tc=5.0 min CN=97 Runoff=0.44 cfs 0.033 af

Reach 1R: POI #1 Inflow=8.90 cfs 3.313 af
Outflow=8.90 cfs 3.313 af

Reach 2R: Avg. Flow Depth=0.39' Max Vel=2.10 fps Inflow=2.99 cfs 1.515 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=2.97 cfs 1.515 af

Reach 3R: Avg. Flow Depth=0.02' Max Vel=0.29 fps Inflow=0.50 cfs 0.185 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=0.33 cfs 0.185 af

Reach 4R: POI #2 Inflow=4.91 cfs 2.086 af
Outflow=4.91 cfs 2.086 af

Reach 5R: POI #3 Inflow=31.26 cfs 5.918 af
Outflow=31.26 cfs 5.918 af

Reach 6R: Avg. Flow Depth=0.23' Max Vel=0.05 fps Inflow=0.25 cfs 0.297 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=0.21 cfs 0.297 af

Reach 7R: Avg. Flow Depth=0.24' Max Vel=1.81 fps Inflow=3.64 cfs 0.319 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=1.75 cfs 0.319 af

Pond 1P: GUSF #1 Peak Elev=102.44' Storage=7,253 cf Inflow=4.92 cfs 0.346 af
Primary=0.06 cfs 0.202 af Secondary=0.81 cfs 0.144 af Tertiary=0.00 cfs 0.000 af Outflow=0.87 cfs 0.346 af

Pond 2P: GUSF #2 Peak Elev=103.34' Storage=6,730 cf Inflow=4.79 cfs 0.330 af
Primary=0.05 cfs 0.178 af Secondary=0.83 cfs 0.152 af Tertiary=0.00 cfs 0.000 af Outflow=0.88 cfs 0.330 af

Pond 3P: GUSF #3 Peak Elev=101.94' Storage=4,496 cf Inflow=3.07 cfs 0.218 af
Primary=0.04 cfs 0.129 af Secondary=0.57 cfs 0.089 af Tertiary=0.00 cfs 0.000 af Outflow=0.61 cfs 0.218 af

Pond 4P: GUSF #5 Peak Elev=102.94' Storage=3,764 cf Inflow=2.64 cfs 0.185 af
Primary=0.04 cfs 0.116 af Secondary=0.46 cfs 0.070 af Tertiary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.185 af

Pond 5P: Gravel Wetland #2 Peak Elev=100.27' Storage=17,563 cf Inflow=11.11 cfs 0.782 af
Primary=0.19 cfs 0.476 af Secondary=1.29 cfs 0.306 af Tertiary=0.00 cfs 0.000 af Outflow=1.48 cfs 0.782 af

Pond 6P: GUSF #4 Peak Elev=101.70' Storage=4,377 cf Inflow=2.94 cfs 0.207 af
Primary=0.04 cfs 0.124 af Secondary=0.38 cfs 0.083 af Tertiary=0.00 cfs 0.000 af Outflow=0.42 cfs 0.207 af

Pond 7P: Gravel Wetland #1 Peak Elev=100.29' Storage=36,339 cf Inflow=19.82 cfs 1.376 af
Primary=1.00 cfs 1.372 af Secondary=0.02 cfs 0.004 af Tertiary=0.00 cfs 0.000 af Outflow=1.02 cfs 1.376 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=99.61' Storage=1,796 cf Inflow=1.30 cfs 0.125 af
Primary=0.14 cfs 0.133 af Secondary=0.00 cfs 0.000 af Tertiary=0.00 cfs 0.000 af Outflow=0.14 cfs 0.133 af

Pond 10P: GUSF #8 Peak Elev=101.69' Storage=4,357 cf Inflow=2.37 cfs 0.165 af
Primary=0.05 cfs 0.145 af Secondary=0.06 cfs 0.019 af Tertiary=0.00 cfs 0.000 af Outflow=0.11 cfs 0.165 af

Pond 11P: GUSF #9 Peak Elev=98.42' Storage=8,216 cf Inflow=5.32 cfs 0.367 af
Primary=0.07 cfs 0.241 af Secondary=0.43 cfs 0.126 af Tertiary=0.00 cfs 0.000 af Outflow=0.50 cfs 0.367 af

Pond 12P: CHAMBER1 Peak Elev=107.13' Storage=0.043 af Inflow=1.63 cfs 0.118 af
Primary=0.02 cfs 0.071 af Secondary=1.31 cfs 0.048 af Outflow=1.33 cfs 0.118 af

Pond 13P: CHAMBER2 Peak Elev=106.91' Storage=0.051 af Inflow=1.91 cfs 0.141 af
Primary=0.02 cfs 0.079 af Secondary=1.64 cfs 0.062 af Outflow=1.66 cfs 0.141 af

Pond 14P: FocalPoint 1 Peak Elev=108.84' Storage=75 cf Inflow=1.20 cfs 0.086 af
Primary=0.15 cfs 0.060 af Secondary=1.05 cfs 0.026 af Outflow=1.20 cfs 0.086 af

Pond 15P: FocalPoint 2 Peak Elev=108.77' Storage=32 cf Inflow=0.41 cfs 0.031 af
Primary=0.15 cfs 0.038 af Secondary=0.26 cfs 0.003 af Outflow=0.41 cfs 0.041 af

Pond 16P: FocalPoint 3 Peak Elev=108.86' Storage=82 cf Inflow=1.44 cfs 0.105 af
Primary=0.18 cfs 0.056 af Secondary=1.26 cfs 0.031 af Outflow=1.44 cfs 0.087 af

Pond 17P: FocalPoint 4 Peak Elev=108.77' Storage=45 cf Inflow=0.44 cfs 0.033 af
Primary=0.07 cfs 0.017 af Secondary=0.37 cfs 0.008 af Outflow=0.44 cfs 0.025 af

Pond 20P: POI 1 Peak Elev=85.14' Storage=18 cf Inflow=8.90 cfs 3.313 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=8.90 cfs 3.313 af

Pond 90P: POI 3 Peak Elev=85.47' Storage=793 cf Inflow=31.26 cfs 5.918 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=31.24 cfs 5.918 af

Pond 91P: POI 2 Peak Elev=95.30' Storage=3,593 cf Inflow=4.91 cfs 2.086 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=3.28 cfs 2.085 af

Total Runoff Area = 93.822 ac Runoff Volume = 11.565 af Average Runoff Depth = 1.48"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=7.82 cfs 0.565 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=88 Runoff=8.05 cfs 0.564 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=4.10"
Tc=5.0 min CN=93 Runoff=4.82 cfs 0.352 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=4.19 cfs 0.303 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=17.68 cfs 1.276 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=3.99"
Tc=5.0 min CN=92 Runoff=4.68 cfs 0.338 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=3.78"
Tc=5.0 min CN=90 Runoff=32.39 cfs 2.300 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=0.81"
Tc=5.0 min CN=53 Runoff=1.32 cfs 0.124 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=2.54"
Tc=5.0 min CN=77 Runoff=2.62 cfs 0.180 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=2.72"
Tc=5.0 min CN=79 Runoff=4.62 cfs 0.316 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=3.57"
Tc=5.0 min CN=88 Runoff=8.95 cfs 0.628 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=2.37"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=12.50 cfs 2.959 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=2.81"
Flow Length=740' Tc=34.4 min CN=80 Runoff=6.89 cfs 0.924 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=2.45"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=60.94 cfs 9.908 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=2.50 cfs 0.186 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=4.43"
Tc=5.0 min CN=96 Runoff=2.91 cfs 0.220 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=1.25 cfs 0.093 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=4.66"
Tc=5.0 min CN=98 Runoff=0.30 cfs 0.023 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=4.21"
Tc=5.0 min CN=94 Runoff=1.86 cfs 0.137 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=4.55"
Tc=5.0 min CN=97 Runoff=0.62 cfs 0.048 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=4.32"
Tc=5.0 min CN=95 Runoff=2.22 cfs 0.165 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=4.55"
Tc=5.0 min CN=97 Runoff=0.67 cfs 0.052 af

Reach 1R: POI #1 Inflow=20.12 cfs 6.019 af
Outflow=20.12 cfs 6.019 af

Reach 2R: Avg. Flow Depth=0.67' Max Vel=3.01 fps Inflow=9.65 cfs 2.495 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=9.64 cfs 2.495 af

Reach 3R: Avg. Flow Depth=0.05' Max Vel=0.46 fps Inflow=1.72 cfs 0.303 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=1.26 cfs 0.303 af

Reach 4R: POI #2 Inflow=9.39 cfs 3.585 af
Outflow=9.39 cfs 3.585 af

Reach 5R: POI #3 Inflow=64.91 cfs 11.655 af
Outflow=64.91 cfs 11.655 af

Reach 6R: Avg. Flow Depth=0.37' Max Vel=0.07 fps Inflow=1.08 cfs 0.620 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=0.48 cfs 0.620 af

Reach 7R: Avg. Flow Depth=0.41' Max Vel=2.41 fps Inflow=6.60 cfs 0.499 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=4.52 cfs 0.499 af

Pond 1P: GUSF #1 Peak Elev=103.06' Storage=10,603 cf Inflow=7.82 cfs 0.565 af
Primary=0.06 cfs 0.214 af Secondary=2.21 cfs 0.350 af Tertiary=0.00 cfs 0.000 af Outflow=2.27 cfs 0.565 af

Pond 2P: GUSF #2 Peak Elev=103.95' Storage=9,678 cf Inflow=8.05 cfs 0.564 af
Primary=0.05 cfs 0.188 af Secondary=2.86 cfs 0.376 af Tertiary=0.00 cfs 0.000 af Outflow=2.91 cfs 0.564 af

Pond 3P: GUSF #3 Peak Elev=102.39' Storage=6,215 cf Inflow=4.82 cfs 0.352 af
Primary=0.04 cfs 0.138 af Secondary=1.73 cfs 0.214 af Tertiary=0.00 cfs 0.000 af Outflow=1.77 cfs 0.352 af

Pond 4P: GUSF #5 Peak Elev=103.30' Storage=5,115 cf Inflow=4.19 cfs 0.303 af
Primary=0.04 cfs 0.125 af Secondary=1.68 cfs 0.178 af Tertiary=0.00 cfs 0.000 af Outflow=1.72 cfs 0.303 af

Pond 5P: Gravel Wetland #2 Peak Elev=100.91' Storage=25,421 cf Inflow=17.68 cfs 1.276 af
Primary=0.22 cfs 0.515 af Secondary=4.72 cfs 0.761 af Tertiary=0.00 cfs 0.000 af Outflow=4.94 cfs 1.276 af

Pond 6P: GUSF #4 Peak Elev=102.47' Storage=7,091 cf Inflow=4.68 cfs 0.338 af
Primary=0.04 cfs 0.133 af Secondary=0.75 cfs 0.205 af Tertiary=0.00 cfs 0.000 af Outflow=0.79 cfs 0.338 af

Pond 7P: Gravel Wetland #1 Peak Elev=101.50' Storage=61,379 cf Inflow=32.39 cfs 2.300 af
Primary=1.58 cfs 2.178 af Secondary=0.18 cfs 0.122 af Tertiary=0.00 cfs 0.000 af Outflow=1.76 cfs 2.300 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=100.58' Storage=6,943 cf Inflow=3.90 cfs 0.304 af
Primary=0.14 cfs 0.280 af Secondary=0.07 cfs 0.023 af Tertiary=0.00 cfs 0.000 af Outflow=0.21 cfs 0.304 af

Pond 10P: GUSF #8 Peak Elev=102.09' Storage=6,024 cf Inflow=4.62 cfs 0.316 af
Primary=0.05 cfs 0.157 af Secondary=0.89 cfs 0.160 af Tertiary=0.00 cfs 0.000 af Outflow=0.94 cfs 0.316 af

Pond 11P: GUSF #9 Peak Elev=99.06' Storage=12,331 cf Inflow=8.95 cfs 0.628 af
Primary=0.07 cfs 0.255 af Secondary=1.99 cfs 0.373 af Tertiary=0.00 cfs 0.000 af Outflow=2.06 cfs 0.628 af

Pond 12P: CHAMBER1 Peak Elev=107.23' Storage=0.044 af Inflow=2.50 cfs 0.186 af
Primary=0.02 cfs 0.074 af Secondary=2.46 cfs 0.112 af Outflow=2.48 cfs 0.186 af

Pond 13P: CHAMBER2 Peak Elev=107.01' Storage=0.052 af Inflow=2.91 cfs 0.220 af
Primary=0.02 cfs 0.082 af Secondary=2.85 cfs 0.138 af Outflow=2.87 cfs 0.220 af

Pond 14P: FocalPoint 1 Peak Elev=108.89' Storage=83 cf Inflow=1.86 cfs 0.137 af
Primary=0.15 cfs 0.087 af Secondary=1.71 cfs 0.050 af Outflow=1.86 cfs 0.137 af

Pond 15P: FocalPoint 2 Peak Elev=108.80' Storage=35 cf Inflow=0.62 cfs 0.048 af
Primary=0.15 cfs 0.026 af Secondary=0.47 cfs 0.008 af Outflow=0.62 cfs 0.034 af

Pond 16P: FocalPoint 3 Peak Elev=108.91' Storage=91 cf Inflow=2.22 cfs 0.165 af
Primary=0.18 cfs 0.115 af Secondary=2.04 cfs 0.060 af Outflow=2.21 cfs 0.174 af

Pond 17P: FocalPoint 4 Peak Elev=108.79' Storage=48 cf Inflow=0.67 cfs 0.052 af
Primary=0.07 cfs 0.048 af Secondary=0.59 cfs 0.015 af Outflow=0.67 cfs 0.064 af

Pond 20P: POI 1 Peak Elev=85.79' Storage=40 cf Inflow=20.12 cfs 6.019 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=20.12 cfs 6.019 af

Pond 90P: POI 3 Peak Elev=86.67' Storage=1,588 cf Inflow=64.91 cfs 11.655 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=64.88 cfs 11.655 af

Pond 91P: POI 2 Peak Elev=96.42' Storage=14,131 cf Inflow=9.39 cfs 3.585 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.22 cfs 3.585 af

Total Runoff Area = 93.822 ac Runoff Volume = 21.661 af Average Runoff Depth = 2.77"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1	Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=10.16 cfs 0.745 af
Subcatchment 2S: Sub to GUSF #2	Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=4.82" Tc=5.0 min CN=88 Runoff=10.69 cfs 0.761 af
Subcatchment 3S: Sub to GUSF #3	Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=5.38" Tc=5.0 min CN=93 Runoff=6.23 cfs 0.461 af
Subcatchment 4S: Sub to GUSF #5	Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=5.44 cfs 0.399 af
Subcatchment 5S: Sub to GW #2	Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=22.96 cfs 1.683 af
Subcatchment 6S: Sub to GUSF #4	Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=5.27" Tc=5.0 min CN=92 Runoff=6.08 cfs 0.446 af
Subcatchment 7S: Sub to GW #1	Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=5.04" Tc=5.0 min CN=90 Runoff=42.53 cfs 3.067 af
Subcatchment 8S: Sub to GUSF #6	Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=1.47" Tc=5.0 min CN=53 Runoff=2.85 cfs 0.225 af
Subcatchment 9S: Sub to GUSF #7	Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=3.65" Tc=5.0 min CN=77 Runoff=3.77 cfs 0.258 af
Subcatchment 10S: Sub to GUSF #8	Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=3.86" Tc=5.0 min CN=79 Runoff=6.53 cfs 0.449 af
Subcatchment 11S: Sub to GUSF #9	Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=4.82" Tc=5.0 min CN=88 Runoff=11.90 cfs 0.846 af
Subcatchment 12S: PRE S1	Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=3.45" Flow Length=2,066' Tc=91.1 min CN=75 Runoff=18.37 cfs 4.315 af
Subcatchment 13S: PRE S2	Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=3.96" Flow Length=740' Tc=34.4 min CN=80 Runoff=9.70 cfs 1.305 af
Subcatchment 14S: PRE S3	Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=3.55" Flow Length=2,998' Tc=49.9 min CN=76 Runoff=88.58 cfs 14.351 af
Subcatchment 15S: Chamber 1	Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=5.61" Tc=5.0 min CN=95 Runoff=3.20 cfs 0.242 af
Subcatchment 16S: Chamber 2	Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=5.73" Tc=5.0 min CN=96 Runoff=3.71 cfs 0.284 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=5.61"
Tc=5.0 min CN=95 Runoff=1.60 cfs 0.121 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=5.96"
Tc=5.0 min CN=98 Runoff=0.38 cfs 0.030 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=5.49"
Tc=5.0 min CN=94 Runoff=2.40 cfs 0.179 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=97 Runoff=0.79 cfs 0.061 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=5.61"
Tc=5.0 min CN=95 Runoff=2.84 cfs 0.215 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=5.84"
Tc=5.0 min CN=97 Runoff=0.85 cfs 0.066 af

Reach 1R: POI #1 Inflow=30.16 cfs 8.364 af
Outflow=30.16 cfs 8.364 af

Reach 2R: Avg. Flow Depth=0.82' Max Vel=3.41 fps Inflow=14.52 cfs 3.305 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=14.51 cfs 3.305 af

Reach 3R: Avg. Flow Depth=0.07' Max Vel=0.57 fps Inflow=2.62 cfs 0.399 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=2.14 cfs 0.399 af

Reach 4R: POI #2 Inflow=12.79 cfs 4.848 af
Outflow=12.79 cfs 4.848 af

Reach 5R: POI #3 Inflow=93.82 cfs 16.776 af
Outflow=93.82 cfs 16.776 af

Reach 6R: Avg. Flow Depth=0.58' Max Vel=0.09 fps Inflow=2.34 cfs 0.932 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=1.11 cfs 0.932 af

Reach 7R: Avg. Flow Depth=0.48' Max Vel=2.63 fps Inflow=8.45 cfs 0.647 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=6.15 cfs 0.647 af

Pond 1P: GUSF #1 Peak Elev=103.56' Storage=13,603 cf Inflow=10.16 cfs 0.745 af
Primary=0.06 cfs 0.221 af Secondary=2.88 cfs 0.524 af Tertiary=0.00 cfs 0.000 af Outflow=2.94 cfs 0.745 af

Pond 2P: GUSF #2 Peak Elev=104.46' Storage=12,391 cf Inflow=10.69 cfs 0.761 af
Primary=0.05 cfs 0.194 af Secondary=3.93 cfs 0.567 af Tertiary=0.00 cfs 0.000 af Outflow=3.98 cfs 0.761 af

Pond 3P: GUSF #3 Peak Elev=102.75' Storage=7,694 cf Inflow=6.23 cfs 0.461 af
Primary=0.04 cfs 0.142 af Secondary=2.33 cfs 0.319 af Tertiary=0.00 cfs 0.000 af Outflow=2.37 cfs 0.461 af

Pond 4P: GUSF #5 Peak Elev=103.56' Storage=6,154 cf Inflow=5.44 cfs 0.399 af
Primary=0.04 cfs 0.129 af Secondary=2.58 cfs 0.270 af Tertiary=0.00 cfs 0.000 af Outflow=2.62 cfs 0.399 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.38' Storage=31,516 cf Inflow=22.96 cfs 1.683 af
Primary=0.23 cfs 0.539 af Secondary=7.12 cfs 1.145 af Tertiary=0.00 cfs 0.000 af Outflow=7.35 cfs 1.683 af

Pond 6P: GUSF #4 Peak Elev=103.05' Storage=9,449 cf Inflow=6.08 cfs 0.446 af
Primary=0.04 cfs 0.137 af Secondary=0.93 cfs 0.308 af Tertiary=0.00 cfs 0.000 af Outflow=0.97 cfs 0.446 af

Pond 7P: Gravel Wetland #1 Peak Elev=102.48' Storage=83,837 cf Inflow=42.53 cfs 3.067 af
Primary=1.92 cfs 2.850 af Secondary=0.24 cfs 0.217 af Tertiary=0.00 cfs 0.000 af Outflow=2.16 cfs 3.067 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=100.91' Storage=9,191 cf Inflow=6.59 cfs 0.483 af
Primary=0.14 cfs 0.307 af Secondary=0.46 cfs 0.176 af Tertiary=0.00 cfs 0.000 af Outflow=0.60 cfs 0.483 af

Pond 10P: GUSF #8 Peak Elev=102.49' Storage=7,790 cf Inflow=6.53 cfs 0.449 af
Primary=0.05 cfs 0.163 af Secondary=1.86 cfs 0.287 af Tertiary=0.00 cfs 0.000 af Outflow=1.91 cfs 0.449 af

Pond 11P: GUSF #9 Peak Elev=99.62' Storage=16,394 cf Inflow=11.90 cfs 0.846 af
Primary=0.07 cfs 0.263 af Secondary=2.80 cfs 0.583 af Tertiary=0.00 cfs 0.000 af Outflow=2.87 cfs 0.846 af

Pond 12P: CHAMBER1 Peak Elev=107.28' Storage=0.044 af Inflow=3.20 cfs 0.242 af
Primary=0.02 cfs 0.076 af Secondary=3.16 cfs 0.166 af Outflow=3.18 cfs 0.242 af

Pond 13P: CHAMBER2 Peak Elev=107.06' Storage=0.053 af Inflow=3.71 cfs 0.284 af
Primary=0.02 cfs 0.083 af Secondary=3.65 cfs 0.201 af Outflow=3.67 cfs 0.284 af

Pond 14P: FocalPoint 1 Peak Elev=108.93' Storage=89 cf Inflow=2.40 cfs 0.179 af
Primary=0.15 cfs 0.107 af Secondary=2.25 cfs 0.072 af Outflow=2.39 cfs 0.179 af

Pond 15P: FocalPoint 2 Peak Elev=108.82' Storage=37 cf Inflow=0.79 cfs 0.061 af
Primary=0.15 cfs 0.041 af Secondary=0.64 cfs 0.013 af Outflow=0.79 cfs 0.055 af

Pond 16P: FocalPoint 3 Peak Elev=108.96' Storage=97 cf Inflow=2.84 cfs 0.215 af
Primary=0.18 cfs 0.143 af Secondary=2.69 cfs 0.086 af Outflow=2.86 cfs 0.228 af

Pond 17P: FocalPoint 4 Peak Elev=108.81' Storage=50 cf Inflow=0.85 cfs 0.066 af
Primary=0.07 cfs 0.053 af Secondary=0.78 cfs 0.022 af Outflow=0.85 cfs 0.075 af

Pond 20P: POI 1 Peak Elev=86.31' Storage=80 cf Inflow=30.16 cfs 8.364 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=30.16 cfs 8.364 af

Pond 90P: POI 3 Peak Elev=87.99' Storage=2,890 cf Inflow=93.82 cfs 16.776 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=93.68 cfs 16.776 af

Pond 91P: POI 2 Peak Elev=96.97' Storage=24,720 cf Inflow=12.79 cfs 4.848 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.61 cfs 4.848 af

Total Runoff Area = 93.822 ac Runoff Volume = 30.510 af Average Runoff Depth = 3.90"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=12.12 cfs 0.898 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=5.89"
Tc=5.0 min CN=88 Runoff=12.92 cfs 0.929 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=6.47"
Tc=5.0 min CN=93 Runoff=7.42 cfs 0.555 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=6.49 cfs 0.481 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=27.39 cfs 2.030 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=6.35"
Tc=5.0 min CN=92 Runoff=7.25 cfs 0.537 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=6.12"
Tc=5.0 min CN=90 Runoff=51.04 cfs 3.722 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=2.12"
Tc=5.0 min CN=53 Runoff=4.36 cfs 0.323 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=4.64"
Tc=5.0 min CN=77 Runoff=4.76 cfs 0.328 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=4.86"
Tc=5.0 min CN=79 Runoff=8.18 cfs 0.566 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=5.89"
Tc=5.0 min CN=88 Runoff=14.37 cfs 1.034 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=4.41"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=23.50 cfs 5.516 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=4.97"
Flow Length=740' Tc=34.4 min CN=80 Runoff=12.12 cfs 1.638 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=4.53"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=112.64 cfs 18.277 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=3.78 cfs 0.289 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=6.82"
Tc=5.0 min CN=96 Runoff=4.38 cfs 0.338 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=1.90 cfs 0.145 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=7.06"
Tc=5.0 min CN=98 Runoff=0.44 cfs 0.035 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=6.59"
Tc=5.0 min CN=94 Runoff=2.84 cfs 0.215 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=6.94"
Tc=5.0 min CN=97 Runoff=0.93 cfs 0.073 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=6.70"
Tc=5.0 min CN=95 Runoff=3.36 cfs 0.257 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=6.94"
Tc=5.0 min CN=97 Runoff=1.01 cfs 0.079 af

Reach 1R: POI #1 Inflow=38.52 cfs 10.410 af
Outflow=38.52 cfs 10.410 af

Reach 2R: Avg. Flow Depth=0.90' Max Vel=3.62 fps Inflow=17.81 cfs 3.996 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=17.79 cfs 3.996 af

Reach 3R: Avg. Flow Depth=0.08' Max Vel=0.62 fps Inflow=3.13 cfs 0.481 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=2.71 cfs 0.481 af

Reach 4R: POI #2 Inflow=15.60 cfs 5.933 af
Outflow=15.60 cfs 5.933 af

Reach 5R: POI #3 Inflow=118.77 cfs 21.300 af
Outflow=118.77 cfs 21.300 af

Reach 6R: Avg. Flow Depth=0.73' Max Vel=0.10 fps Inflow=3.33 cfs 1.217 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=1.71 cfs 1.217 af

Reach 7R: Avg. Flow Depth=0.52' Max Vel=2.77 fps Inflow=10.00 cfs 0.772 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=7.41 cfs 0.772 af

Pond 1P: GUSF #1 Peak Elev=103.94' Storage=16,034 cf Inflow=12.12 cfs 0.898 af
Primary=0.06 cfs 0.225 af Secondary=3.30 cfs 0.673 af Tertiary=0.04 cfs 0.000 af Outflow=3.41 cfs 0.898 af

Pond 2P: GUSF #2 Peak Elev=104.85' Storage=14,594 cf Inflow=12.92 cfs 0.929 af
Primary=0.05 cfs 0.197 af Secondary=4.58 cfs 0.732 af Tertiary=0.03 cfs 0.000 af Outflow=4.66 cfs 0.929 af

Pond 3P: GUSF #3 Peak Elev=103.01' Storage=8,851 cf Inflow=7.42 cfs 0.555 af
Primary=0.04 cfs 0.145 af Secondary=2.70 cfs 0.409 af Tertiary=0.05 cfs 0.000 af Outflow=2.78 cfs 0.555 af

Pond 4P: GUSF #5 Peak Elev=103.75' Storage=6,968 cf Inflow=6.49 cfs 0.481 af
Primary=0.04 cfs 0.132 af Secondary=3.04 cfs 0.349 af Tertiary=0.05 cfs 0.000 af Outflow=3.13 cfs 0.481 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.75' Storage=36,622 cf Inflow=27.39 cfs 2.030 af
Primary=0.25 cfs 0.555 af Secondary=8.50 cfs 1.474 af Tertiary=0.15 cfs 0.001 af Outflow=8.90 cfs 2.030 af

Pond 6P: GUSF #4 Peak Elev=103.49' Storage=11,406 cf Inflow=7.25 cfs 0.537 af
Primary=0.04 cfs 0.140 af Secondary=1.06 cfs 0.397 af Tertiary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.537 af

Pond 7P: Gravel Wetland #1 Peak Elev=103.26' Storage=103,371 cf Inflow=51.04 cfs 3.722 af
Primary=2.15 cfs 3.427 af Secondary=0.28 cfs 0.295 af Tertiary=0.00 cfs 0.000 af Outflow=2.44 cfs 3.722 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=101.32' Storage=12,304 cf Inflow=9.10 cfs 0.651 af
Primary=0.14 cfs 0.321 af Secondary=0.76 cfs 0.330 af Tertiary=0.00 cfs 0.000 af Outflow=0.90 cfs 0.651 af

Pond 10P: GUSF #8 Peak Elev=102.87' Storage=9,607 cf Inflow=8.18 cfs 0.566 af
Primary=0.05 cfs 0.166 af Secondary=2.47 cfs 0.400 af Tertiary=0.00 cfs 0.000 af Outflow=2.52 cfs 0.566 af

Pond 11P: GUSF #9 Peak Elev=100.07' Storage=19,896 cf Inflow=14.37 cfs 1.034 af
Primary=0.07 cfs 0.269 af Secondary=3.30 cfs 0.765 af Tertiary=0.04 cfs 0.000 af Outflow=3.41 cfs 1.034 af

Pond 12P: CHAMBER1 Peak Elev=107.32' Storage=0.044 af Inflow=3.78 cfs 0.289 af
Primary=0.02 cfs 0.077 af Secondary=3.74 cfs 0.212 af Outflow=3.76 cfs 0.289 af

Pond 13P: CHAMBER2 Peak Elev=107.10' Storage=0.053 af Inflow=4.38 cfs 0.338 af
Primary=0.02 cfs 0.084 af Secondary=4.33 cfs 0.254 af Outflow=4.35 cfs 0.338 af

Pond 14P: FocalPoint 1 Peak Elev=108.96' Storage=93 cf Inflow=2.84 cfs 0.215 af
Primary=0.15 cfs 0.122 af Secondary=2.69 cfs 0.093 af Outflow=2.84 cfs 0.215 af

Pond 15P: FocalPoint 2 Peak Elev=108.84' Storage=38 cf Inflow=0.93 cfs 0.073 af
Primary=0.15 cfs 0.057 af Secondary=0.78 cfs 0.018 af Outflow=0.93 cfs 0.075 af

Pond 16P: FocalPoint 3 Peak Elev=108.99' Storage=97 cf Inflow=3.36 cfs 0.257 af
Primary=0.18 cfs 0.164 af Secondary=3.22 cfs 0.111 af Outflow=3.40 cfs 0.275 af

Pond 17P: FocalPoint 4 Peak Elev=108.83' Storage=51 cf Inflow=1.01 cfs 0.079 af
Primary=0.07 cfs 0.063 af Secondary=0.93 cfs 0.028 af Outflow=1.00 cfs 0.091 af

Pond 20P: POI 1 Peak Elev=86.76' Storage=175 cf Inflow=38.52 cfs 10.410 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=38.51 cfs 10.410 af

Pond 90P: POI 3 Peak Elev=89.50' Storage=10,115 cf Inflow=118.77 cfs 21.300 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=114.63 cfs 21.300 af

Pond 91P: POI 2 Peak Elev=97.37' Storage=34,760 cf Inflow=15.60 cfs 5.933 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=4.88 cfs 5.933 af

Total Runoff Area = 93.822 ac Runoff Volume = 38.266 af Average Runoff Depth = 4.89"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Time span=0.00-100.00 hrs, dt=0.01 hrs, 10001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Sub to GUSF #1 Runoff Area=73,933 sf 67.19% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=14.60 cfs 1.094 af

Subcatchment 2S: Sub to GUSF #2 Runoff Area=82,545 sf 47.04% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=15.74 cfs 1.145 af

Subcatchment 3S: Sub to GUSF #3 Runoff Area=44,837 sf 71.91% Impervious Runoff Depth=7.86"
Tc=5.0 min CN=93 Runoff=8.92 cfs 0.674 af

Subcatchment 4S: Sub to GUSF #5 Runoff Area=39,620 sf 67.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=7.82 cfs 0.586 af

Subcatchment 5S: Sub to GW #2 Runoff Area=167,094 sf 63.95% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=33.00 cfs 2.473 af

Subcatchment 6S: Sub to GUSF #4 Runoff Area=44,235 sf 66.73% Impervious Runoff Depth=7.74"
Tc=5.0 min CN=92 Runoff=8.74 cfs 0.655 af

Subcatchment 7S: Sub to GW #1 Runoff Area=318,070 sf 60.35% Impervious Runoff Depth=7.50"
Tc=5.0 min CN=90 Runoff=61.81 cfs 4.561 af

Subcatchment 8S: Sub to GUSF #6 Runoff Area=79,636 sf 23.58% Impervious Runoff Depth=3.04"
Tc=5.0 min CN=53 Runoff=6.49 cfs 0.463 af

Subcatchment 9S: Sub to GUSF #7 Runoff Area=36,965 sf 63.79% Impervious Runoff Depth=5.92"
Tc=5.0 min CN=77 Runoff=6.04 cfs 0.419 af

Subcatchment 10S: Sub to GUSF #8 Runoff Area=60,887 sf 60.77% Impervious Runoff Depth=6.16"
Tc=5.0 min CN=79 Runoff=10.29 cfs 0.718 af

Subcatchment 11S: Sub to GUSF #9 Runoff Area=91,815 sf 70.56% Impervious Runoff Depth=7.25"
Tc=5.0 min CN=88 Runoff=17.50 cfs 1.274 af

Subcatchment 12S: PRE S1 Runoff Area=653,124 sf 12.20% Impervious Runoff Depth=5.68"
Flow Length=2,066' Tc=91.1 min CN=75 Runoff=30.14 cfs 7.094 af

Subcatchment 13S: PRE S2 Runoff Area=172,161 sf 11.00% Impervious Runoff Depth=6.28"
Flow Length=740' Tc=34.4 min CN=80 Runoff=15.20 cfs 2.070 af

Subcatchment 14S: PRE S3 Runoff Area=2,111,132 sf 12.78% Impervious Runoff Depth=5.80"
Flow Length=2,998' Tc=49.9 min CN=76 Runoff=143.68 cfs 23.420 af

Subcatchment 15S: Chamber 1 Runoff Area=22,534 sf 84.12% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=4.53 cfs 0.349 af

Subcatchment 16S: Chamber 2 Runoff Area=25,923 sf 86.51% Impervious Runoff Depth=8.22"
Tc=5.0 min CN=96 Runoff=5.24 cfs 0.408 af

Subcatchment 17S: SF Dripedges Runoff Area=11,292 sf 82.15% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=2.27 cfs 0.175 af

Subcatchment 19S: Front Duplex (Drip Runoff Area=2,612 sf 100.00% Impervious Runoff Depth=8.46"
Tc=5.0 min CN=98 Runoff=0.53 cfs 0.042 af

Subcatchment 20S: FP 1 Subcatchment Runoff Area=17,052 sf 80.52% Impervious Runoff Depth=7.98"
Tc=5.0 min CN=94 Runoff=3.41 cfs 0.260 af

Subcatchment 21S: FP 2 Subcatchment Runoff Area=5,482 sf 95.31% Impervious Runoff Depth=8.34"
Tc=5.0 min CN=97 Runoff=1.11 cfs 0.087 af

Subcatchment 22S: FP 3 Subcatchment Runoff Area=20,003 sf 83.70% Impervious Runoff Depth=8.10"
Tc=5.0 min CN=95 Runoff=4.02 cfs 0.310 af

Subcatchment 23S: FP 4 Subcatchment Runoff Area=5,920 sf 96.01% Impervious Runoff Depth=8.34"
Tc=5.0 min CN=97 Runoff=1.20 cfs 0.094 af

Reach 1R: POI #1 Inflow=46.32 cfs 13.067 af
Outflow=46.32 cfs 13.067 af

Reach 2R: Avg. Flow Depth=1.16' Max Vel=4.27 fps Inflow=31.39 cfs 4.879 af
n=0.025 L=457.6' S=0.0077 '/' Capacity=232.90 cfs Outflow=30.76 cfs 4.879 af

Reach 3R: Avg. Flow Depth=0.09' Max Vel=0.70 fps Inflow=5.07 cfs 0.586 af
n=0.030 L=565.9' S=0.0046 '/' Capacity=997.94 cfs Outflow=3.64 cfs 0.586 af

Reach 4R: POI #2 Inflow=20.14 cfs 7.328 af
Outflow=20.14 cfs 7.328 af

Reach 5R: POI #3 Inflow=150.41 cfs 27.225 af
Outflow=150.41 cfs 27.225 af

Reach 6R: Avg. Flow Depth=0.98' Max Vel=0.12 fps Inflow=8.82 cfs 1.599 af
n=0.800 L=610.0' S=0.0066 '/' Capacity=13.21 cfs Outflow=2.99 cfs 1.599 af

Reach 7R: Avg. Flow Depth=0.58' Max Vel=2.93 fps Inflow=11.98 cfs 0.932 af
n=0.025 L=1,480.0' S=0.0083 '/' Capacity=129.49 cfs Outflow=9.01 cfs 0.932 af

Pond 1P: GUSF #1 Peak Elev=104.12' Storage=17,272 cf Inflow=14.60 cfs 1.094 af
Primary=0.06 cfs 0.229 af Secondary=3.49 cfs 0.801 af Tertiary=3.05 cfs 0.065 af Outflow=6.60 cfs 1.094 af

Pond 2P: GUSF #2 Peak Elev=105.06' Storage=15,857 cf Inflow=15.74 cfs 1.145 af
Primary=0.05 cfs 0.201 af Secondary=4.90 cfs 0.884 af Tertiary=3.68 cfs 0.061 af Outflow=8.63 cfs 1.145 af

Pond 3P: GUSF #3 Peak Elev=103.15' Storage=9,497 cf Inflow=8.92 cfs 0.674 af
Primary=0.04 cfs 0.148 af Secondary=2.87 cfs 0.494 af Tertiary=2.16 cfs 0.033 af Outflow=5.07 cfs 0.674 af

Pond 4P: GUSF #5 Peak Elev=103.87' Storage=7,523 cf Inflow=7.82 cfs 0.586 af
Primary=0.04 cfs 0.135 af Secondary=3.32 cfs 0.431 af Tertiary=1.71 cfs 0.020 af Outflow=5.07 cfs 0.586 af

Pond 5P: Gravel Wetland #2 Peak Elev=101.96' Storage=39,563 cf Inflow=33.00 cfs 2.473 af
Primary=0.25 cfs 0.572 af Secondary=9.18 cfs 1.763 af Tertiary=7.31 cfs 0.138 af Outflow=16.75 cfs 2.473 af

Pond 6P: GUSF #4 Peak Elev=103.85' Storage=13,136 cf Inflow=8.74 cfs 0.655 af
Primary=0.04 cfs 0.143 af Secondary=1.14 cfs 0.488 af Tertiary=1.14 cfs 0.024 af Outflow=2.32 cfs 0.655 af

Pond 7P: Gravel Wetland #1 Peak Elev=104.19' Storage=128,676 cf Inflow=61.81 cfs 4.561 af
Primary=2.40 cfs 4.166 af Secondary=0.32 cfs 0.395 af Tertiary=0.00 cfs 0.000 af Outflow=2.73 cfs 4.561 af

Pond 8/9P: GUSF #6 & #7 Peak Elev=101.49' Storage=13,692 cf Inflow=12.51 cfs 0.881 af
Primary=0.14 cfs 0.335 af Secondary=0.86 cfs 0.411 af Tertiary=3.57 cfs 0.136 af Outflow=4.57 cfs 0.881 af

Pond 10P: GUSF #8 Peak Elev=103.07' Storage=10,577 cf Inflow=10.29 cfs 0.718 af
Primary=0.05 cfs 0.170 af Secondary=2.73 cfs 0.489 af Tertiary=3.11 cfs 0.058 af Outflow=5.88 cfs 0.718 af

Pond 11P: GUSF #9 Peak Elev=100.28' Storage=21,691 cf Inflow=17.50 cfs 1.274 af
Primary=0.07 cfs 0.274 af Secondary=3.52 cfs 0.906 af Tertiary=3.80 cfs 0.093 af Outflow=7.39 cfs 1.274 af

Pond 12P: CHAMBER1 Peak Elev=107.36' Storage=0.045 af Inflow=4.53 cfs 0.349 af
Primary=0.02 cfs 0.077 af Secondary=4.49 cfs 0.272 af Outflow=4.51 cfs 0.349 af

Pond 13P: CHAMBER2 Peak Elev=107.15' Storage=0.054 af Inflow=5.24 cfs 0.408 af
Primary=0.02 cfs 0.085 af Secondary=5.19 cfs 0.323 af Outflow=5.21 cfs 0.408 af

Pond 14P: FocalPoint 1 Peak Elev=108.99' Storage=99 cf Inflow=3.41 cfs 0.260 af
Primary=0.15 cfs 0.138 af Secondary=3.26 cfs 0.122 af Outflow=3.41 cfs 0.260 af

Pond 15P: FocalPoint 2 Peak Elev=108.86' Storage=40 cf Inflow=1.11 cfs 0.087 af
Primary=0.15 cfs 0.085 af Secondary=0.96 cfs 0.024 af Outflow=1.11 cfs 0.108 af

Pond 16P: FocalPoint 3 Peak Elev=109.03' Storage=97 cf Inflow=4.02 cfs 0.310 af
Primary=0.18 cfs 0.185 af Secondary=3.90 cfs 0.145 af Outflow=4.08 cfs 0.330 af

Pond 17P: FocalPoint 4 Peak Elev=108.84' Storage=53 cf Inflow=1.20 cfs 0.094 af
Primary=0.07 cfs 0.060 af Secondary=1.12 cfs 0.036 af Outflow=1.20 cfs 0.096 af

Pond 20P: POI 1 Peak Elev=87.35' Storage=419 cf Inflow=46.32 cfs 13.067 af
36.0" Round Culvert n=0.011 L=88.0' S=0.0398 '/' Outflow=46.30 cfs 13.067 af

Pond 90P: POI 3 Peak Elev=91.10' Storage=35,099 cf Inflow=150.41 cfs 27.225 af
36.0" Round Culvert x 2.00 n=0.011 L=126.0' S=0.0020 '/' Outflow=133.25 cfs 27.225 af

Pond 91P: POI 2 Peak Elev=97.88' Storage=49,191 cf Inflow=20.14 cfs 7.328 af
12.0" Round Culvert n=0.025 L=38.0' S=0.0134 '/' Outflow=5.20 cfs 7.328 af

Total Runoff Area = 93.822 ac Runoff Volume = 48.372 af Average Runoff Depth = 6.19"
73.50% Pervious = 68.955 ac 26.50% Impervious = 24.867 ac

Summary for Subcatchment 1S: Sub to GUSF #1

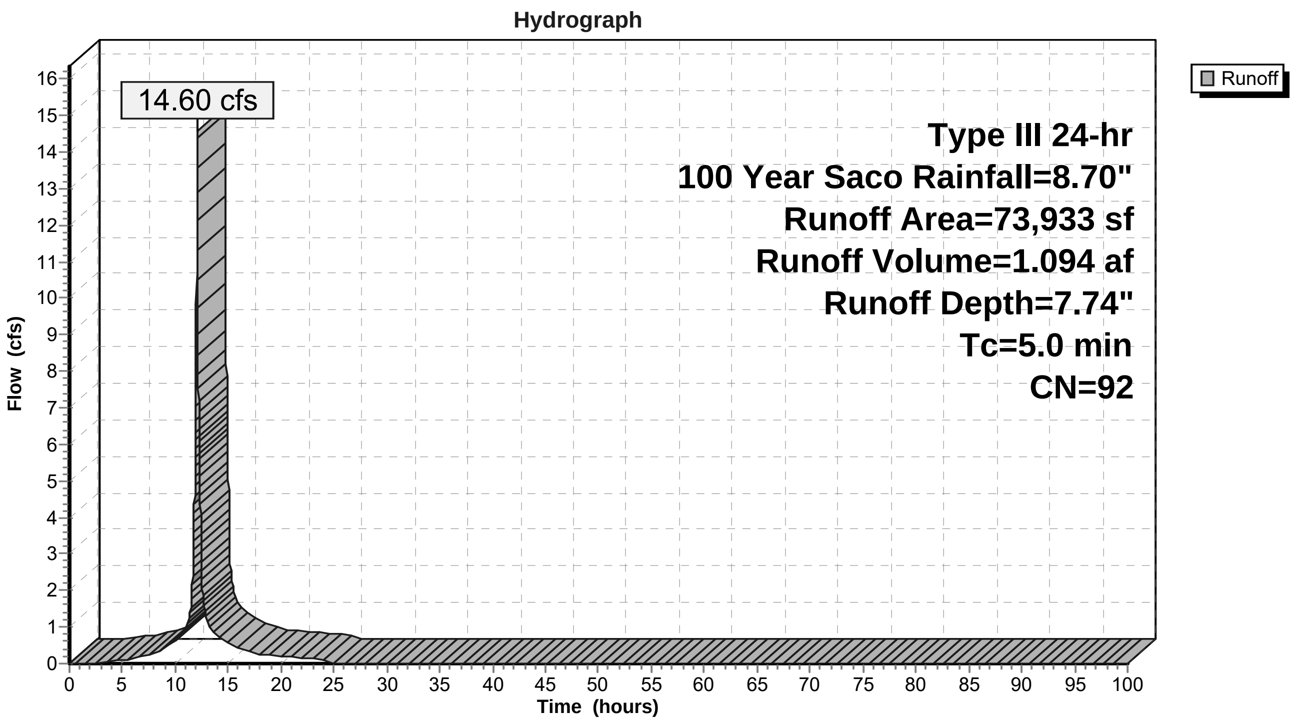
Runoff = 14.60 cfs @ 12.07 hrs, Volume= 1.094 af, Depth= 7.74"
Routed to Pond 1P : GUSF #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
49,677	98	Paved parking, HSG D
24,256	80	>75% Grass cover, Good, HSG D
73,933	92	Weighted Average
24,256		32.81% Pervious Area
49,677		67.19% Impervious Area

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

Subcatchment 1S: Sub to GUSF #1



Summary for Subcatchment 2S: Sub to GUSF #2

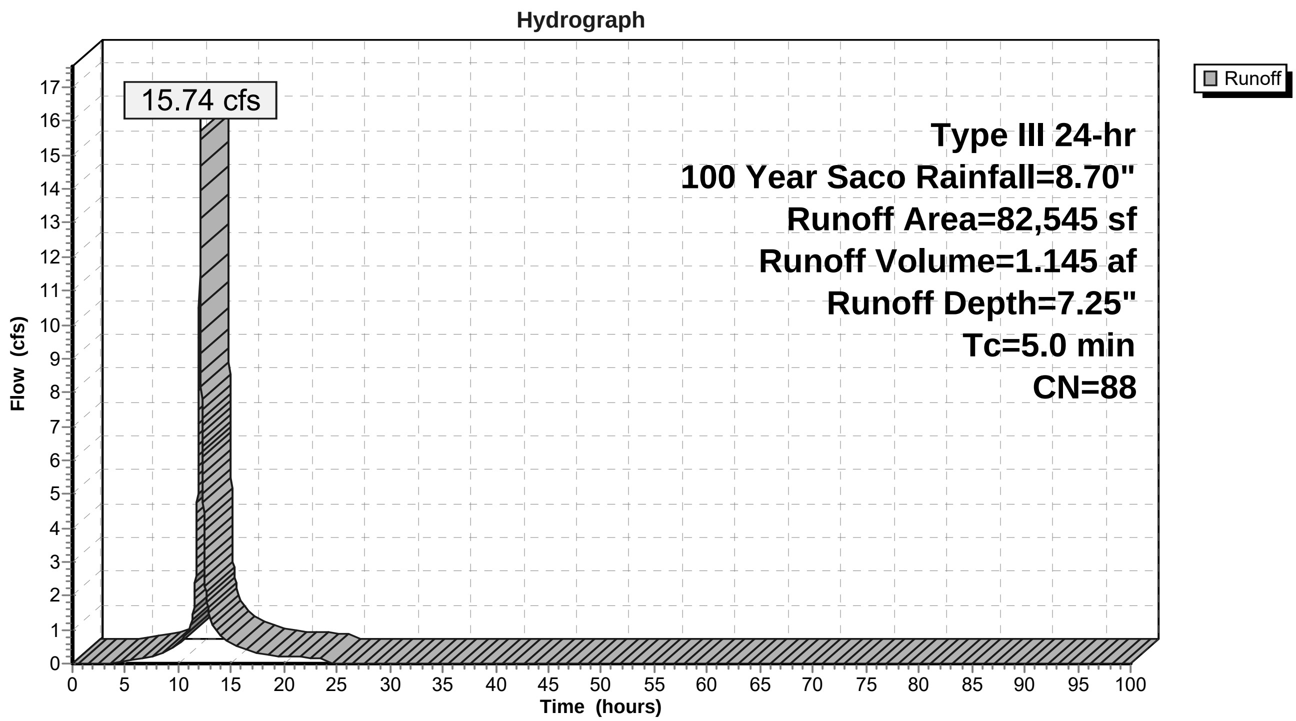
Runoff = 15.74 cfs @ 12.07 hrs, Volume= 1.145 af, Depth= 7.25"
Routed to Pond 2P : GUSF #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
38,830	98	Paved parking, HSG D
43,715	80	>75% Grass cover, Good, HSG D
82,545	88	Weighted Average
43,715		52.96% Pervious Area
38,830		47.04% Impervious Area

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

Subcatchment 2S: Sub to GUSF #2



Summary for Subcatchment 3S: Sub to GUSF #3

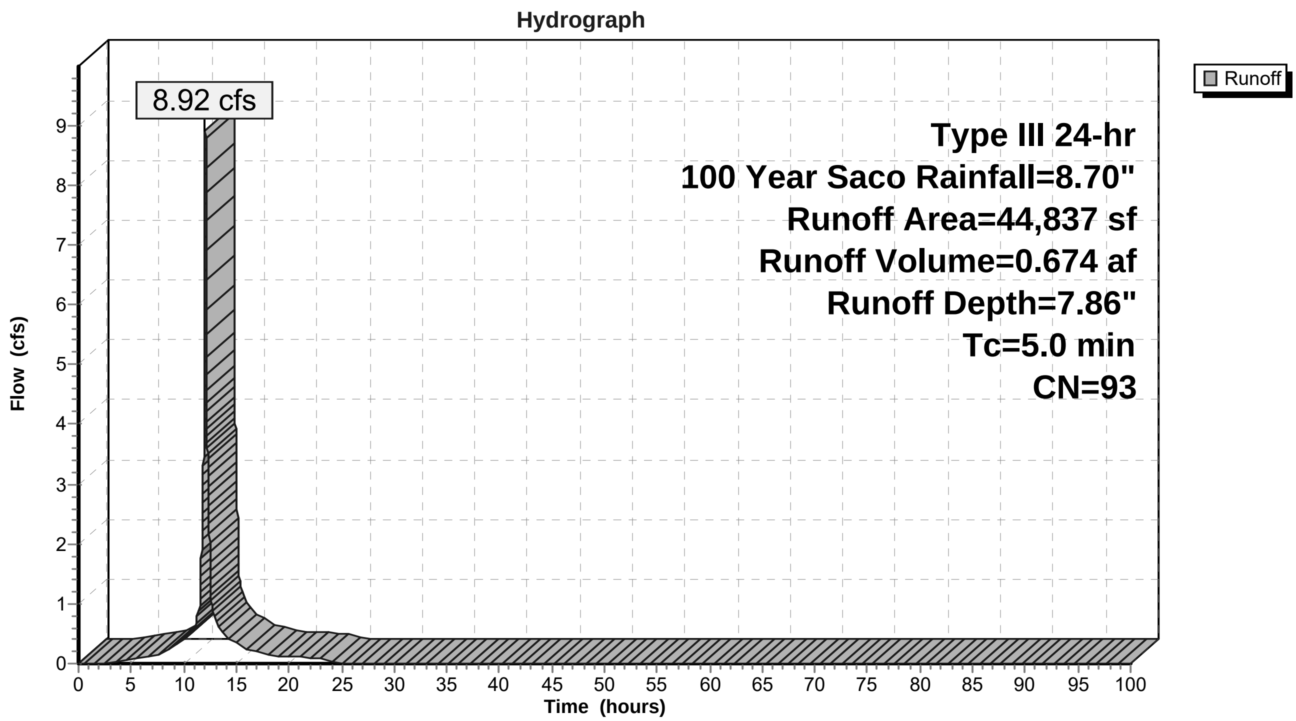
Runoff = 8.92 cfs @ 12.07 hrs, Volume= 0.674 af, Depth= 7.86"
Routed to Pond 3P : GUSF #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
32,243	98	Paved parking, HSG D
12,594	80	>75% Grass cover, Good, HSG D
44,837	93	Weighted Average
12,594		28.09% Pervious Area
32,243		71.91% Impervious Area

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

Subcatchment 3S: Sub to GUSF #3



Summary for Subcatchment 4S: Sub to GUSF #5

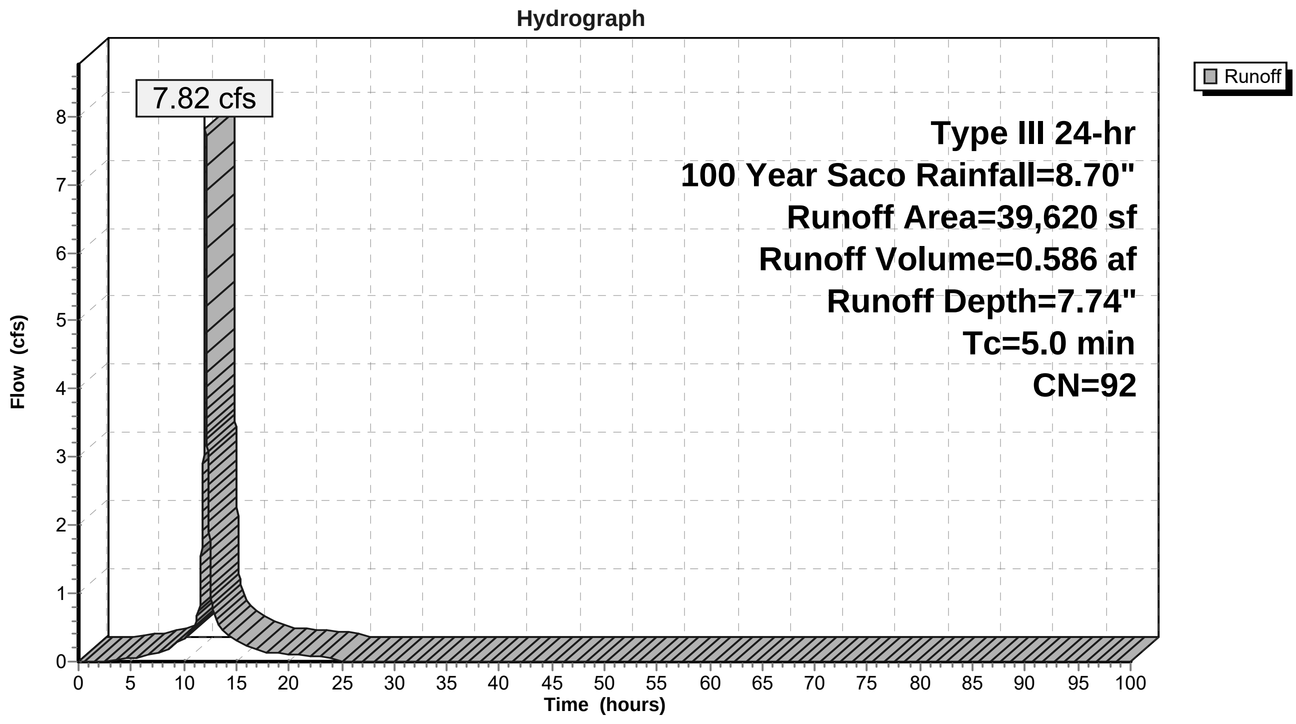
Runoff = 7.82 cfs @ 12.07 hrs, Volume= 0.586 af, Depth= 7.74"
Routed to Pond 4P : GUSF #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
26,921	98	Paved parking, HSG D
439	39	>75% Grass cover, Good, HSG A
12,260	80	>75% Grass cover, Good, HSG D
39,620	92	Weighted Average
12,699		32.05% Pervious Area
26,921		67.95% Impervious Area

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

Subcatchment 4S: Sub to GUSF #5



Summary for Subcatchment 5S: Sub to GW #2

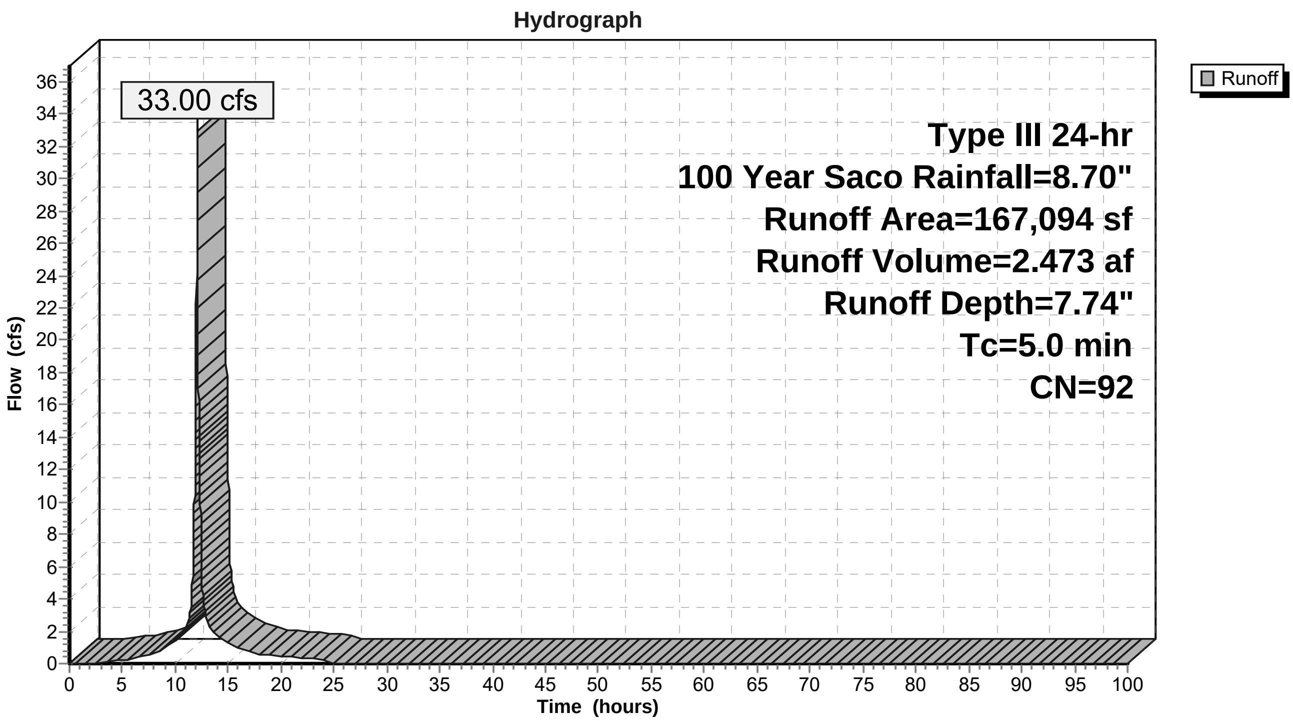
Runoff = 33.00 cfs @ 12.07 hrs, Volume= 2.473 af, Depth= 7.74"
Routed to Pond 5P : Gravel Wetland #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
106,853	98	Paved parking, HSG D
60,241	80	>75% Grass cover, Good, HSG D
167,094	92	Weighted Average
60,241		36.05% Pervious Area
106,853		63.95% Impervious Area

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

Subcatchment 5S: Sub to GW #2



Summary for Subcatchment 6S: Sub to GUSF #4

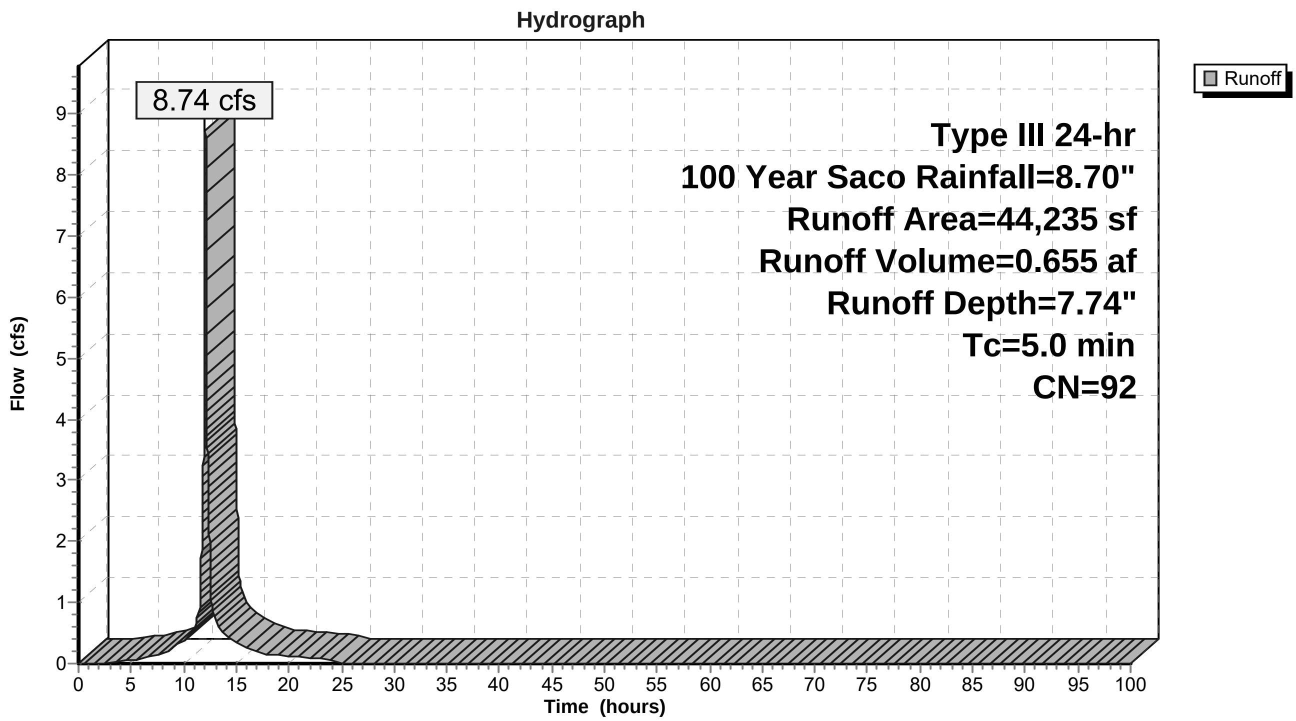
Runoff = 8.74 cfs @ 12.07 hrs, Volume= 0.655 af, Depth= 7.74"
Routed to Pond 6P : GUSF #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
29,518	98	Paved parking, HSG D
14,717	80	>75% Grass cover, Good, HSG D
44,235	92	Weighted Average
14,717		33.27% Pervious Area
29,518		66.73% Impervious Area

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

Subcatchment 6S: Sub to GUSF #4



Summary for Subcatchment 7S: Sub to GW #1

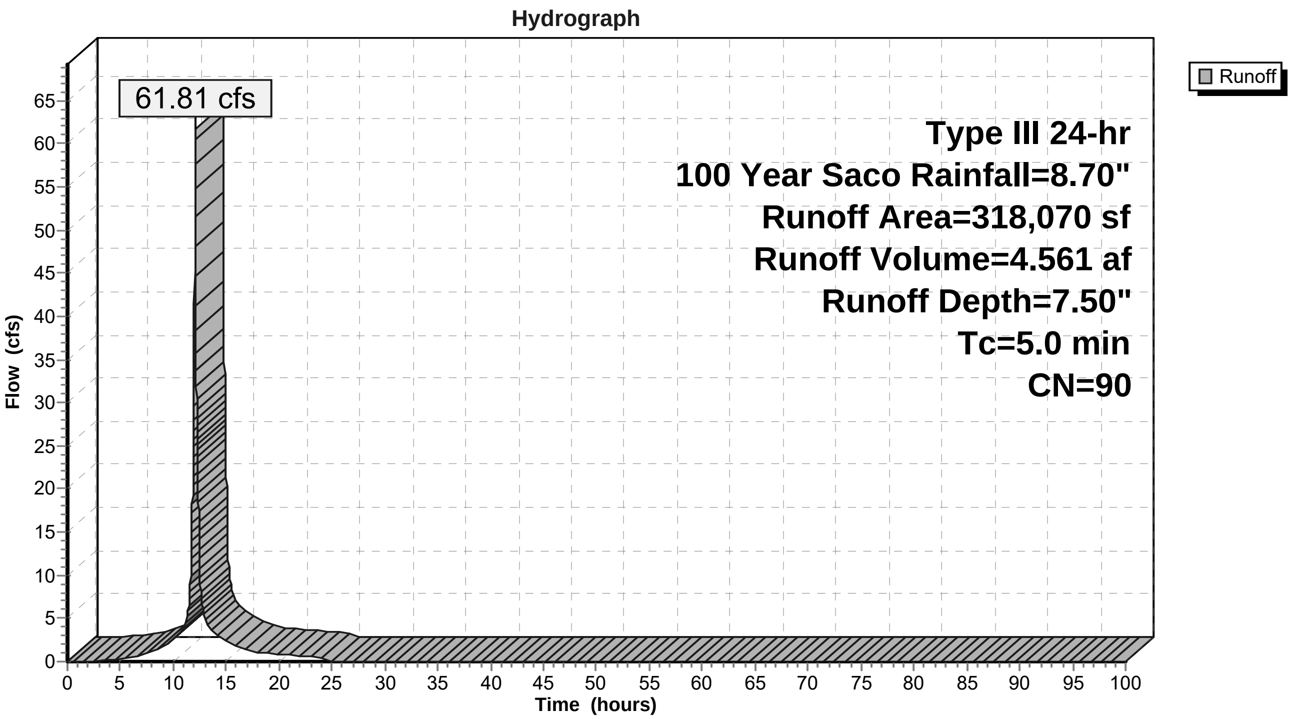
Runoff = 61.81 cfs @ 12.07 hrs, Volume= 4.561 af, Depth= 7.50"
Routed to Pond 7P : Gravel Wetland #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
191,968	98	Paved parking, HSG D
7,411	39	>75% Grass cover, Good, HSG A
118,691	80	>75% Grass cover, Good, HSG D
318,070	90	Weighted Average
126,102		39.65% Pervious Area
191,968		60.35% Impervious Area

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

Subcatchment 7S: Sub to GW #1



Summary for Subcatchment 8S: Sub to GUSF #6

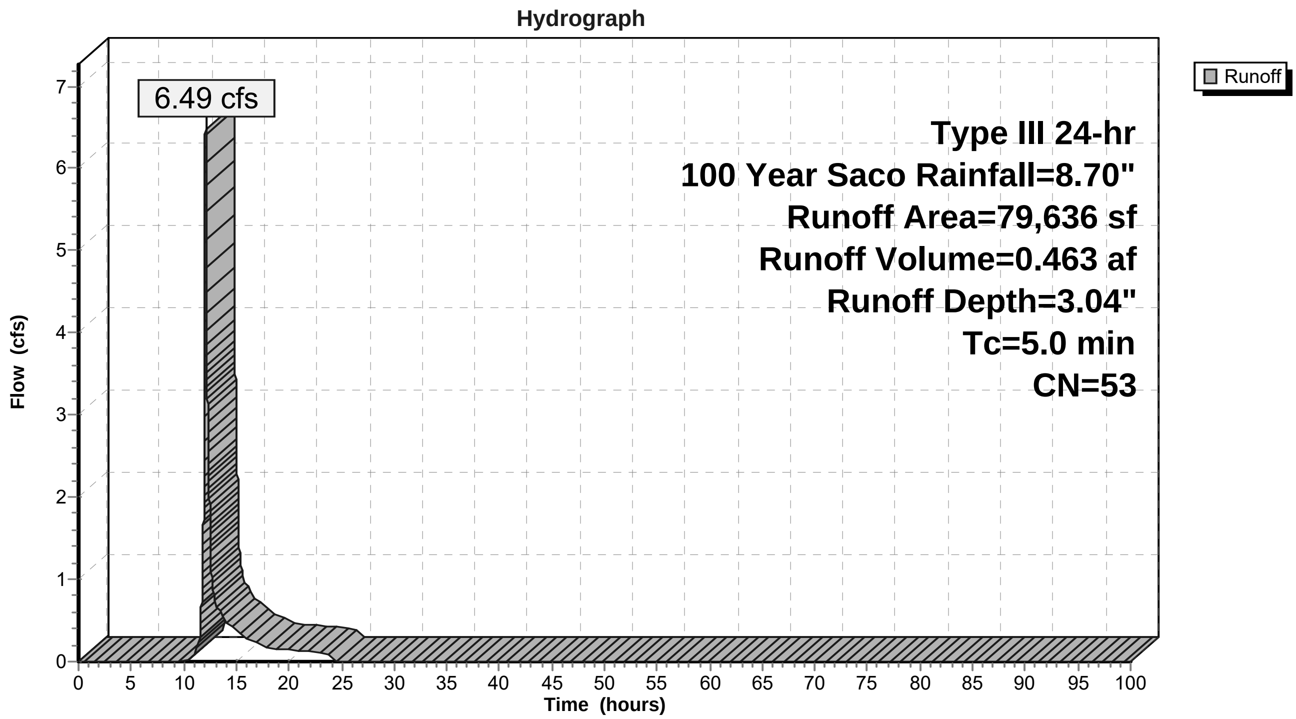
Runoff = 6.49 cfs @ 12.08 hrs, Volume= 0.463 af, Depth= 3.04"
Routed to Pond 8/9P : GUSF #6 & #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
18,778	98	Paved parking, HSG D
60,443	39	>75% Grass cover, Good, HSG A
415	80	>75% Grass cover, Good, HSG D
79,636	53	Weighted Average
60,858		76.42% Pervious Area
18,778		23.58% Impervious Area

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

Subcatchment 8S: Sub to GUSF #6



Summary for Subcatchment 9S: Sub to GUSF #7

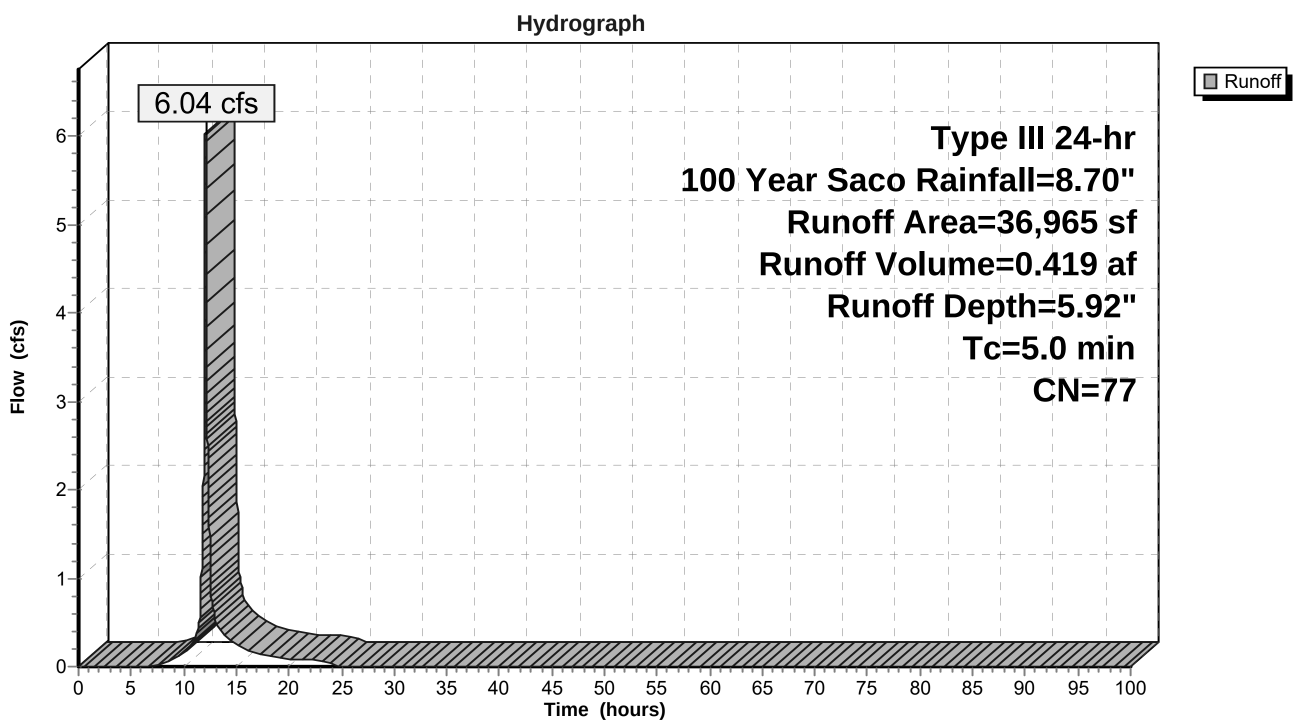
Runoff = 6.04 cfs @ 12.07 hrs, Volume= 0.419 af, Depth= 5.92"
Routed to Pond 8/9P : GUSF #6 & #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
23,580	98	Paved parking, HSG D
405	80	>75% Grass cover, Good, HSG D
12,980	39	>75% Grass cover, Good, HSG A
36,965	77	Weighted Average
13,385		36.21% Pervious Area
23,580		63.79% Impervious Area

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

Subcatchment 9S: Sub to GUSF #7



Summary for Subcatchment 10S: Sub to GUSF #8

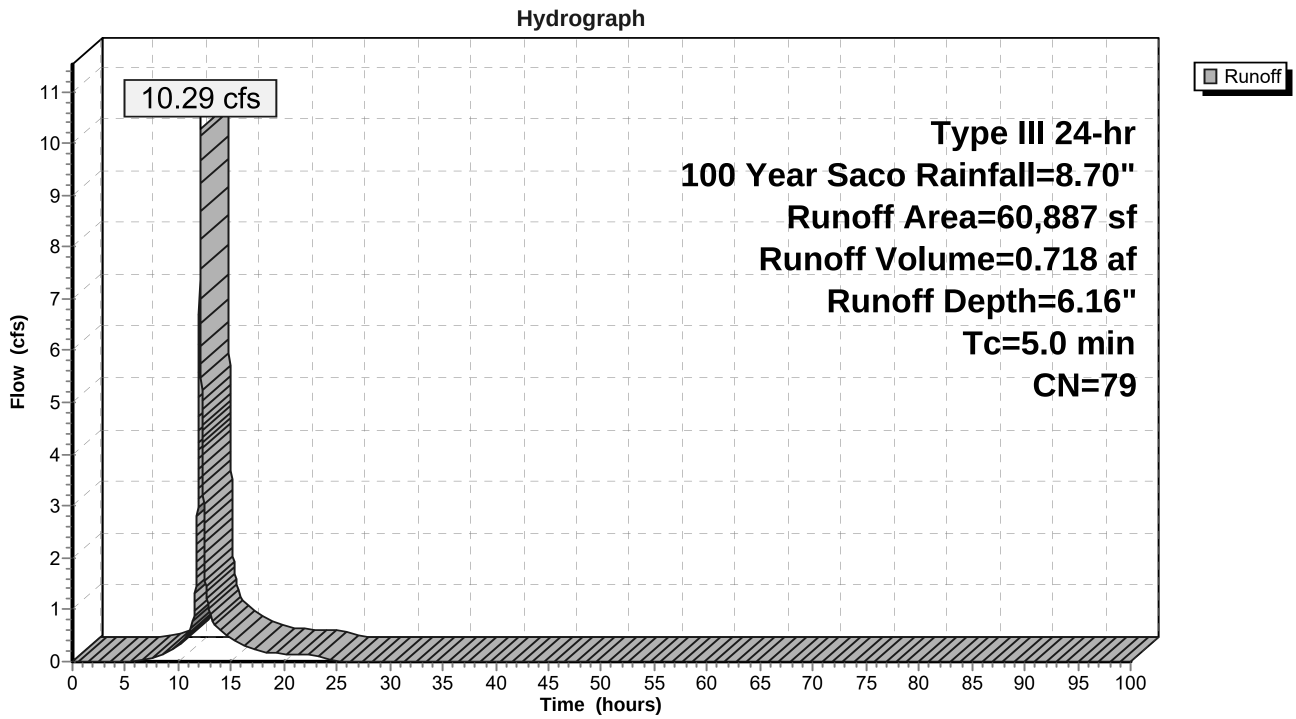
Runoff = 10.29 cfs @ 12.07 hrs, Volume= 0.718 af, Depth= 6.16"
Routed to Pond 10P : GUSF #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
36,998	98	Paved parking, HSG D
6,024	80	>75% Grass cover, Good, HSG D
17,865	39	>75% Grass cover, Good, HSG A
60,887	79	Weighted Average
23,889		39.23% Pervious Area
36,998		60.77% Impervious Area

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

Subcatchment 10S: Sub to GUSF #8



Summary for Subcatchment 11S: Sub to GUSF #9

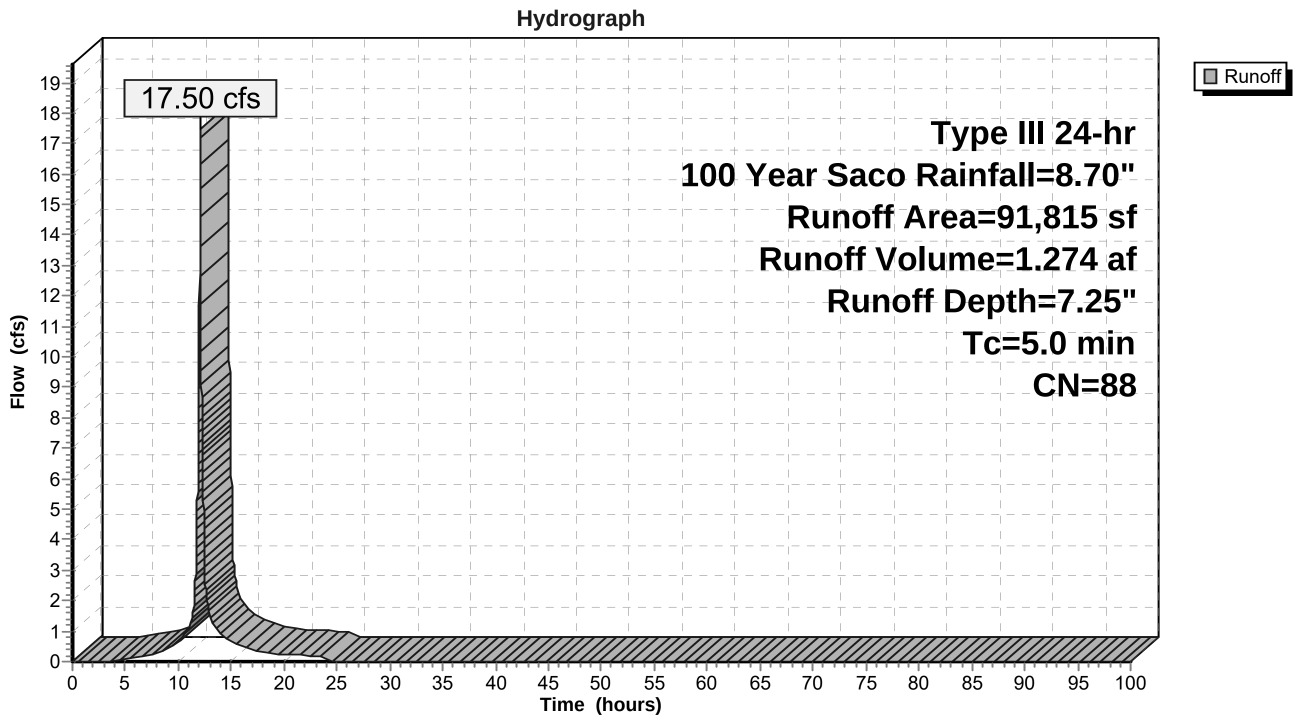
Runoff = 17.50 cfs @ 12.07 hrs, Volume= 1.274 af, Depth= 7.25"
Routed to Pond 11P : GUSF #9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
64,781	98	Paved parking, HSG D
17,188	80	>75% Grass cover, Good, HSG D
9,846	39	>75% Grass cover, Good, HSG A
91,815	88	Weighted Average
27,034		29.44% Pervious Area
64,781		70.56% Impervious Area

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

Subcatchment 11S: Sub to GUSF #9



Summary for Subcatchment 12S: PRE S1

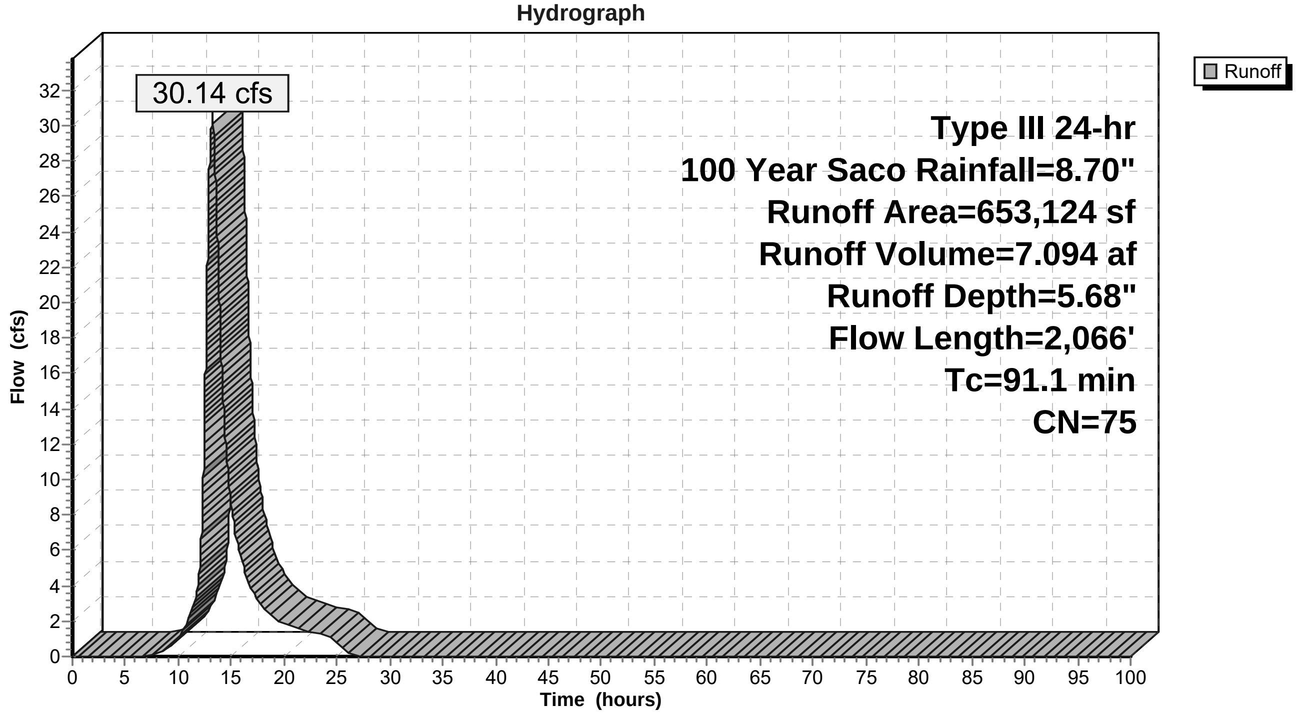
Runoff = 30.14 cfs @ 13.25 hrs, Volume= 7.094 af, Depth= 5.68"
Routed to Reach 1R : POI #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
64,275	30	Woods, Good, HSG A
439,956	77	Woods, Good, HSG D
36,631	85	1/8 acre lots, 65% imp, HSG B
4,922	98	Roofs, HSG D
29,435	98	Paved parking, HSG D
48,787	86	1/3 acre lots, 30% imp, HSG D
5,619	81	1/3 acre lots, 30% imp, HSG C
7,971	92	1/8 acre lots, 65% imp, HSG D
15,528	80	>75% Grass cover, Good, HSG D
653,124	75	Weighted Average
573,454		87.80% Pervious Area
79,670		12.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.0	105	0.0200	0.08		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
29.1	731	0.0070	0.42		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
9.7	265	0.0083	0.46		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
28.4	408	0.0023	0.24		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
1.9	557	0.0083	4.89	29.32	**Channel Flow, E - F** Area= 6.0 sf Perim= 7.0' r= 0.86' n= 0.025 Earth, clean & winding
91.1	2,066	Total			

Subcatchment 12S: PRE S1



Summary for Subcatchment 13S: PRE S2

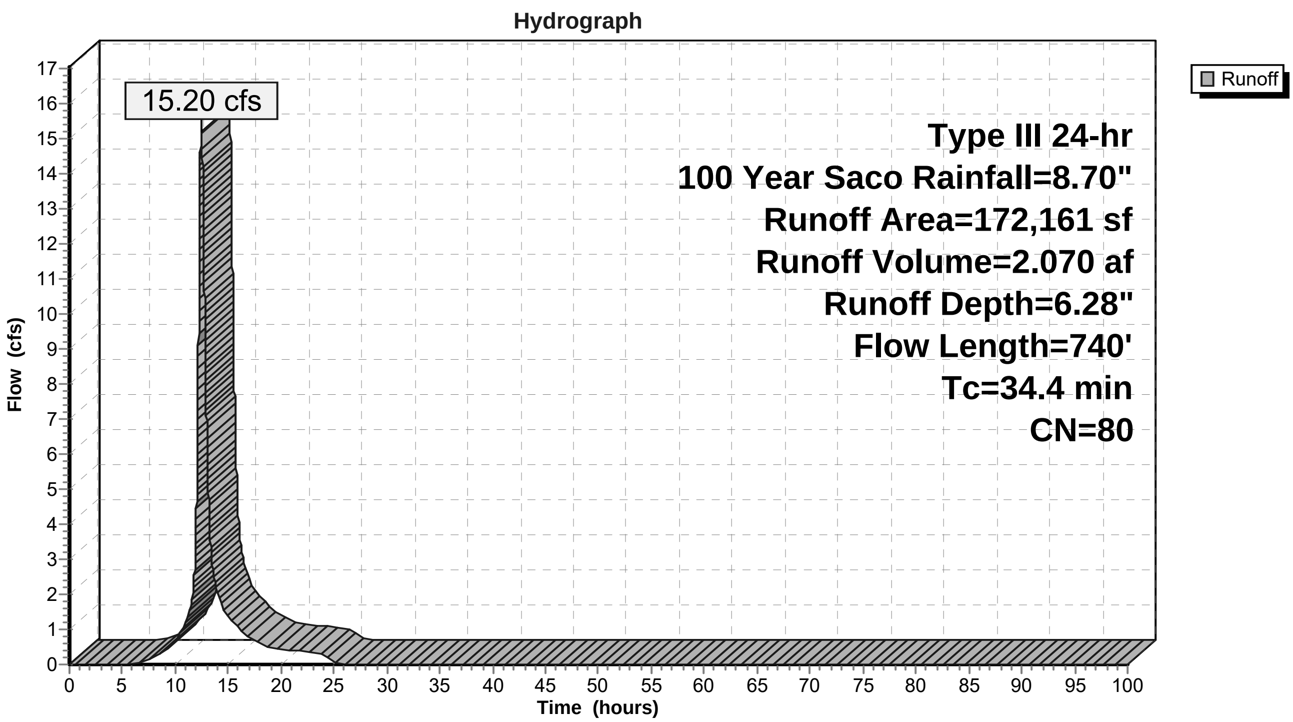
Runoff = 15.20 cfs @ 12.46 hrs, Volume= 2.070 af, Depth= 6.28"
Routed to Reach 4R : POI #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
112,222	77	Woods, Good, HSG D
47,872	87	1/4 acre lots, 38% imp, HSG D
11,315	80	>75% Grass cover, Good, HSG D
752	98	Paved parking, HSG D
172,161	80	Weighted Average
153,218		89.00% Pervious Area
18,943		11.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	84	0.0436	0.10		**Sheet Flow, A - B** Woods: Light underbrush n= 0.400 P2= 3.30"
3.4	220	0.0454	1.07		**Shallow Concentrated Flow, B - C** Woodland Kv= 5.0 fps
17.5	436	0.0069	0.42		**Shallow Concentrated Flow, C - D** Woodland Kv= 5.0 fps
34.4	740	Total			

Subcatchment 13S: PRE S2



Summary for Subcatchment 14S: PRE S3

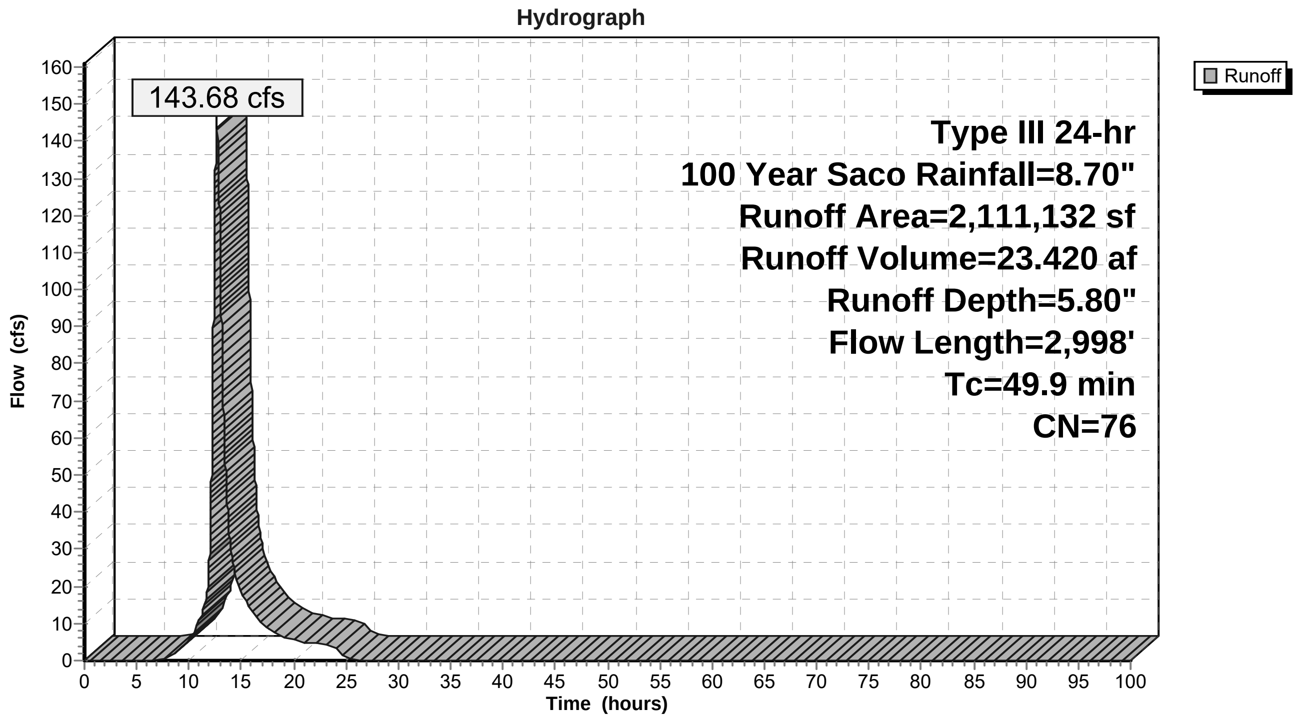
Runoff = 143.68 cfs @ 12.69 hrs, Volume= 23.420 af, Depth= 5.80"
Routed to Reach 5R : POI #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
62,552	30	Woods, Good, HSG A
1,067,368	77	Woods, Good, HSG D
209,654	54	1/2 acre lots, 25% imp, HSG A
119,137	87	1/4 acre lots, 38% imp, HSG D
580,960	85	1/2 acre lots, 25% imp, HSG D
26,858	98	Paved parking, HSG D
44,603	80	>75% Grass cover, Good, HSG D
2,111,132	76	Weighted Average
1,841,348		87.22% Pervious Area
269,784		12.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.6	125	0.0161	0.17		**Sheet Flow, A - B** Grass: Short n= 0.150 P2= 3.30"
3.2	380	0.0172	1.97		**Shallow Concentrated Flow, B - C** Grassed Waterway Kv= 15.0 fps
0.1	40	0.0373	11.48	20.29	**Pipe Channel, C - D** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
24.8	721	0.0094	0.48		**Shallow Concentrated Flow, D - E** Woodland Kv= 5.0 fps
3.3	584	0.0062	2.93	23.40	**Channel Flow, E - F** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
2.5	540	0.0095	3.62	28.97	**Channel Flow, F - G** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
3.4	608	0.0066	3.02	24.14	**Channel Flow, G - H** Area= 8.0 sf Perim= 8.0' r= 1.00' n= 0.040 Winding stream, pools & shoals
49.9	2,998	Total			

Subcatchment 14S: PRE S3



Summary for Subcatchment 15S: Chamber 1 Subcatchment

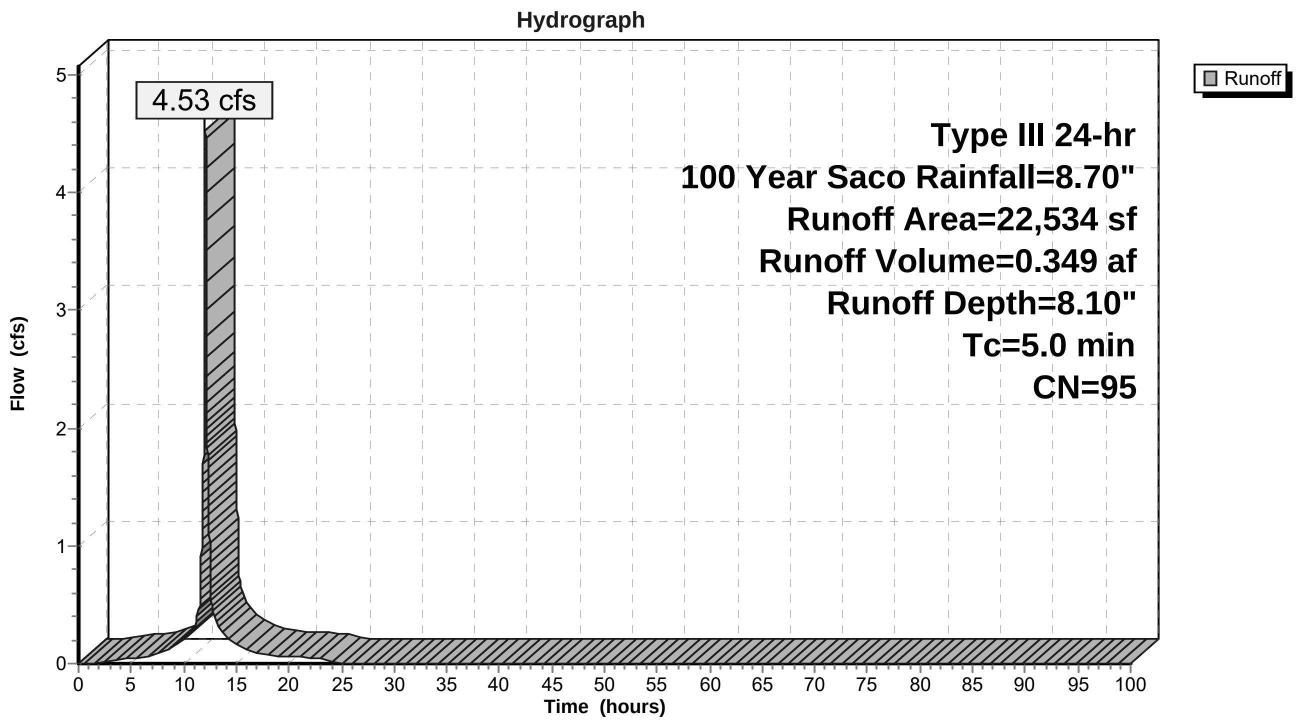
Runoff = 4.53 cfs @ 12.07 hrs, Volume= 0.349 af, Depth= 8.10"
Routed to Pond 12P : CHAMBER1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
18,955	98	Paved parking, HSG D
3,579	80	>75% Grass cover, Good, HSG D
22,534	95	Weighted Average
3,579		15.88% Pervious Area
18,955		84.12% Impervious Area

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

Subcatchment 15S: Chamber 1 Subcatchment



Summary for Subcatchment 16S: Chamber 2 Subcatchment

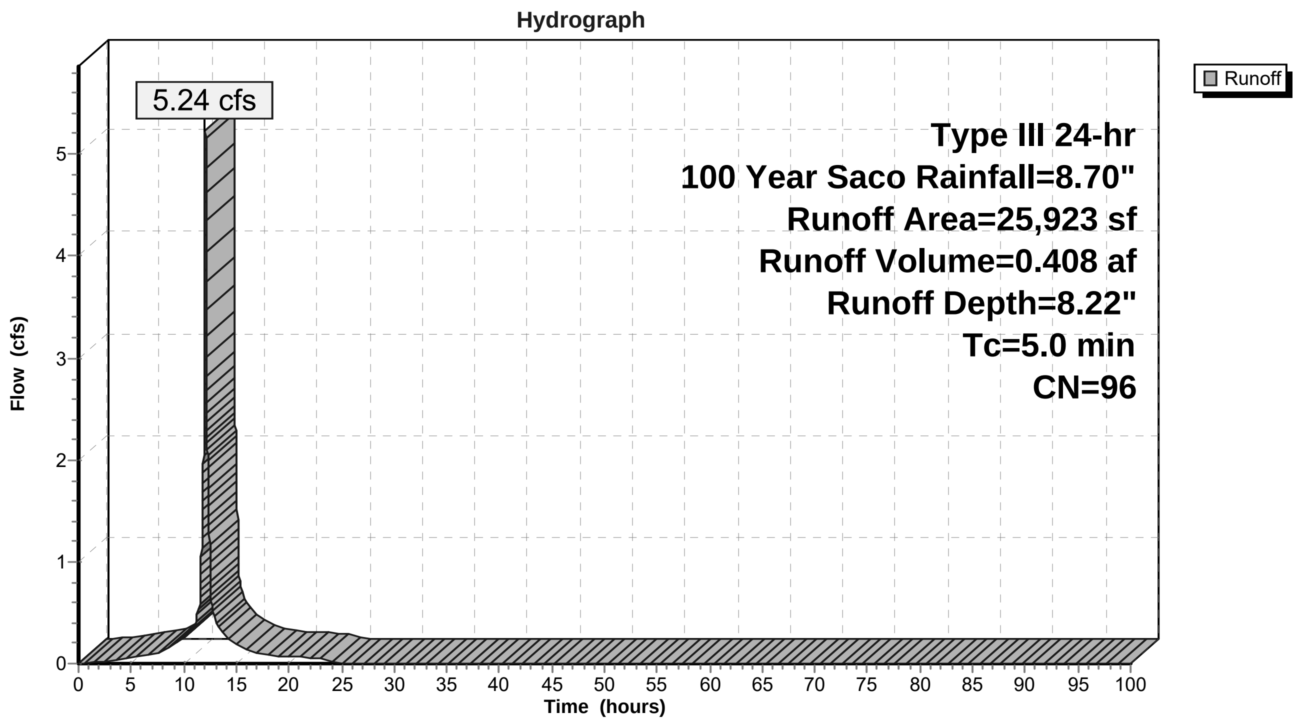
Runoff = 5.24 cfs @ 12.07 hrs, Volume= 0.408 af, Depth= 8.22"
Routed to Pond 13P : CHAMBER2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
22,426	98	Paved parking, HSG D
3,497	80	>75% Grass cover, Good, HSG D
25,923	96	Weighted Average
3,497		13.49% Pervious Area
22,426		86.51% Impervious Area

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

Subcatchment 16S: Chamber 2 Subcatchment



Summary for Subcatchment 17S: SF Dripedges

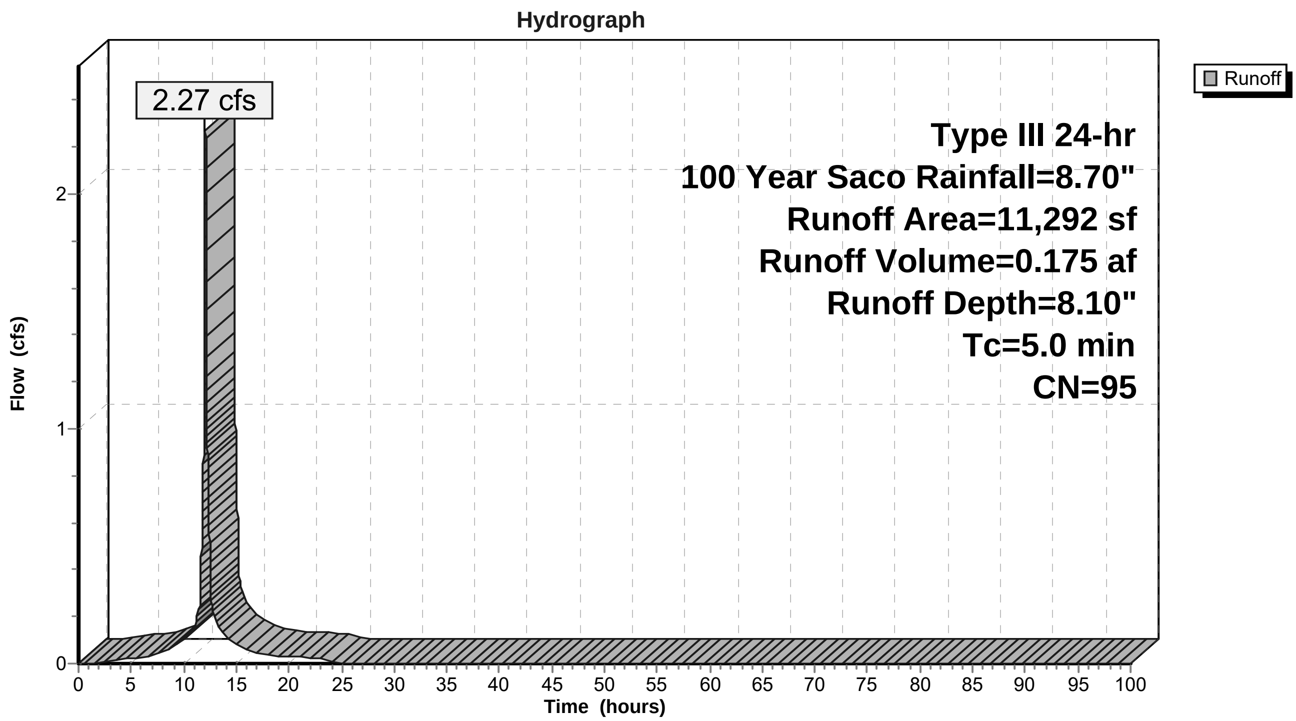
Runoff = 2.27 cfs @ 12.07 hrs, Volume= 0.175 af, Depth= 8.10"
Routed to Reach 7R :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
9,276	98	Paved parking, HSG D
2,016	80	>75% Grass cover, Good, HSG D
11,292	95	Weighted Average
2,016		17.85% Pervious Area
9,276		82.15% Impervious Area

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

Subcatchment 17S: SF Dripedges



Summary for Subcatchment 19S: Front Duplex (Drip Edges)

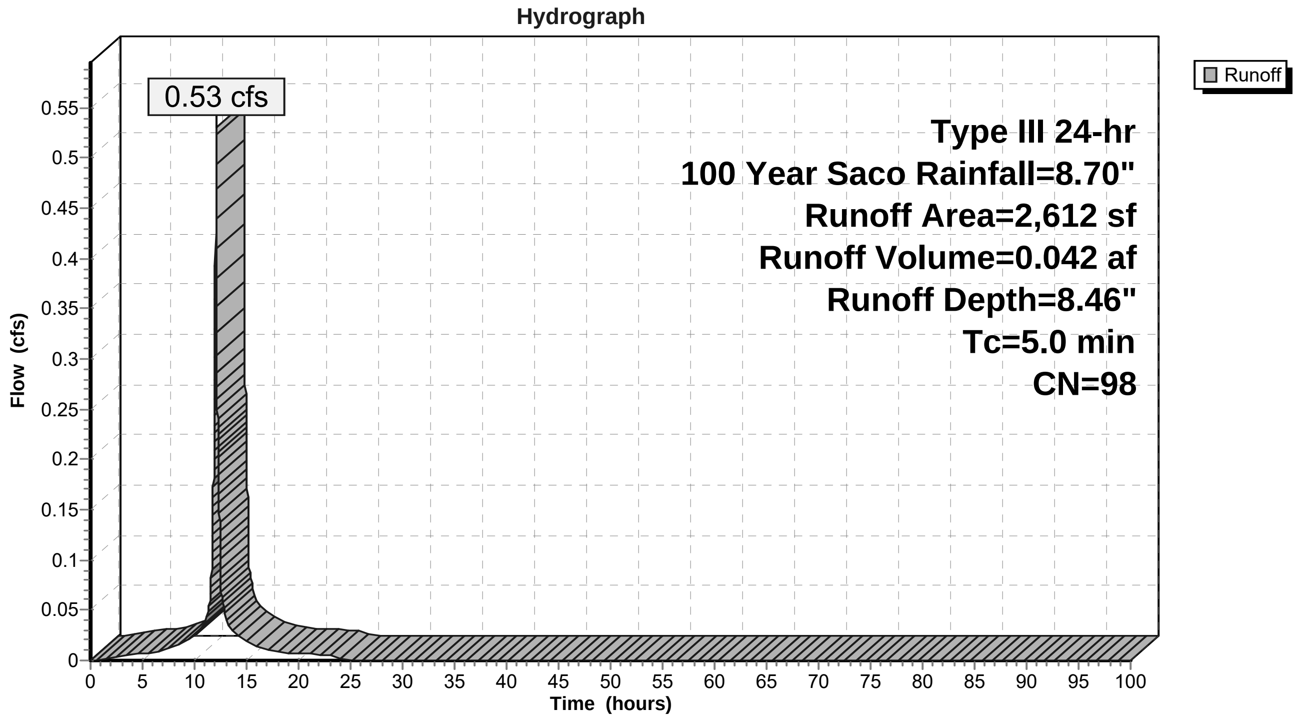
Runoff = 0.53 cfs @ 12.07 hrs, Volume= 0.042 af, Depth= 8.46"
Routed to Reach 4R : POI #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
2,612	98	Roofs, HSG D
2,612		100.00% Impervious Area

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

Subcatchment 19S: Front Duplex (Drip Edges)



Summary for Subcatchment 20S: FP 1 Subcatchment

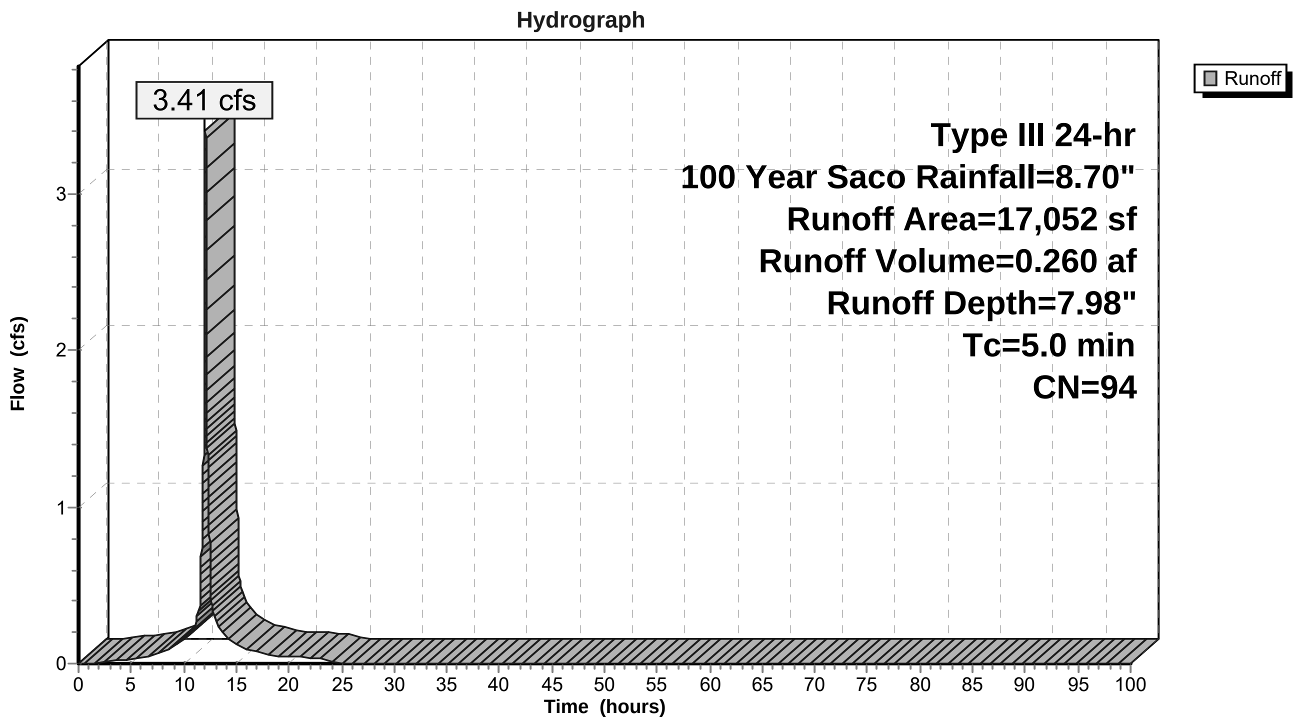
Runoff = 3.41 cfs @ 12.07 hrs, Volume= 0.260 af, Depth= 7.98"
Routed to Pond 14P : FocalPoint 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
13,730	98	Paved parking, HSG D
3,322	80	>75% Grass cover, Good, HSG D
17,052	94	Weighted Average
3,322		19.48% Pervious Area
13,730		80.52% Impervious Area

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

Subcatchment 20S: FP 1 Subcatchment



Summary for Subcatchment 21S: FP 2 Subcatchment

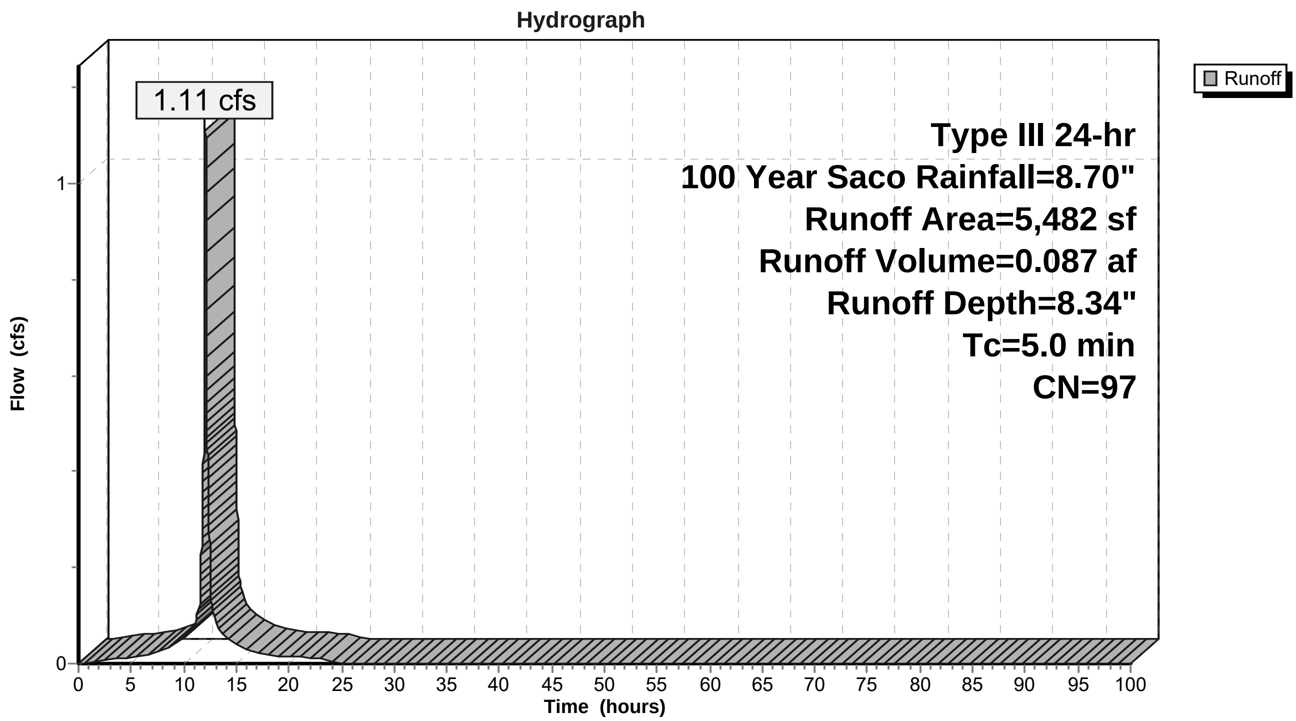
Runoff = 1.11 cfs @ 12.07 hrs, Volume= 0.087 af, Depth= 8.34"
Routed to Pond 15P : FocalPoint 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
5,225	98	Paved parking, HSG D
257	80	>75% Grass cover, Good, HSG D
5,482	97	Weighted Average
257		4.69% Pervious Area
5,225		95.31% Impervious Area

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

Subcatchment 21S: FP 2 Subcatchment



Summary for Subcatchment 22S: FP 3 Subcatchment

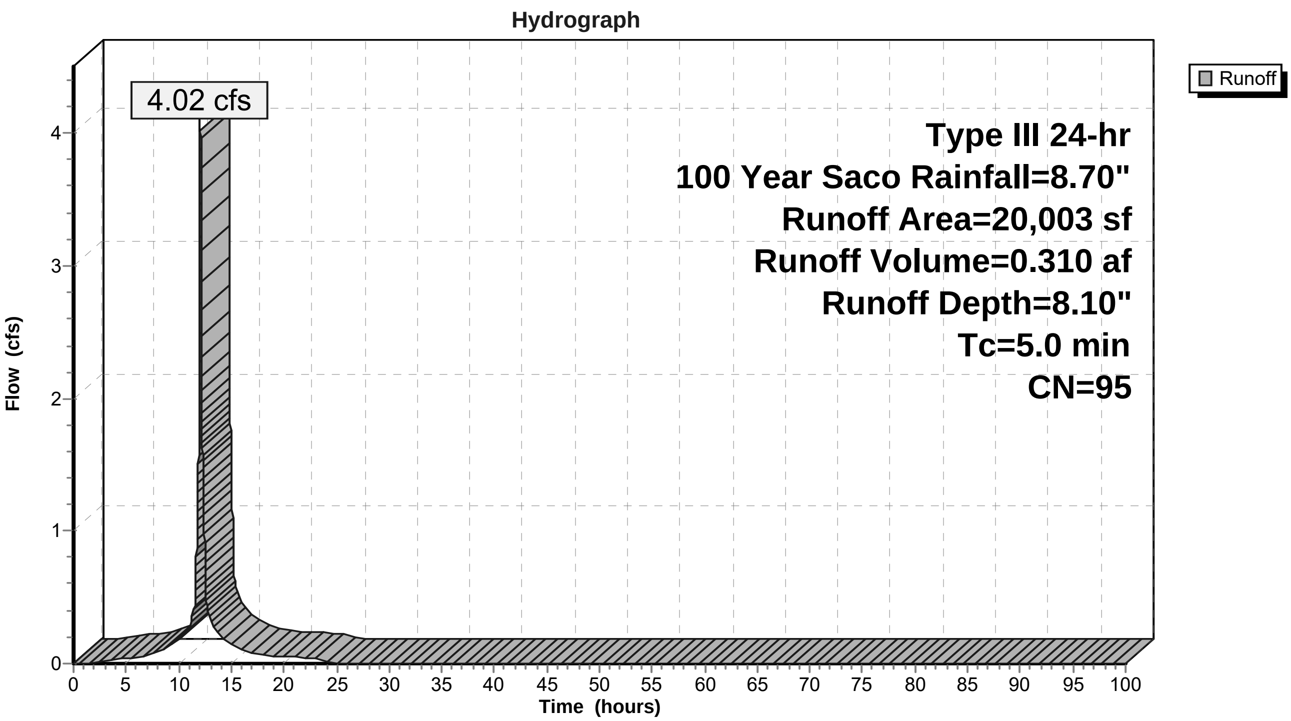
Runoff = 4.02 cfs @ 12.07 hrs, Volume= 0.310 af, Depth= 8.10"
Routed to Pond 16P : FocalPoint 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
16,742	98	Paved parking, HSG D
3,261	80	>75% Grass cover, Good, HSG D
20,003	95	Weighted Average
3,261		16.30% Pervious Area
16,742		83.70% Impervious Area

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

Subcatchment 22S: FP 3 Subcatchment



Summary for Subcatchment 23S: FP 4 Subcatchment

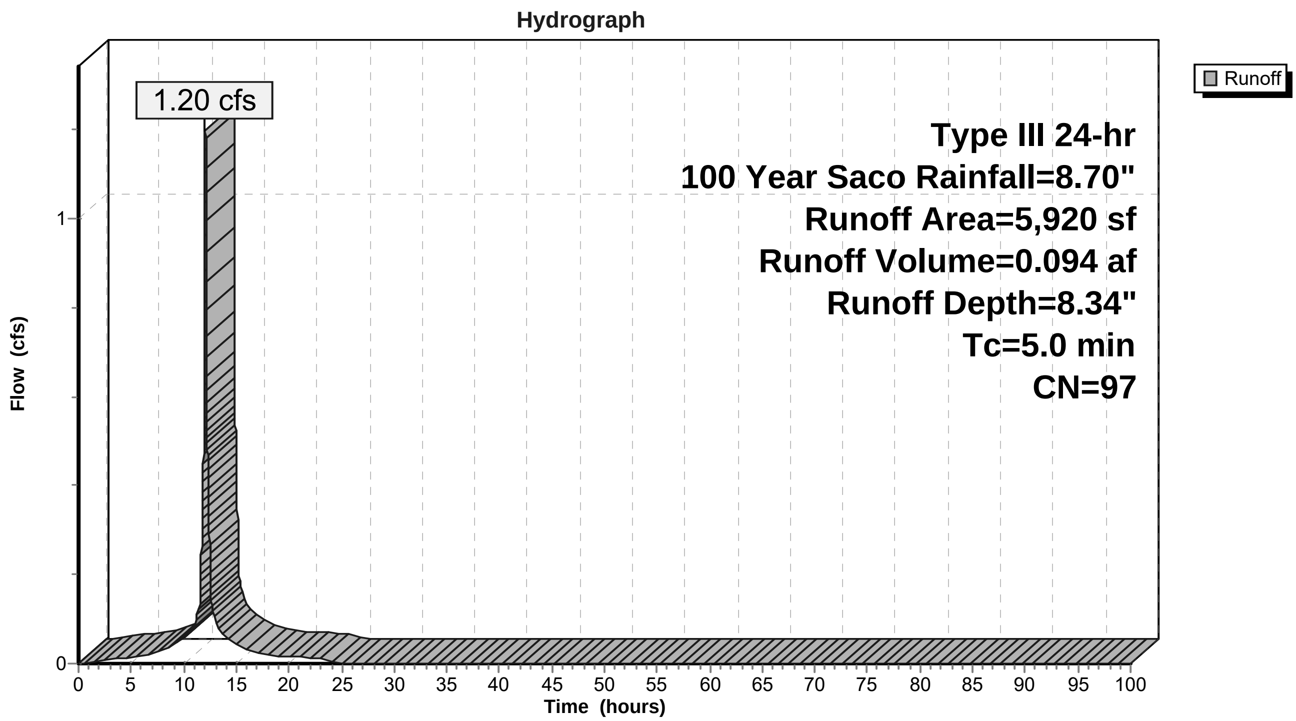
Runoff = 1.20 cfs @ 12.07 hrs, Volume= 0.094 af, Depth= 8.34"
Routed to Pond 17P : FocalPoint 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Type III 24-hr 100 Year Saco Rainfall=8.70"

Area (sf)	CN	Description
5,684	98	Paved parking, HSG D
236	80	>75% Grass cover, Good, HSG D
5,920	97	Weighted Average
236		3.99% Pervious Area
5,684		96.01% Impervious Area

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

Subcatchment 23S: FP 4 Subcatchment

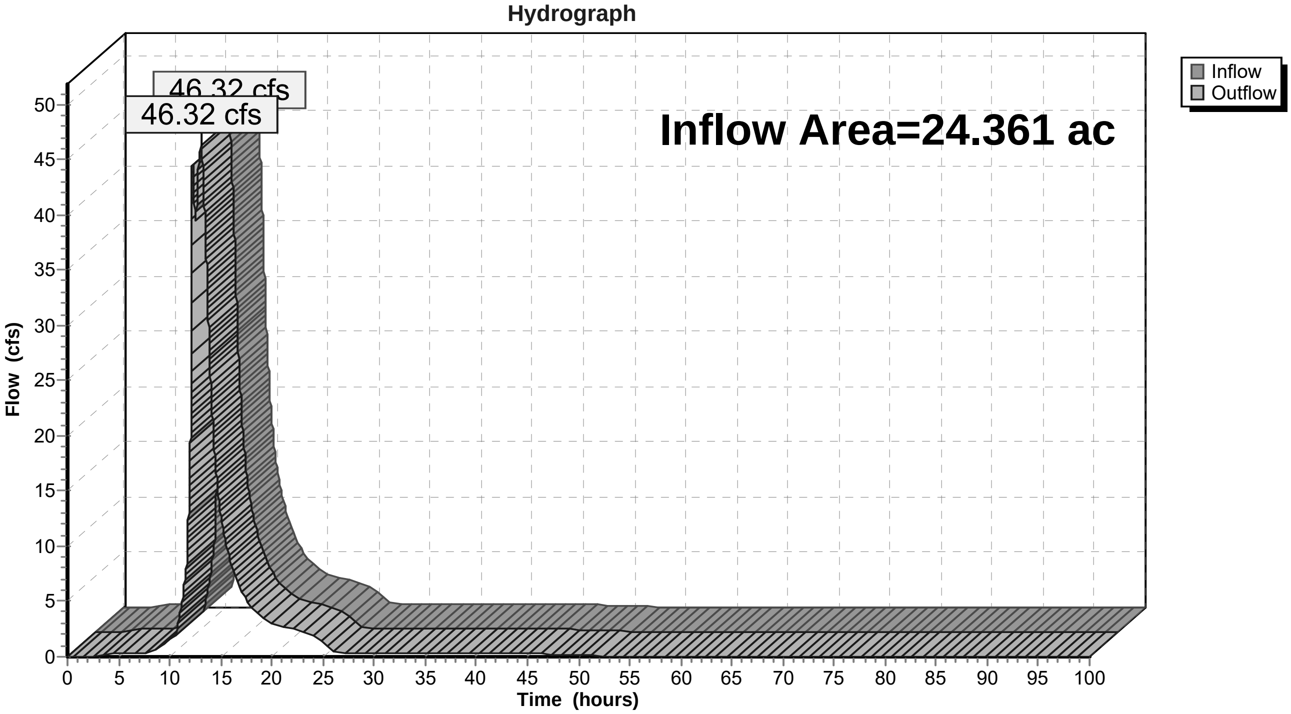


Summary for Reach 1R: POI #1

Inflow Area = 24.361 ac, 31.49% Impervious, Inflow Depth = 6.44" for 100 Year Saco event
Inflow = 46.32 cfs @ 13.05 hrs, Volume= 13.067 af
Outflow = 46.32 cfs @ 13.05 hrs, Volume= 13.067 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 20P : POI 1

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 1R: POI #1



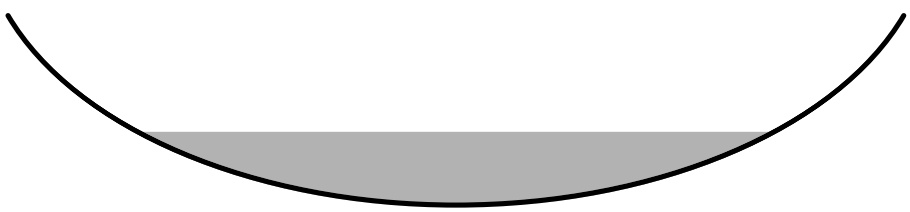
Summary for Reach 2R:

Inflow Area = 7.670 ac, 61.31% Impervious, Inflow Depth = 7.63" for 100 Year Saco event
Inflow = 31.39 cfs @ 12.19 hrs, Volume= 4.879 af
Outflow = 30.76 cfs @ 12.25 hrs, Volume= 4.879 af, Atten= 2%, Lag= 3.5 min
Routed to Reach 1R : POI #1

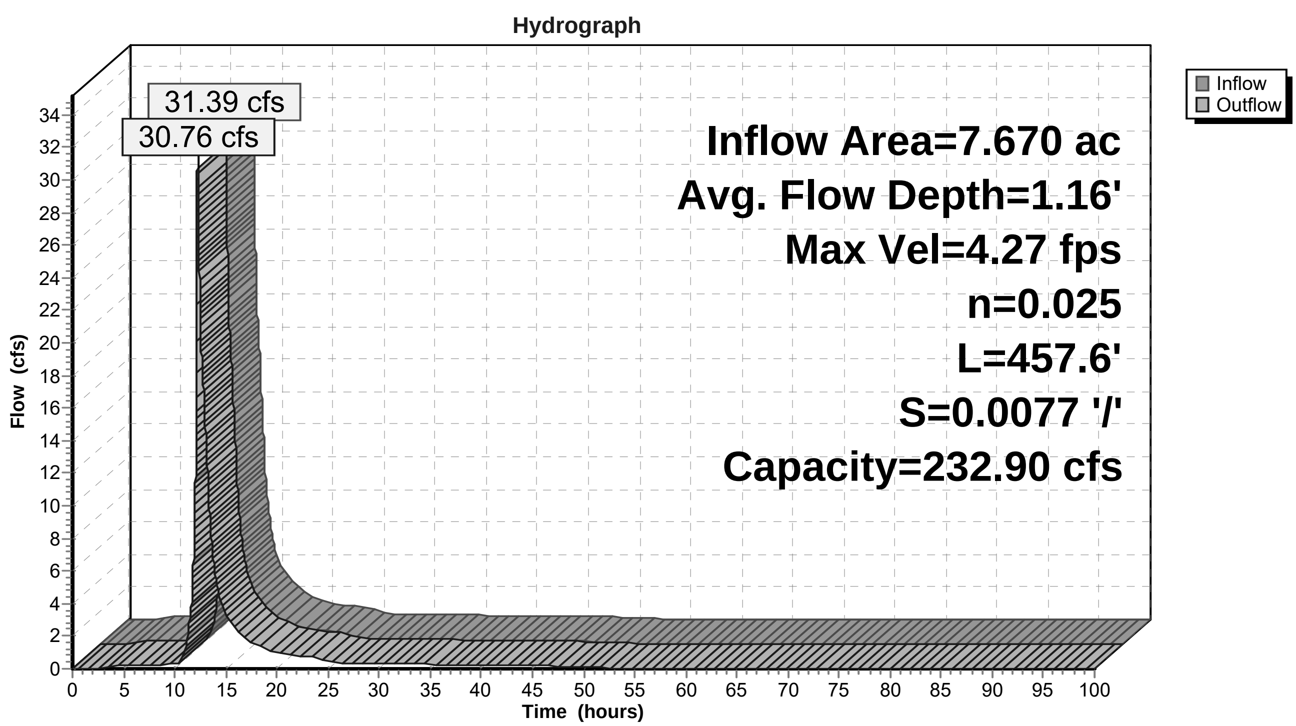
Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Max. Velocity= 4.27 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 1.19 fps, Avg. Travel Time= 6.4 min

Peak Storage= 3,296 cf @ 12.22 hrs
Average Depth at Peak Storage= 1.16' , Surface Width= 9.32'
Bank-Full Depth= 3.00' Flow Area= 30.0 sf, Capacity= 232.90 cfs

15.00' x 3.00' deep Parabolic Channel, n= 0.025 Earth, clean & winding
Length= 457.6' Slope= 0.0077 '/'
Inlet Invert= 95.91', Outlet Invert= 92.40'



Reach 2R:



Summary for Reach 3R:

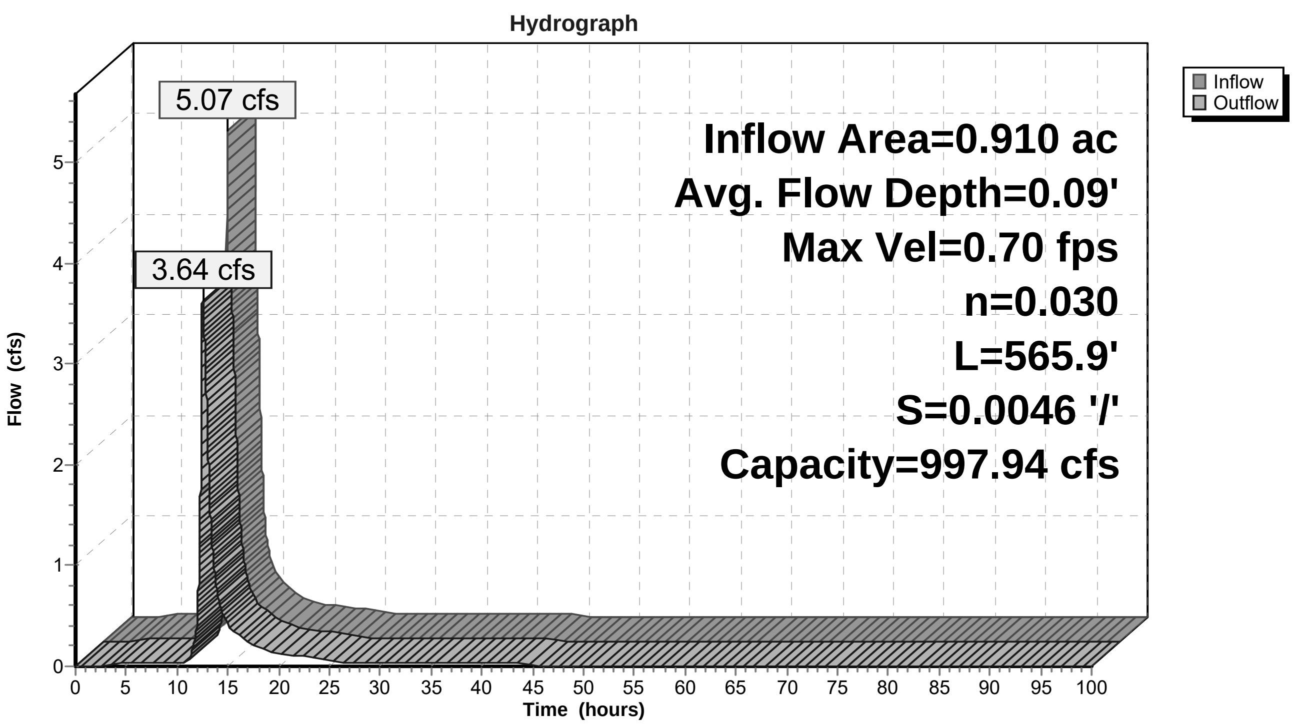
Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 5.07 cfs @ 12.15 hrs, Volume= 0.586 af
Outflow = 3.64 cfs @ 12.52 hrs, Volume= 0.586 af, Atten= 28%, Lag= 21.7 min
Routed to Reach 2R :

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.70 fps, Min. Travel Time= 13.5 min
Avg. Velocity = 0.30 fps, Avg. Travel Time= 31.6 min

Peak Storage= 2,949 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.09' , Surface Width= 55.71'
Bank-Full Depth= 2.50' Flow Area= 191.3 sf, Capacity= 997.94 cfs

54.00' x 2.50' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 10.0 8.0 '/' Top Width= 99.00'
Length= 565.9' Slope= 0.0046 '/'
Inlet Invert= 98.53', Outlet Invert= 95.91'

Reach 3R:

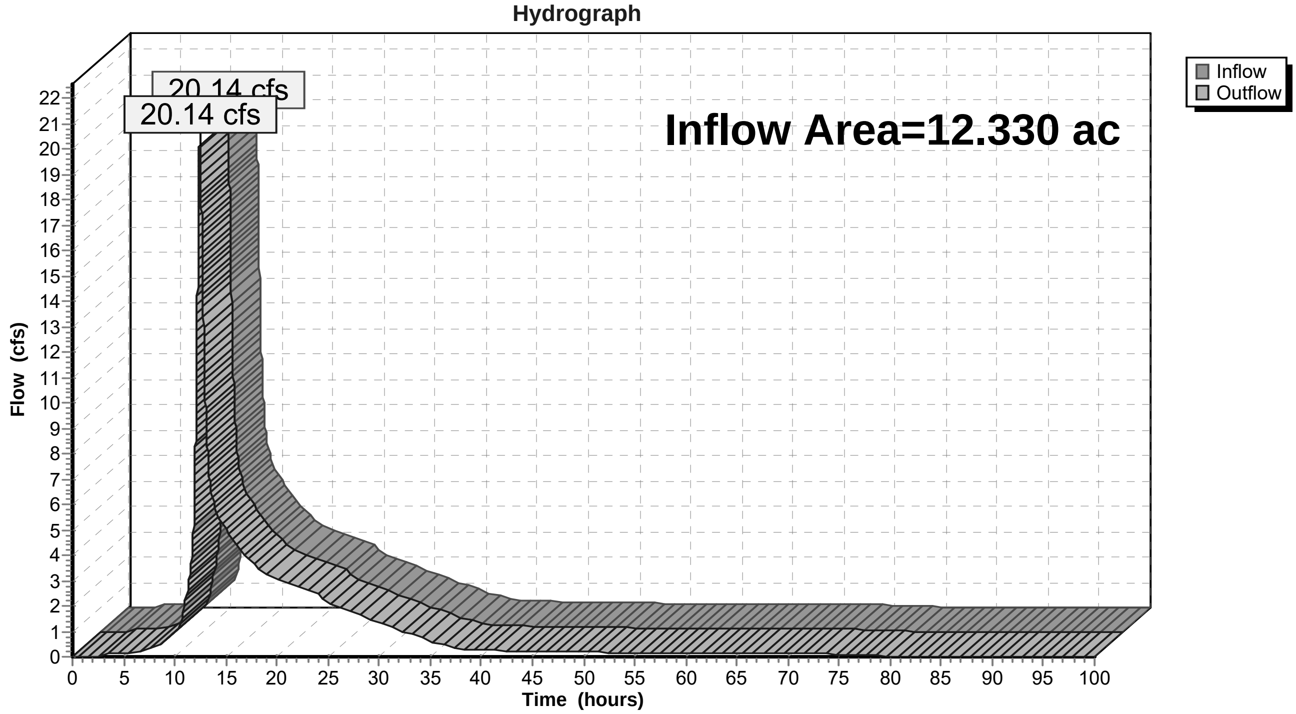


Summary for Reach 4R: POI #2

Inflow Area = 12.330 ac, 45.25% Impervious, Inflow Depth = 7.13" for 100 Year Saco event
Inflow = 20.14 cfs @ 12.44 hrs, Volume= 7.328 af
Outflow = 20.14 cfs @ 12.44 hrs, Volume= 7.328 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 91P : POI 2

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 4R: POI #2

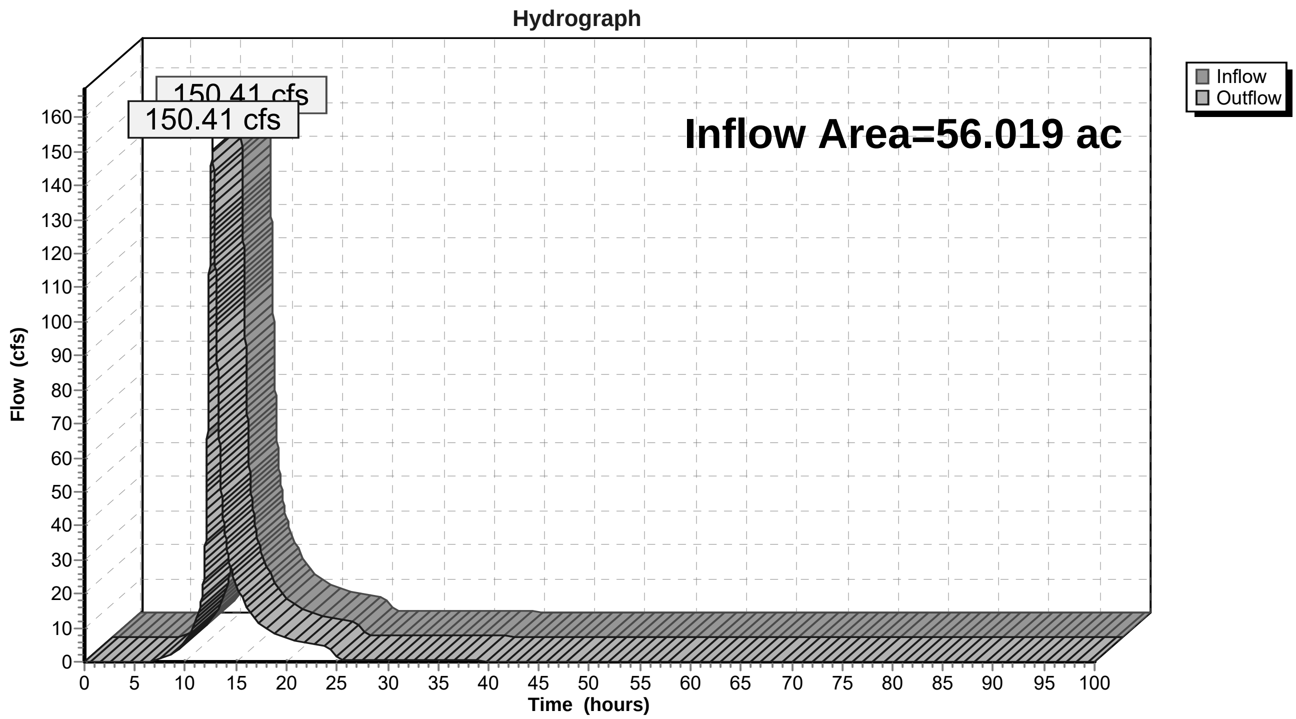


Summary for Reach 5R: POI #3

Inflow Area = 56.019 ac, 19.04% Impervious, Inflow Depth = 5.83" for 100 Year Saco event
Inflow = 150.41 cfs @ 12.65 hrs, Volume= 27.225 af
Outflow = 150.41 cfs @ 12.65 hrs, Volume= 27.225 af, Atten= 0%, Lag= 0.0 min
Routed to Pond 90P : POI 3

Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs

Reach 5R: POI #3



Summary for Reach 6R:

Inflow Area = 4.075 ac, 44.71% Impervious, Inflow Depth = 4.71" for 100 Year Saco event
Inflow = 8.82 cfs @ 12.31 hrs, Volume= 1.599 af
Outflow = 2.99 cfs @ 14.61 hrs, Volume= 1.599 af, Atten= 66%, Lag= 138.1 min
Routed to Reach 5R : POI #3

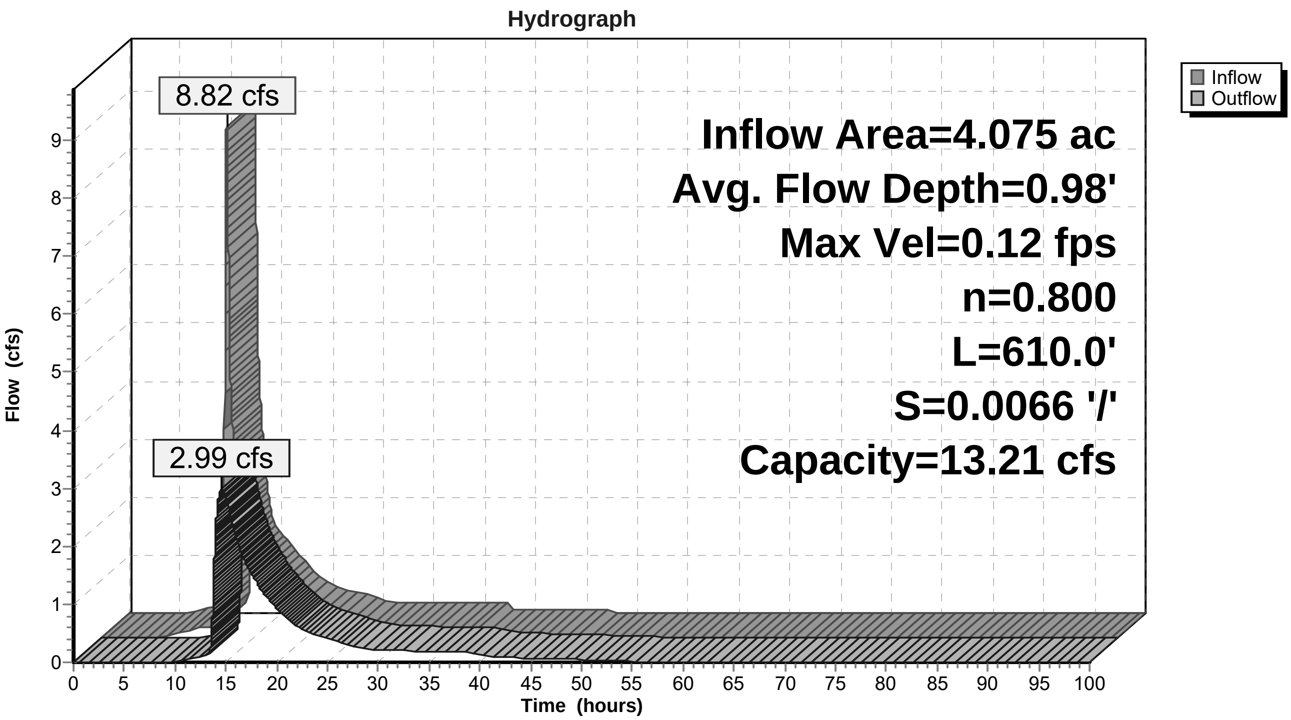
Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 87.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 323.2 min

Peak Storage= 15,622 cf @ 13.16 hrs
Average Depth at Peak Storage= 0.98' , Surface Width= 37.46'
Bank-Full Depth= 2.00' Flow Area= 76.0 sf, Capacity= 13.21 cfs

15.00' x 2.00' deep channel, n= 0.800 Sheet flow: Woods+dense brush
Side Slope Z-value= 13.0 10.0 '/' Top Width= 61.00'
Length= 610.0' Slope= 0.0066 '/'
Inlet Invert= 95.00', Outlet Invert= 91.00'

‡

Reach 6R:



Summary for Reach 7R:

Inflow Area = 1.372 ac, 84.78% Impervious, Inflow Depth = 8.15" for 100 Year Saco event
Inflow = 11.98 cfs @ 12.08 hrs, Volume= 0.932 af
Outflow = 9.01 cfs @ 12.28 hrs, Volume= 0.932 af, Atten= 25%, Lag= 12.3 min
Routed to Reach 5R : POI #3

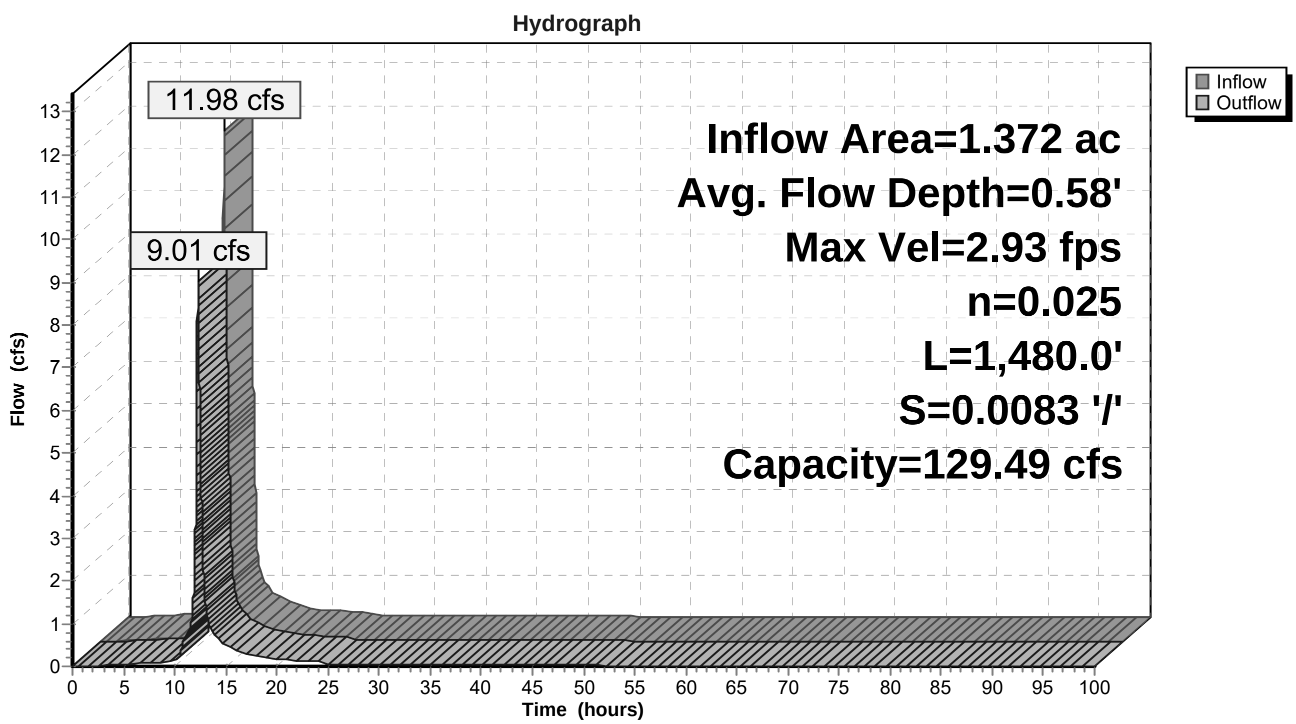
Routing by Stor-Ind+Trans method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.93 fps, Min. Travel Time= 8.4 min
Avg. Velocity = 0.64 fps, Avg. Travel Time= 38.7 min

Peak Storage= 4,556 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.58' , Surface Width= 7.63'
Bank-Full Depth= 2.00' Flow Area= 22.0 sf, Capacity= 129.49 cfs

3.00' x 2.00' deep channel, n= 0.025 Earth, clean & winding
Side Slope Z-value= 4.0 '/' Top Width= 19.00'
Length= 1,480.0' Slope= 0.0083 '/'
Inlet Invert= 103.35', Outlet Invert= 91.00'

‡

Reach 7R:



Summary for Pond 1P: GUSF #1

Inflow Area = 1.697 ac, 67.19% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 14.60 cfs @ 12.07 hrs, Volume= 1.094 af
Outflow = 6.60 cfs @ 12.22 hrs, Volume= 1.094 af, Atten= 55%, Lag= 9.1 min
Primary = 0.06 cfs @ 3.92 hrs, Volume= 0.229 af
Routed to Reach 1R : POI #1
Secondary = 3.49 cfs @ 12.22 hrs, Volume= 0.801 af
Routed to Reach 1R : POI #1
Tertiary = 3.05 cfs @ 12.22 hrs, Volume= 0.065 af
Routed to Reach 1R : POI #1

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 104.12' @ 12.22 hrs Surf.Area= 6,847 sf Storage= 17,272 cf

Plug-Flow detention time= 221.9 min calculated for 1.094 af (100% of inflow)
Center-of-Mass det. time= 222.0 min (988.0 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	98.40'	23,689 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.40	3,110	0.0	0	0
100.59	3,110	0.0	0	0
100.60	3,110	100.0	31	31
101.00	3,450	100.0	1,312	1,343
102.00	4,334	100.0	3,892	5,235
103.00	5,677	100.0	5,006	10,241
104.00	6,715	100.0	6,196	16,437
105.00	7,789	100.0	7,252	23,689

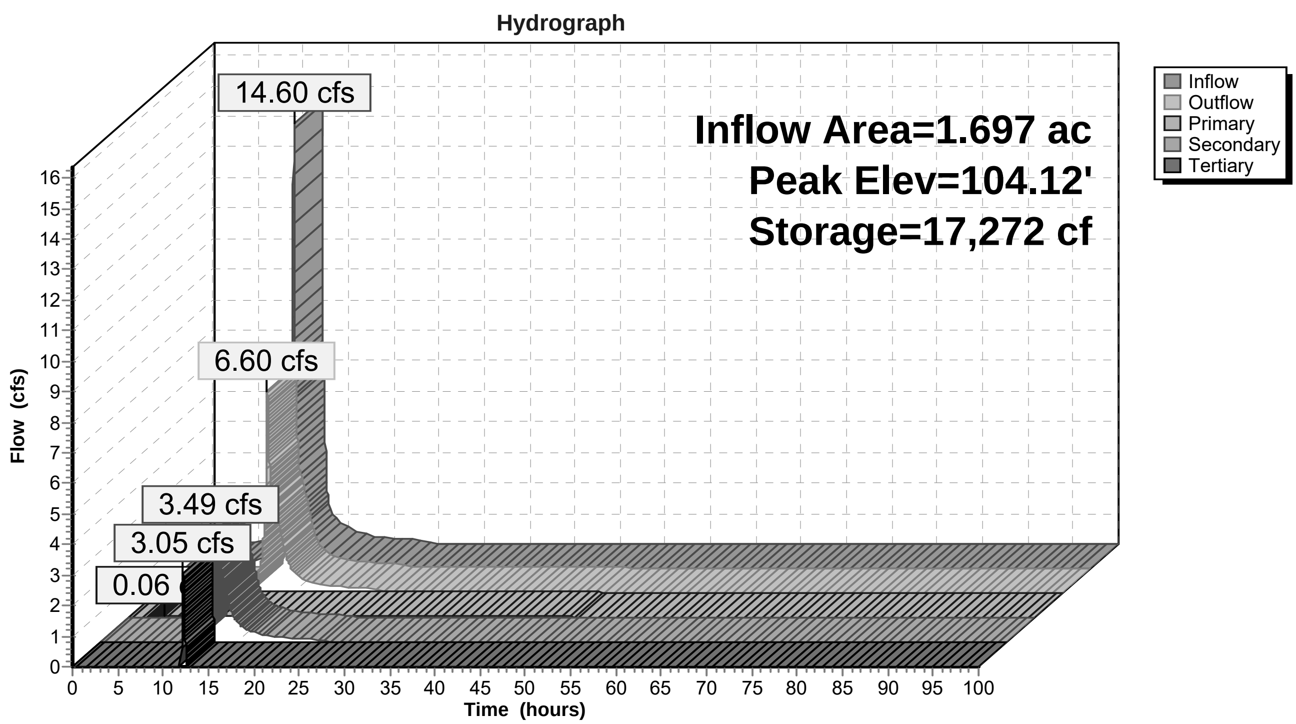
Device	Routing	Invert	Outlet Devices
#1	Primary	98.40'	**0.06 cfs Exfiltration at all elevations**
#2	Secondary	98.30'	**18.0" Round Culvert** L= 60.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.30' / 98.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.94'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.93'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.06 cfs @ 3.92 hrs HW=100.59' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Secondary OutFlow Max=3.49 cfs @ 12.22 hrs HW=104.12' (Free Discharge)
└─**2=Culvert** (Passes 3.49 cfs of 15.13 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.49 cfs @ 6.40 fps)

Tertiary OutFlow Max=3.01 cfs @ 12.22 hrs HW=104.12' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.01 cfs @ 1.04 fps)

Pond 1P: GUSF #1



Summary for Pond 2P: GUSF #2

Inflow Area = 1.895 ac, 47.04% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 15.74 cfs @ 12.07 hrs, Volume= 1.145 af
Outflow = 8.63 cfs @ 12.18 hrs, Volume= 1.145 af, Atten= 45%, Lag= 6.6 min
Primary = 0.05 cfs @ 4.72 hrs, Volume= 0.201 af
Routed to Reach 2R :
Secondary = 4.90 cfs @ 12.18 hrs, Volume= 0.884 af
Routed to Reach 2R :
Tertiary = 3.68 cfs @ 12.18 hrs, Volume= 0.061 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 105.06' @ 12.18 hrs Surf.Area= 6,099 sf Storage= 15,857 cf

Plug-Flow detention time= 204.5 min calculated for 1.145 af (100% of inflow)
Center-of-Mass det. time= 204.6 min (983.2 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	99.30'	22,037 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.30	2,848	0.0	0	0
101.49	2,848	0.0	0	0
101.50	2,848	100.0	28	28
102.00	3,087	100.0	1,484	1,512
103.00	4,294	100.0	3,691	5,203
104.00	5,146	100.0	4,720	9,923
105.00	6,046	100.0	5,596	15,519
106.00	6,991	100.0	6,519	22,037

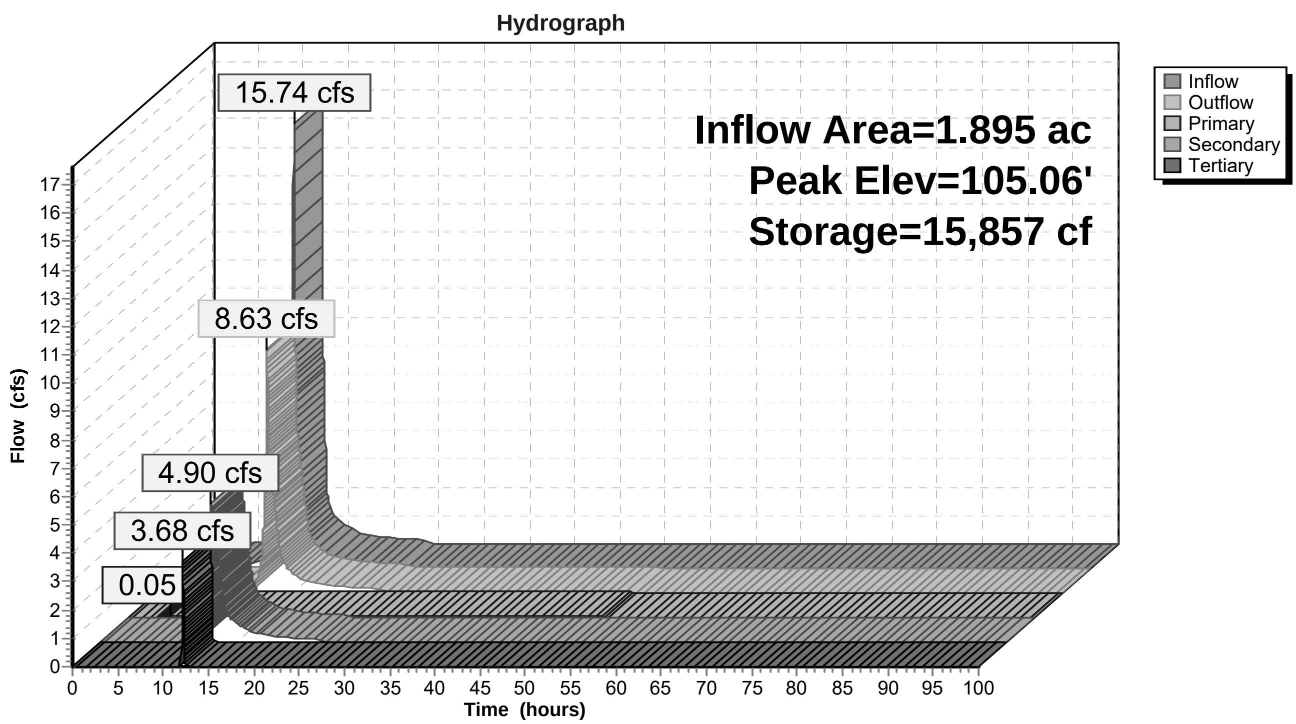
Device	Routing	Invert	Outlet Devices
#1	Secondary	99.20'	**18.0" Round Culvert** L= 45.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.20' / 99.00' S= 0.0044 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Primary	99.30'	**0.05 cfs Exfiltration at all elevations**
#3	Device 1	102.88'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	104.84'	**15.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.05 cfs @ 4.72 hrs HW=101.49' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=4.90 cfs @ 12.18 hrs HW=105.06' (Free Discharge)
└─**1=Culvert** (Passes 4.90 cfs of 15.18 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 4.90 cfs @ 6.23 fps)

Tertiary OutFlow Max=3.67 cfs @ 12.18 hrs HW=105.06' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.67 cfs @ 1.13 fps)

Pond 2P: GUSF #2



Summary for Pond 3P: GUSF #3

Inflow Area = 1.029 ac, 71.91% Impervious, Inflow Depth = 7.86" for 100 Year Saco event
Inflow = 8.92 cfs @ 12.07 hrs, Volume= 0.674 af
Outflow = 5.07 cfs @ 12.17 hrs, Volume= 0.674 af, Atten= 43%, Lag= 6.1 min
Primary = 0.04 cfs @ 3.73 hrs, Volume= 0.148 af
Routed to Reach 2R :
Secondary = 2.87 cfs @ 12.17 hrs, Volume= 0.494 af
Routed to Reach 2R :
Tertiary = 2.16 cfs @ 12.17 hrs, Volume= 0.033 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 103.15' @ 12.17 hrs Surf.Area= 4,602 sf Storage= 9,497 cf

Plug-Flow detention time= 209.8 min calculated for 0.674 af (100% of inflow)
Center-of-Mass det. time= 209.9 min (972.3 - 762.4)

Volume	Invert	Avail.Storage	Storage Description
#1	98.20'	13,683 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.20	2,466	0.0	0	0
100.39	2,466	0.0	0	0
100.40	2,466	100.0	25	25
101.00	2,593	100.0	1,518	1,542
102.00	3,724	100.0	3,159	4,701
103.00	4,479	100.0	4,102	8,802
104.00	5,282	100.0	4,881	13,683

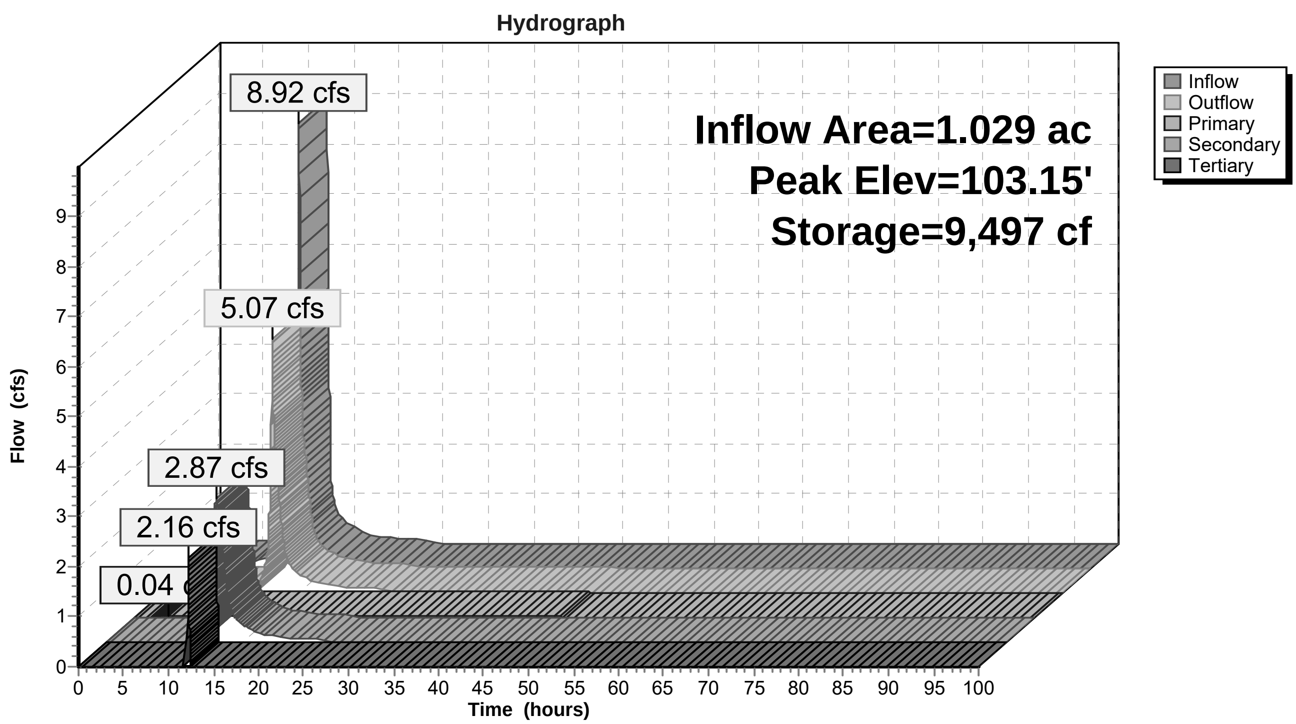
Device	Routing	Invert	Outlet Devices
#1	Primary	98.20'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	98.10'	**18.0" Round Culvert** L= 23.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.10' / 98.00' S= 0.0043 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.54'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.00'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 3.73 hrs HW=100.39' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=2.87 cfs @ 12.17 hrs HW=103.15' (Free Discharge)
└─**2=Culvert** (Passes 2.87 cfs of 13.93 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.87 cfs @ 5.27 fps)

Tertiary OutFlow Max=2.12 cfs @ 12.17 hrs HW=103.15' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 2.12 cfs @ 0.93 fps)

Pond 3P: GUSF #3



Summary for Pond 4P: GUSF #5

Inflow Area = 0.910 ac, 67.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 7.82 cfs @ 12.07 hrs, Volume= 0.586 af
Outflow = 5.07 cfs @ 12.15 hrs, Volume= 0.586 af, Atten= 35%, Lag= 5.0 min
Primary = 0.04 cfs @ 4.34 hrs, Volume= 0.135 af
Routed to Reach 3R :
Secondary = 3.32 cfs @ 12.15 hrs, Volume= 0.431 af
Routed to Reach 3R :
Tertiary = 1.71 cfs @ 12.15 hrs, Volume= 0.020 af
Routed to Reach 3R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 103.87' @ 12.15 hrs Surf.Area= 4,536 sf Storage= 7,523 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 189.7 min (955.7 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	99.23'	13,370 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.23	1,763	0.0	0	0
101.42	1,763	0.0	0	0
101.43	1,763	100.0	18	18
102.00	2,135	100.0	1,111	1,129
103.00	3,583	100.0	2,859	3,988
104.00	4,677	100.0	4,130	8,118
105.00	5,828	100.0	5,253	13,370

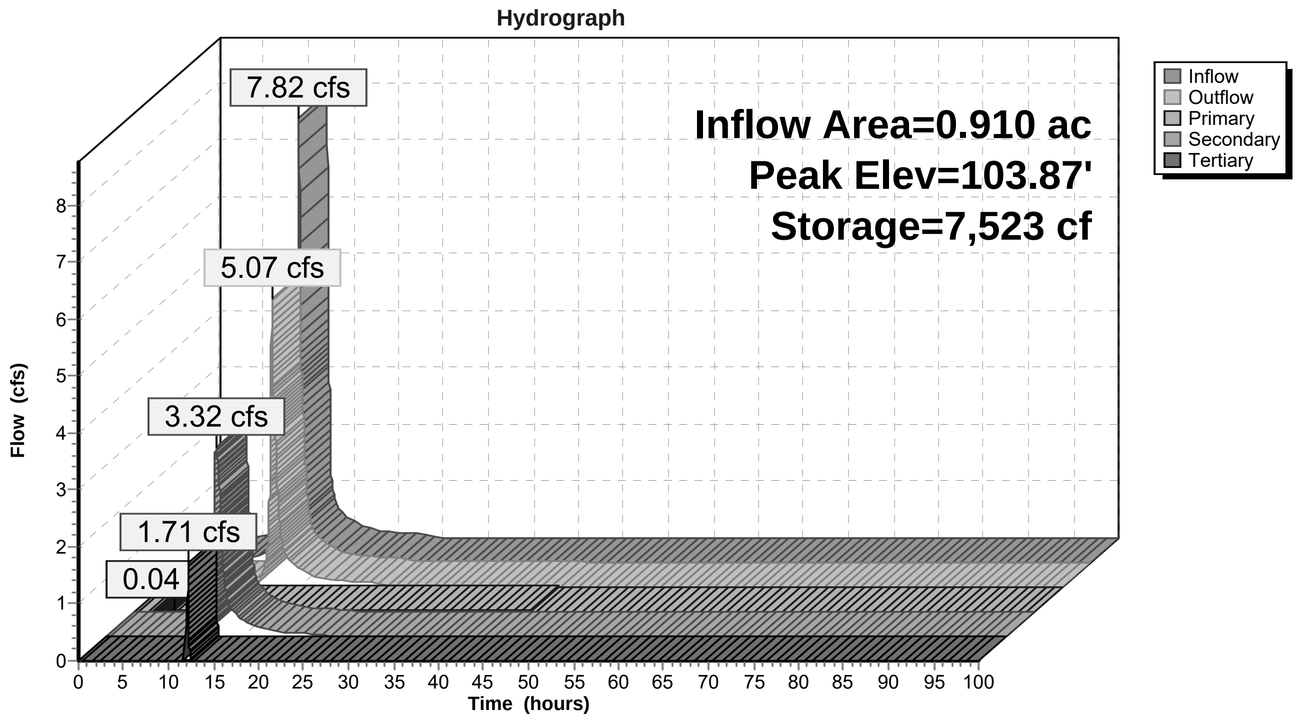
Device	Routing	Invert	Outlet Devices
#1	Primary	99.23'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	99.20'	**18.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.20' / 98.62' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	102.60'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.74'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 4.34 hrs HW=101.42' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=3.32 cfs @ 12.15 hrs HW=103.87' (Free Discharge)
└─**2=Culvert** (Passes 3.32 cfs of 13.30 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.32 cfs @ 4.23 fps)

Tertiary OutFlow Max=1.68 cfs @ 12.15 hrs HW=103.87' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.68 cfs @ 0.86 fps)

Pond 4P: GUSF #5



Summary for Pond 5P: Gravel Wetland #2

Inflow Area = 3.836 ac, 63.95% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 33.00 cfs @ 12.07 hrs, Volume= 2.473 af
Outflow = 16.75 cfs @ 12.19 hrs, Volume= 2.473 af, Atten= 49%, Lag= 7.4 min
Primary = 0.25 cfs @ 12.19 hrs, Volume= 0.572 af
Routed to Reach 2R :
Secondary = 9.18 cfs @ 12.19 hrs, Volume= 1.763 af
Routed to Reach 2R :
Tertiary = 7.31 cfs @ 12.19 hrs, Volume= 0.138 af
Routed to Reach 2R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 101.96' @ 12.19 hrs Surf.Area= 14,430 sf Storage= 39,563 cf

Plug-Flow detention time= 230.5 min calculated for 2.473 af (100% of inflow)
Center-of-Mass det. time= 230.6 min (996.6 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	95.14'	55,660 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.14	6,646	0.0	0	0
97.98	6,646	0.0	0	0
98.30	6,646	0.0	0	0
98.31	6,646	100.0	66	66
99.00	7,763	100.0	4,971	5,038
100.00	11,190	100.0	9,477	14,514
101.00	12,808	100.0	11,999	26,513
102.00	14,501	100.0	13,655	40,168
103.00	16,484	100.0	15,493	55,660

Device	Routing	Invert	Outlet Devices
#1	Device 2	95.14'	**2.2" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 3	97.98'	**0.5' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#3	Primary	97.90'	**24.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.90' / 97.80' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#4	Secondary	99.67'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	100.27'	**12.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	101.74'	**30.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65

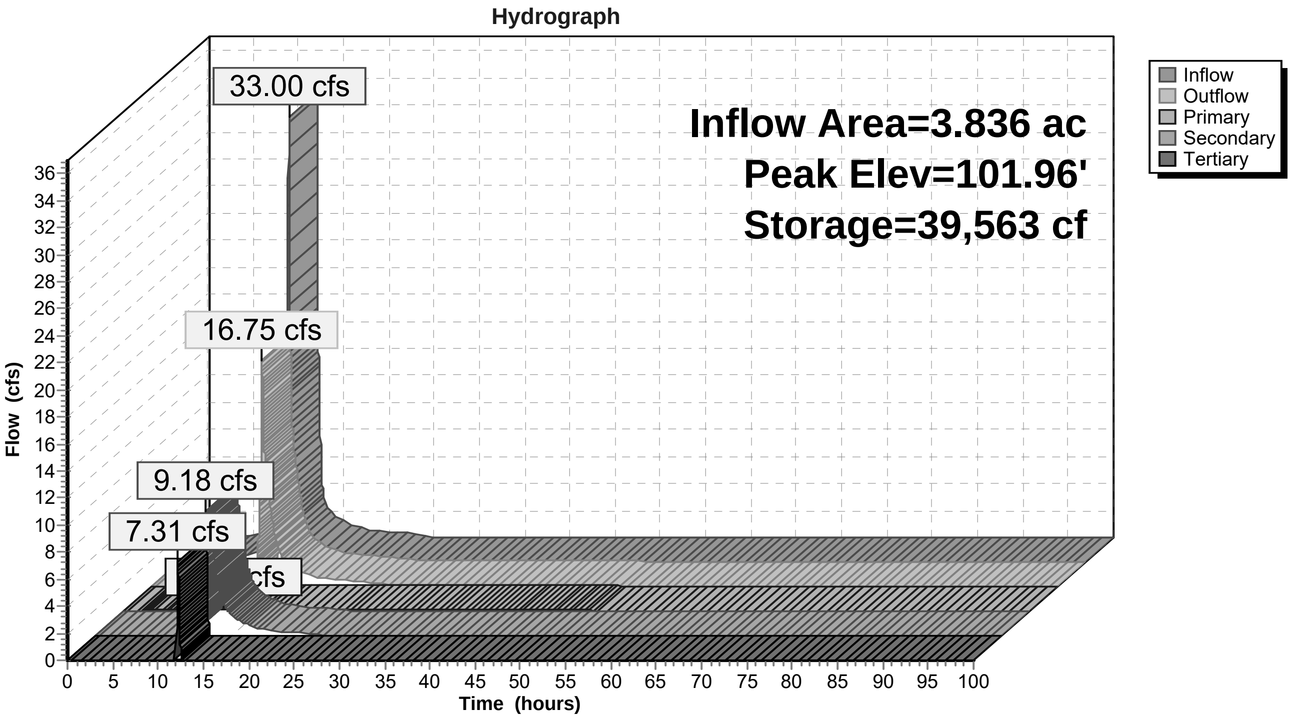
2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.25 cfs @ 12.19 hrs HW=101.96' (Free Discharge)
└─**3=Culvert** (Passes 0.25 cfs of 26.45 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Passes 0.25 cfs of 10.67 cfs potential flow)
    └─**1=Orifice/Grate** (Orifice Controls 0.25 cfs @ 9.60 fps)

Secondary OutFlow Max=9.18 cfs @ 12.19 hrs HW=101.96' (Free Discharge)
├─**4=Orifice/Grate** (Orifice Controls 5.06 cfs @ 6.44 fps)
└─**5=Orifice/Grate** (Orifice Controls 4.12 cfs @ 5.25 fps)

Tertiary OutFlow Max=7.27 cfs @ 12.19 hrs HW=101.96' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Weir Controls 7.27 cfs @ 1.11 fps)

Pond 5P: Gravel Wetland #2



Summary for Pond 6P: GUSF #4

Inflow Area = 1.015 ac, 66.73% Impervious, Inflow Depth = 7.74" for 100 Year Saco event
Inflow = 8.74 cfs @ 12.07 hrs, Volume= 0.655 af
Outflow = 2.32 cfs @ 12.41 hrs, Volume= 0.655 af, Atten= 73%, Lag= 20.4 min
Primary = 0.04 cfs @ 4.12 hrs, Volume= 0.143 af
Routed to Reach 4R : POI #2
Secondary = 1.14 cfs @ 12.41 hrs, Volume= 0.488 af
Routed to Reach 4R : POI #2
Tertiary = 1.14 cfs @ 12.41 hrs, Volume= 0.024 af
Routed to Reach 4R : POI #2

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 103.85' @ 12.41 hrs Surf.Area= 4,925 sf Storage= 13,136 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 250.4 min (1,016.4 - 766.0)

Volume	Invert	Avail.Storage	Storage Description
#1	97.70'	13,892 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.70	1,869	0.0	0	0
99.89	1,869	0.0	0	0
99.90	1,869	100.0	19	19
100.00	1,924	100.0	190	208
101.00	2,446	100.0	2,185	2,393
102.00	3,511	100.0	2,979	5,372
103.00	4,241	100.0	3,876	9,248
104.00	5,047	100.0	4,644	13,892

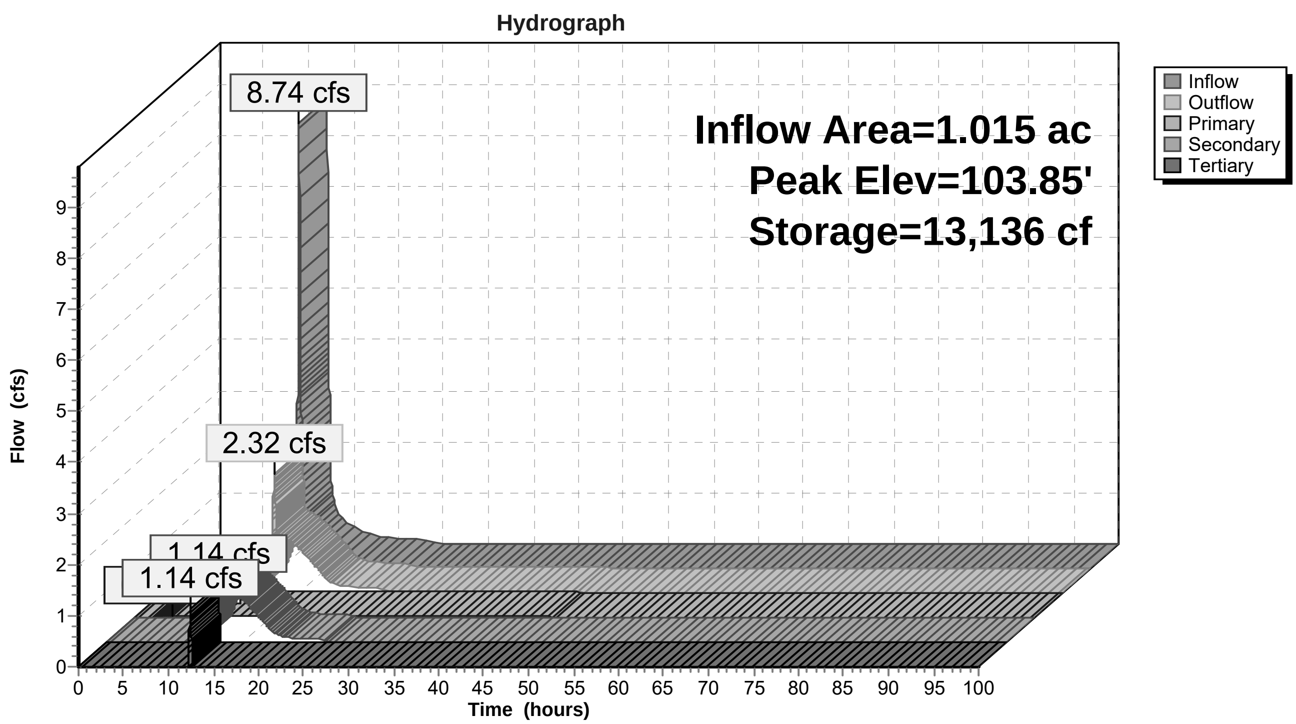
Device	Routing	Invert	Outlet Devices
#1	Primary	97.70'	**0.04 cfs Exfiltration at all elevations**
#2	Secondary	97.60'	**18.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.60' / 97.50' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.22'	**5.3" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	103.75'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.04 cfs @ 4.12 hrs HW=99.89' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.04 cfs)

Secondary OutFlow Max=1.14 cfs @ 12.41 hrs HW=103.85' (Free Discharge)
└─**2=Culvert** (Passes 1.14 cfs of 19.95 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 1.14 cfs @ 7.47 fps)

Tertiary OutFlow Max=1.10 cfs @ 12.41 hrs HW=103.85' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.10 cfs @ 0.74 fps)

Pond 6P: GUSF #4



Summary for Pond 7P: Gravel Wetland #1

Inflow Area = 7.302 ac, 60.35% Impervious, Inflow Depth = 7.50" for 100 Year Saco event
Inflow = 61.81 cfs @ 12.07 hrs, Volume= 4.561 af
Outflow = 2.73 cfs @ 14.57 hrs, Volume= 4.561 af, Atten= 96%, Lag= 149.8 min
Primary = 2.40 cfs @ 14.57 hrs, Volume= 4.166 af
Routed to Reach 4R : POI #2
Secondary = 0.32 cfs @ 14.57 hrs, Volume= 0.395 af
Routed to Reach 4R : POI #2
Tertiary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af
Routed to Reach 4R : POI #2

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 104.19' @ 14.57 hrs Surf.Area= 29,197 sf Storage= 128,676 cf

Plug-Flow detention time= 737.9 min calculated for 4.560 af (100% of inflow)
Center-of-Mass det. time= 738.1 min (1,510.7 - 772.6)

Volume	Invert	Avail.Storage	Storage Description
#1	94.76'	138,013 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.76	12,121	0.0	0	0
97.60	12,121	0.0	0	0
97.92	12,121	0.0	0	0
97.93	12,121	100.0	121	121
98.00	12,239	100.0	853	974
99.00	14,188	100.0	13,214	14,187
100.00	18,901	100.0	16,545	30,732
101.00	20,916	100.0	19,909	50,640
102.00	23,050	100.0	21,983	72,623
103.00	25,237	100.0	24,144	96,767
104.00	27,639	100.0	26,438	123,205
104.25	29,662	100.0	7,163	130,367
104.50	31,500	100.0	7,645	138,013

Device	Routing	Invert	Outlet Devices
#1	Device 2	94.76'	**2.4" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Device 3	97.60'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32
#3	Primary	97.50'	**36.0" Round Culvert** L= 69.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.50' / 96.50' S= 0.0145 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#4	Device 2	99.41'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Secondary	100.18'	**2.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Tertiary	104.25'	**15.0' long x 10.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60

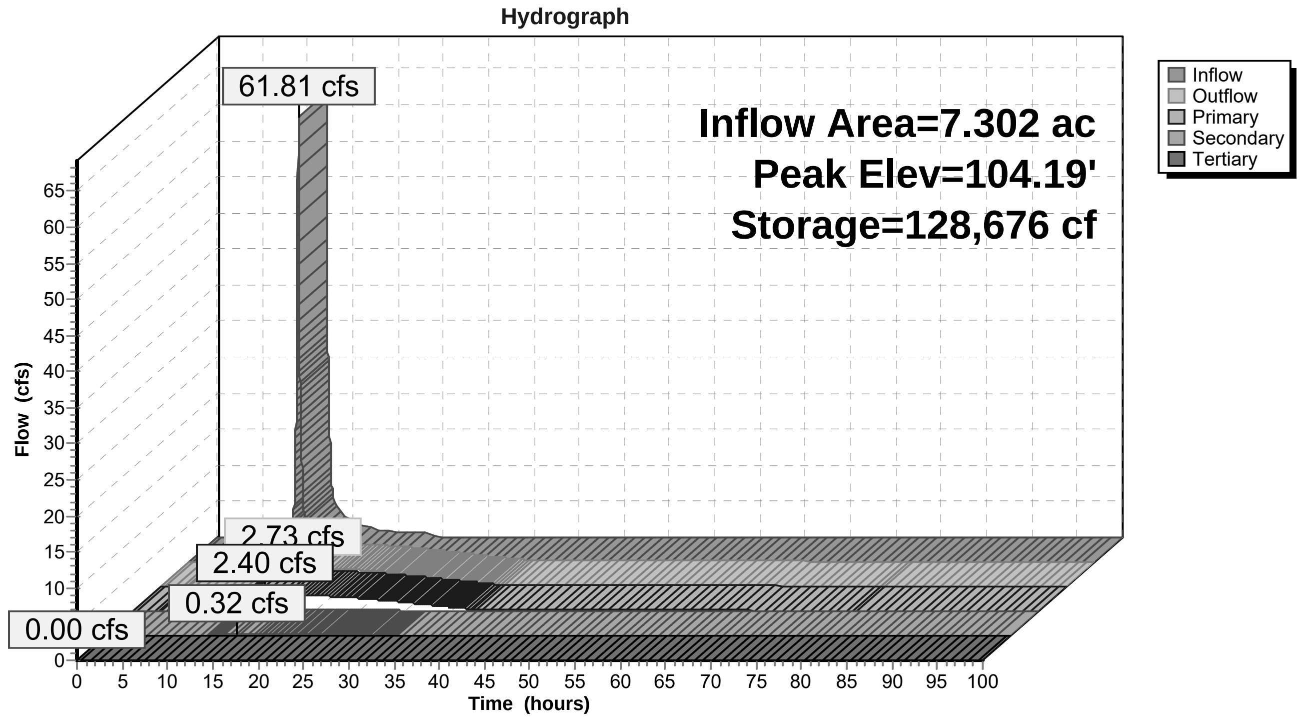
Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64

Primary OutFlow Max=2.40 cfs @ 14.57 hrs HW=104.19' (Free Discharge)
└─**3=Culvert** (Passes 2.40 cfs of 77.56 cfs potential flow)
  └─**2=Broad-Crested Rectangular Weir** (Passes 2.40 cfs of 337.18 cfs potential flow)
    ├─**1=Orifice/Grate** (Orifice Controls 0.39 cfs @ 12.36 fps)
    └─**4=Orifice/Grate** (Orifice Controls 2.01 cfs @ 10.25 fps)

Secondary OutFlow Max=0.32 cfs @ 14.57 hrs HW=104.19' (Free Discharge)
└─**5=Orifice/Grate** (Orifice Controls 0.32 cfs @ 9.52 fps)

Tertiary OutFlow Max=0.00 cfs @ 0.00 hrs HW=94.76' (Free Discharge)
└─**6=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 7P: Gravel Wetland #1



Summary for Pond 8/9P: GUSF #6 & #7

Inflow Area = 2.677 ac, 36.33% Impervious, Inflow Depth = 3.95" for 100 Year Saco event
Inflow = 12.51 cfs @ 12.08 hrs, Volume= 0.881 af
Outflow = 4.57 cfs @ 12.36 hrs, Volume= 0.881 af, Atten= 63%, Lag= 17.0 min
Primary = 0.14 cfs @ 9.77 hrs, Volume= 0.335 af
Routed to Reach 6R :
Secondary = 0.86 cfs @ 12.36 hrs, Volume= 0.411 af
Routed to Reach 6R :
Tertiary = 3.57 cfs @ 12.36 hrs, Volume= 0.136 af
Routed to Reach 6R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 101.49' @ 12.36 hrs Surf.Area= 8,032 sf Storage= 13,692 cf

Plug-Flow detention time= 248.9 min calculated for 0.881 af (100% of inflow)
Center-of-Mass det. time= 248.9 min (1,081.3 - 832.3)

Volume	Invert	Avail.Storage	Storage Description
#1	97.00'	27,139 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
97.00	4,024	0.0	0	0
99.19	4,024	0.0	0	0
99.20	4,024	100.0	40	40
100.00	4,989	100.0	3,605	3,645
101.00	7,445	100.0	6,217	9,862
102.00	8,631	100.0	8,038	17,900
103.00	9,847	100.0	9,239	27,139

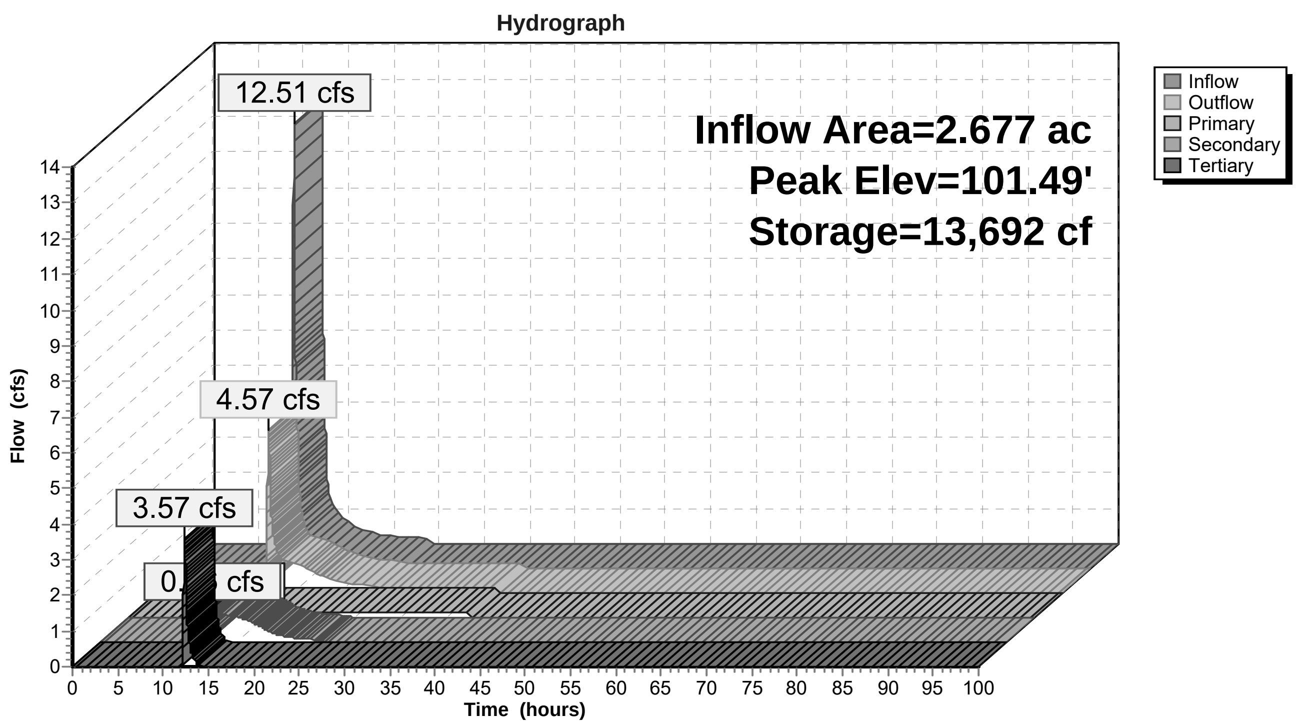
Device	Routing	Invert	Outlet Devices
#1	Primary	97.00'	**0.14 cfs Exfiltration at all elevations**
#2	Secondary	96.90'	**18.0" Round Culvert** L= 103.3' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 96.90' / 95.97' S= 0.0090 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	100.42'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	101.32'	**20.0' long x 8.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.43 2.54 2.70 2.69 2.68 2.68 2.66 2.64 2.64 2.64 2.65 2.65 2.66 2.66 2.68 2.70 2.74

Primary OutFlow Max=0.14 cfs @ 9.77 hrs HW=99.19' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.14 cfs)

Secondary OutFlow Max=0.86 cfs @ 12.36 hrs HW=101.49' (Free Discharge)
└─**2=Culvert** (Passes 0.86 cfs of 13.17 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 0.86 cfs @ 4.37 fps)

Tertiary OutFlow Max=3.55 cfs @ 12.36 hrs HW=101.49' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.55 cfs @ 1.02 fps)

Pond 8/9P: GUSF #6 & #7



Summary for Pond 10P: GUSF #8

Inflow Area = 1.398 ac, 60.77% Impervious, Inflow Depth = 6.16" for 100 Year Saco event
Inflow = 10.29 cfs @ 12.07 hrs, Volume= 0.718 af
Outflow = 5.88 cfs @ 12.18 hrs, Volume= 0.718 af, Atten= 43%, Lag= 6.2 min
Primary = 0.05 cfs @ 7.26 hrs, Volume= 0.170 af
Routed to Reach 6R :
Secondary = 2.73 cfs @ 12.18 hrs, Volume= 0.489 af
Routed to Reach 6R :
Tertiary = 3.11 cfs @ 12.18 hrs, Volume= 0.058 af
Routed to Reach 6R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 103.07' @ 12.18 hrs Surf.Area= 5,067 sf Storage= 10,577 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 230.8 min (1,031.9 - 801.1)

Volume	Invert	Avail.Storage	Storage Description
#1	98.16'	21,975 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
98.16	2,918	0.0	0	0
100.35	2,918	0.0	0	0
100.36	2,918	100.0	29	29
101.00	3,108	100.0	1,928	1,958
102.00	4,231	100.0	3,670	5,627
103.00	5,012	100.0	4,622	10,249
104.00	5,850	100.0	5,431	15,680
105.00	6,741	100.0	6,296	21,975

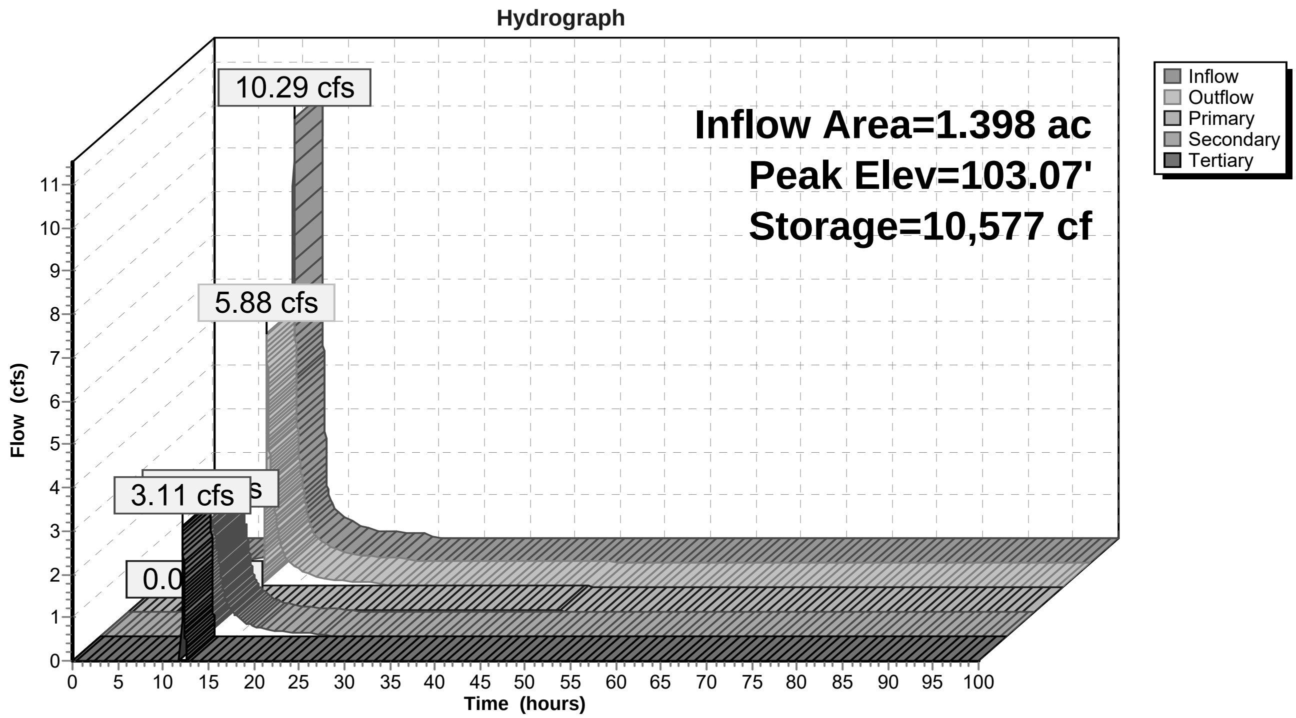
Device	Routing	Invert	Outlet Devices
#1	Primary	98.16'	**0.05 cfs Exfiltration at all elevations**
#2	Secondary	98.10'	**18.0" Round Culvert** L= 30.8' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.10' / 97.89' S= 0.0068 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	101.57'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	102.87'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.05 cfs @ 7.26 hrs HW=100.35' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Secondary OutFlow Max=2.73 cfs @ 12.18 hrs HW=103.06' (Free Discharge)
└─**2=Culvert** (Passes 2.73 cfs of 13.79 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 2.73 cfs @ 5.00 fps)

Tertiary OutFlow Max=3.06 cfs @ 12.18 hrs HW=103.06' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.06 cfs @ 1.05 fps)

Pond 10P: GUSF #8



Summary for Pond 11P: GUSF #9

Inflow Area = 2.108 ac, 70.56% Impervious, Inflow Depth = 7.25" for 100 Year Saco event
Inflow = 17.50 cfs @ 12.07 hrs, Volume= 1.274 af
Outflow = 7.39 cfs @ 12.25 hrs, Volume= 1.274 af, Atten= 58%, Lag= 10.7 min
Primary = 0.07 cfs @ 5.09 hrs, Volume= 0.274 af
Routed to Reach 5R : POI #3
Secondary = 3.52 cfs @ 12.25 hrs, Volume= 0.906 af
Routed to Reach 5R : POI #3
Tertiary = 3.80 cfs @ 12.25 hrs, Volume= 0.093 af
Routed to Reach 5R : POI #3

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 100.28' @ 12.25 hrs Surf.Area= 8,436 sf Storage= 21,691 cf

Plug-Flow detention time= 249.4 min calculated for 1.274 af (100% of inflow)
Center-of-Mass det. time= 249.5 min (1,028.1 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	94.46'	28,068 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.46	3,783	0.0	0	0
96.65	3,783	0.0	0	0
96.66	3,783	100.0	38	38
97.00	4,087	100.0	1,338	1,376
98.00	5,074	100.0	4,581	5,956
99.00	6,824	100.0	5,949	11,905
100.00	8,066	100.0	7,445	19,350
101.00	9,370	100.0	8,718	28,068

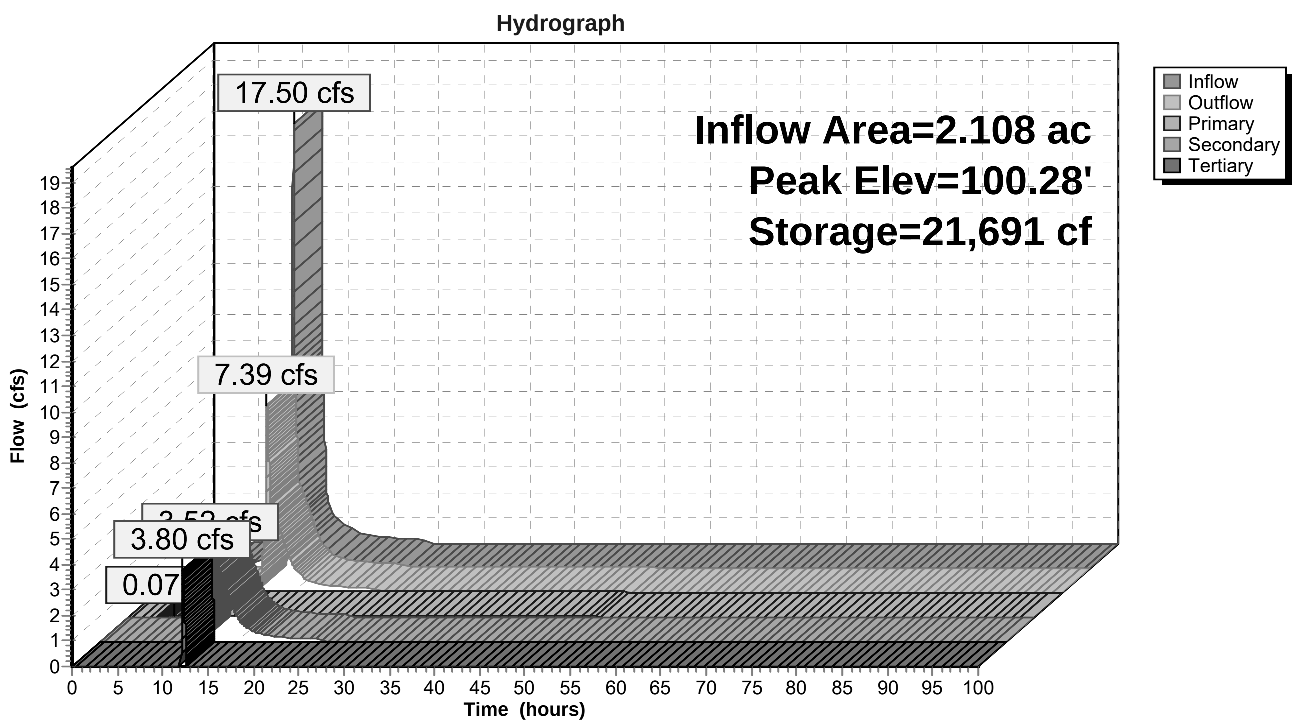
Device	Routing	Invert	Outlet Devices
#1	Primary	94.46'	**0.07 cfs Exfiltration at all elevations**
#2	Secondary	94.36'	**18.0" Round Culvert** L= 58.1' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.36' / 93.92' S= 0.0076 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#3	Device 2	98.07'	**10.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Tertiary	100.06'	**15.0' long x 6.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83

Primary OutFlow Max=0.07 cfs @ 5.09 hrs HW=96.65' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=3.52 cfs @ 12.25 hrs HW=100.28' (Free Discharge)
└─**2=Culvert** (Passes 3.52 cfs of 15.28 cfs potential flow)
  └─**3=Orifice/Grate** (Orifice Controls 3.52 cfs @ 6.45 fps)

Tertiary OutFlow Max=3.79 cfs @ 12.25 hrs HW=100.28' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 3.79 cfs @ 1.13 fps)

Pond 11P: GUSF #9



Summary for Pond 12P: CHAMBER1

Inflow Area = 0.517 ac, 84.12% Impervious, Inflow Depth = 8.10" for 100 Year Saco event
Inflow = 4.53 cfs @ 12.07 hrs, Volume= 0.349 af
Outflow = 4.51 cfs @ 12.08 hrs, Volume= 0.349 af, Atten= 0%, Lag= 0.4 min
Primary = 0.02 cfs @ 3.12 hrs, Volume= 0.077 af
Routed to Reach 7R :
Secondary = 4.49 cfs @ 12.08 hrs, Volume= 0.272 af
Routed to Reach 7R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 107.36' @ 12.08 hrs Surf.Area= 0.021 ac Storage= 0.045 af

Plug-Flow detention time= 201.3 min calculated for 0.349 af (100% of inflow)
Center-of-Mass det. time= 201.3 min (955.7 - 754.4)

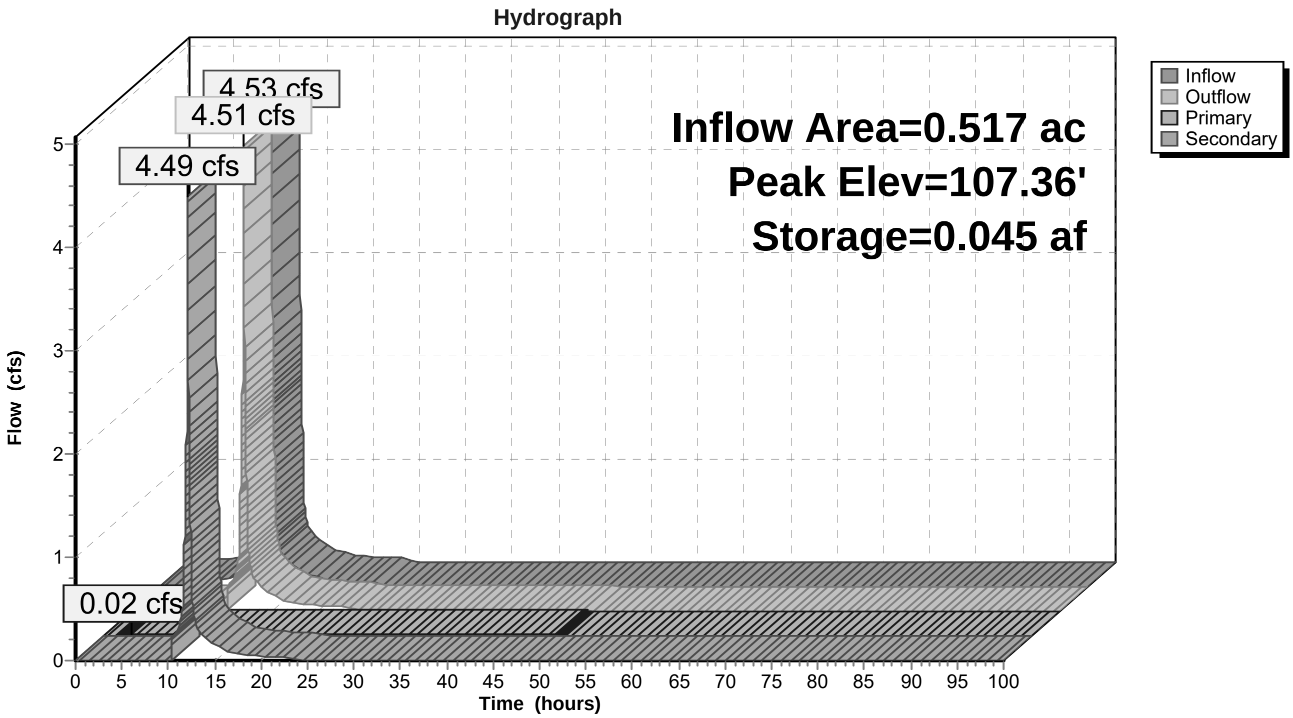
Volume	Invert	Avail.Storage	Storage Description
#1	104.10'	0.018 af	**5.33'W x 7.21'L x 3.54'H Prismatoid** x 24 0.075 af Overall - 0.029 af Embedded = 0.046 af x 40.0% Voids
#2	104.60'	0.029 af	**Cultec R-330XLHD** x 24 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		0.047 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	104.10'	**0.02 cfs Exfiltration at all elevations**
#2	Secondary	106.95'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.02 cfs @ 3.12 hrs HW=104.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=4.48 cfs @ 12.08 hrs HW=107.36' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 4.48 cfs @ 1.81 fps)

Pond 12P: CHAMBER1



Summary for Pond 13P: CHAMBER2

Inflow Area = 0.595 ac, 86.51% Impervious, Inflow Depth = 8.22" for 100 Year Saco event
Inflow = 5.24 cfs @ 12.07 hrs, Volume= 0.408 af
Outflow = 5.21 cfs @ 12.08 hrs, Volume= 0.408 af, Atten= 1%, Lag= 0.4 min
Primary = 0.02 cfs @ 2.51 hrs, Volume= 0.085 af
Routed to Reach 7R :
Secondary = 5.19 cfs @ 12.08 hrs, Volume= 0.323 af
Routed to Reach 7R :

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 107.15' @ 12.08 hrs Surf.Area= 0.026 ac Storage= 0.054 af

Plug-Flow detention time= 218.5 min calculated for 0.408 af (100% of inflow)
Center-of-Mass det. time= 218.5 min (968.4 - 749.9)

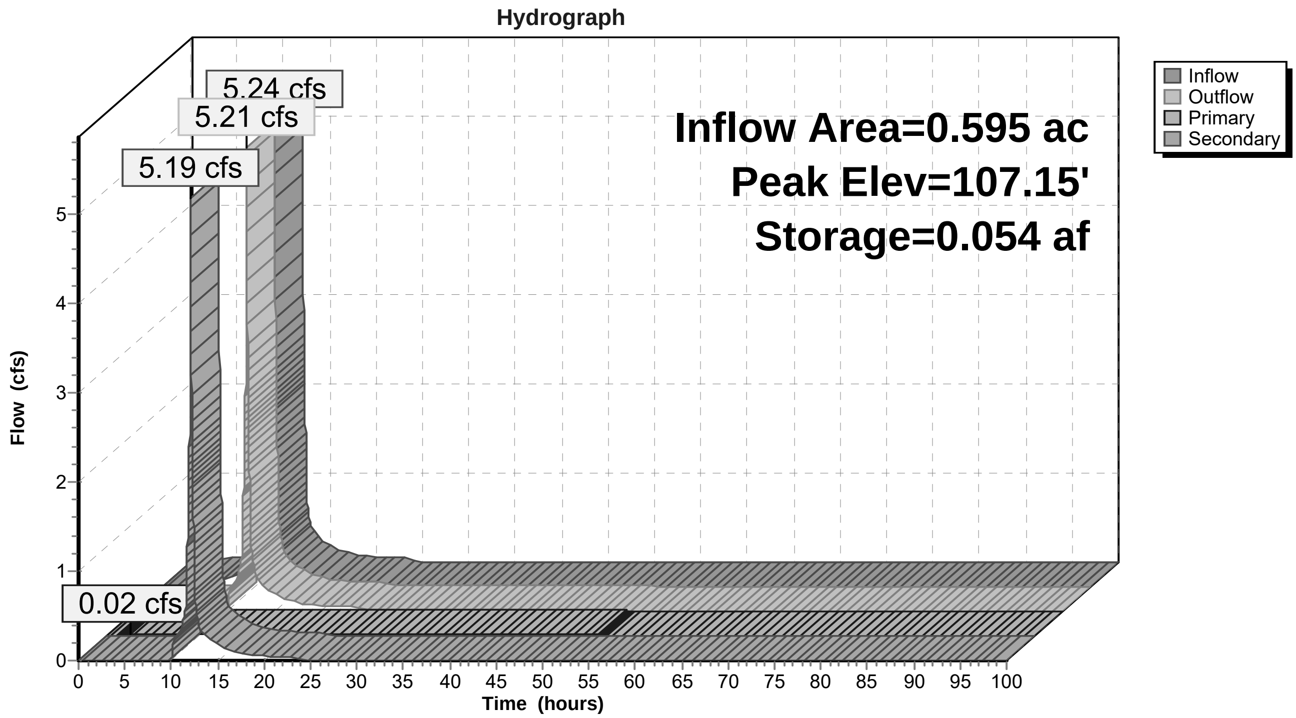
Volume	Invert	Avail.Storage	Storage Description
#1	104.10'	0.023 af	**5.33'W x 7.21'L x 3.54'H Prismatoid** x 30 0.094 af Overall - 0.036 af Embedded = 0.058 af x 40.0% Voids
#2	104.60'	0.036 af	**Cultec R-330XLHD** x 30 Inside #1 Effective Size= 47.8"W x 30.0"H => 7.45 sf x 7.00'L = 52.2 cf Overall Size= 52.0"W x 30.5"H x 8.50'L with 1.50' Overlap
		0.059 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	104.10'	**0.02 cfs Exfiltration at all elevations**
#2	Secondary	106.70'	**6.0' long x 0.7' 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 Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32 3.31 3.32

Primary OutFlow Max=0.02 cfs @ 2.51 hrs HW=104.14' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.02 cfs)

Secondary OutFlow Max=5.17 cfs @ 12.08 hrs HW=107.15' (Free Discharge)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 5.17 cfs @ 1.91 fps)

Pond 13P: CHAMBER2



Summary for Pond 14P: FocalPoint 1

Inflow Area = 0.391 ac, 80.52% Impervious, Inflow Depth = 7.98" for 100 Year Saco event
Inflow = 3.41 cfs @ 12.07 hrs, Volume= 0.260 af
Outflow = 3.41 cfs @ 12.07 hrs, Volume= 0.260 af, Atten= 0%, Lag= 0.2 min
Primary = 0.15 cfs @ 9.95 hrs, Volume= 0.138 af
Secondary = 3.26 cfs @ 12.07 hrs, Volume= 0.122 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 108.99' @ 12.07 hrs Surf.Area= 64 sf Storage= 99 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (760.1 - 758.5)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**16.00'W x 4.00'L x 2.25'H FocalPoint** 144 cf Overall x 0.0% Voids
#2	108.20'	100 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		100 cf	Total Available Storage

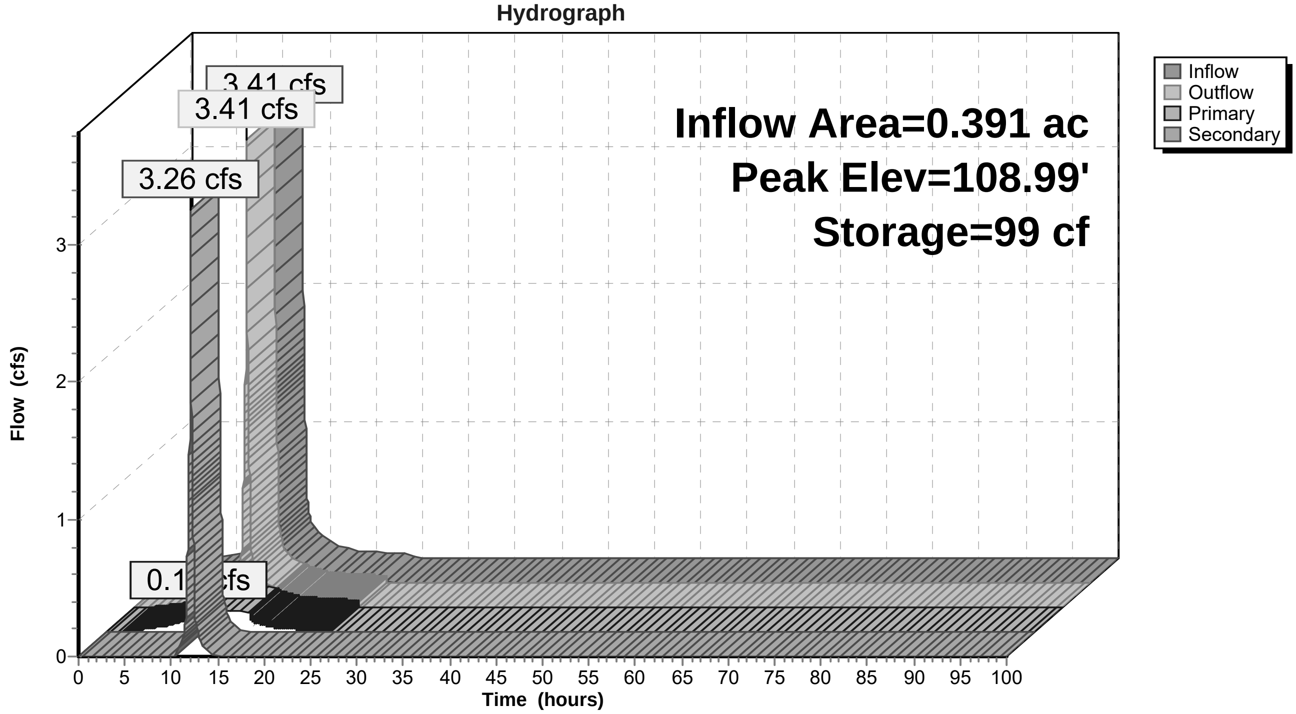
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	64	0	0
108.50	124	28	28
109.00	164	72	100

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 9.95 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=3.25 cfs @ 12.07 hrs HW=108.99' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 3.25 cfs @ 1.77 fps)

Pond 14P: FocalPoint 1



Summary for Pond 15P: FocalPoint 2

Inflow Area = 0.126 ac, 95.31% Impervious, Inflow Depth = 8.34" for 100 Year Saco event
Inflow = 1.11 cfs @ 12.07 hrs, Volume= 0.087 af
Outflow = 1.11 cfs @ 12.07 hrs, Volume= 0.108 af, Atten= 0%, Lag= 0.2 min
Primary = 0.15 cfs @ 11.59 hrs, Volume= 0.085 af
Secondary = 0.96 cfs @ 12.07 hrs, Volume= 0.024 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 108.86' @ 12.07 hrs Surf.Area= 64 sf Storage= 40 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 52.1 min (797.0 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**16.00'W x 4.00'L x 2.25'H FocalPoint** 144 cf Overall x 0.0% Voids
#2	108.20'	53 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		53 cf	Total Available Storage

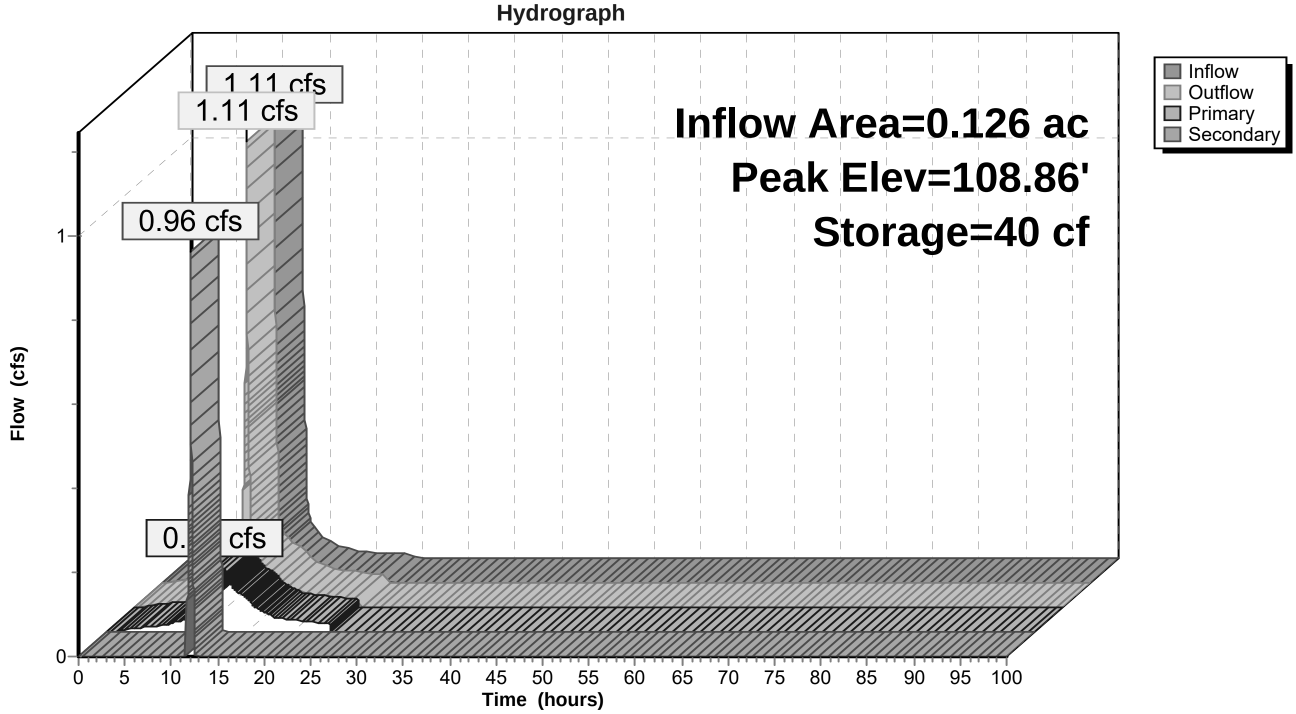
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	24	0	0
108.50	64	13	13
109.00	96	40	53

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**18.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.15 cfs @ 11.59 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Secondary OutFlow Max=0.96 cfs @ 12.07 hrs HW=108.86' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 0.96 cfs @ 1.30 fps)

Pond 15P: FocalPoint 2



Summary for Pond 16P: FocalPoint 3

Inflow Area = 0.459 ac, 83.70% Impervious, Inflow Depth = 8.10" for 100 Year Saco event
Inflow = 4.02 cfs @ 12.07 hrs, Volume= 0.310 af
Outflow = 4.08 cfs @ 12.07 hrs, Volume= 0.330 af, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 9.90 hrs, Volume= 0.185 af
Secondary = 3.90 cfs @ 12.07 hrs, Volume= 0.145 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 109.03' @ 12.07 hrs Surf.Area= 76 sf Storage= 97 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 26.1 min (780.4 - 754.4)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**19.00'W x 4.00'L x 2.25'H FocalPoint** 171 cf Overall x 0.0% Voids
#2	108.20'	97 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		97 cf	Total Available Storage

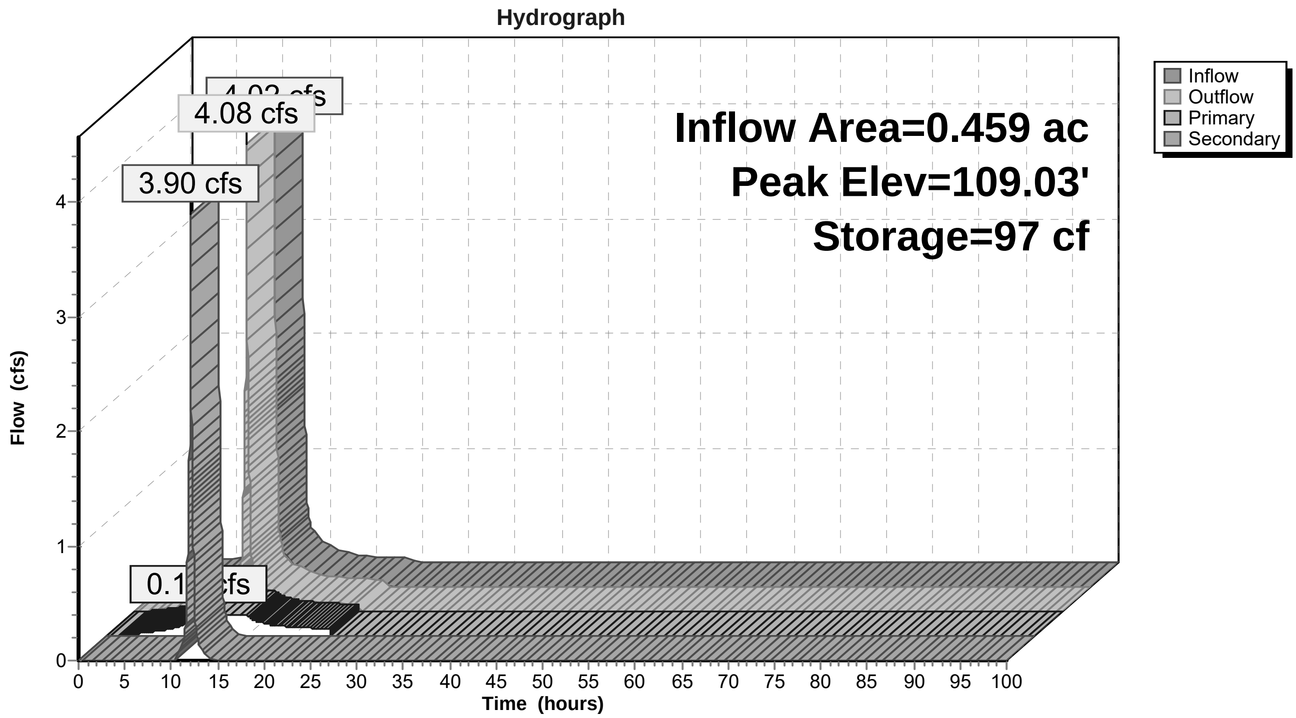
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	76	0	0
108.50	128	31	31
108.95	168	67	97

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 9.90 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.18 cfs)

Secondary OutFlow Max=3.90 cfs @ 12.07 hrs HW=109.03' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 3.90 cfs @ 1.88 fps)

Pond 16P: FocalPoint 3



Summary for Pond 17P: FocalPoint 4

Inflow Area = 0.136 ac, 96.01% Impervious, Inflow Depth = 8.34" for 100 Year Saco event
Inflow = 1.20 cfs @ 12.07 hrs, Volume= 0.094 af
Outflow = 1.20 cfs @ 12.07 hrs, Volume= 0.096 af, Atten= 0%, Lag= 0.2 min
Primary = 0.07 cfs @ 10.68 hrs, Volume= 0.060 af
Secondary = 1.12 cfs @ 12.07 hrs, Volume= 0.036 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs / 2
Peak Elev= 108.84' @ 12.07 hrs Surf.Area= 32 sf Storage= 53 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 9.7 min (754.6 - 744.9)

Volume	Invert	Avail.Storage	Storage Description
#1	105.95'	0 cf	**8.00'W x 4.00'L x 2.25'H FocalPoint** 72 cf Overall x 0.0% Voids
#2	108.20'	67 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) -Impervious
		67 cf	Total Available Storage

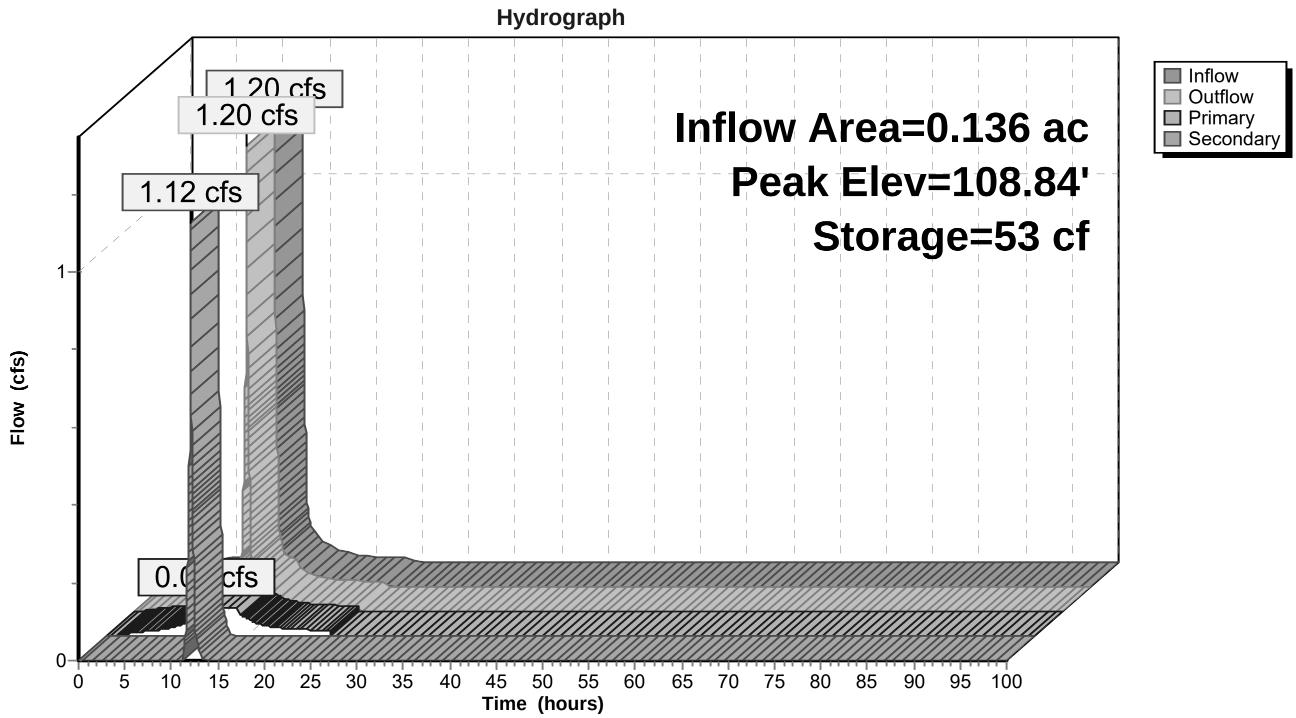
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
108.20	32	0	0
108.50	88	18	18
108.95	128	49	67

Device	Routing	Invert	Outlet Devices
#1	Primary	105.95'	**100.000 in/hr Exfiltration over Surface area** Phase-In= 0.10'
#2	Secondary	108.70'	**24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.07 cfs @ 10.68 hrs HW=108.20' (Free Discharge)
└─**1=Exfiltration** (Exfiltration Controls 0.07 cfs)

Secondary OutFlow Max=1.12 cfs @ 12.07 hrs HW=108.84' (Free Discharge)
└─**2=Orifice/Grate** (Weir Controls 1.12 cfs @ 1.24 fps)

Pond 17P: FocalPoint 4



Summary for Pond 20P: POI 1

Inflow Area = 24.361 ac, 31.49% Impervious, Inflow Depth = 6.44" for 100 Year Saco event
Inflow = 46.32 cfs @ 13.05 hrs, Volume= 13.067 af
Outflow = 46.30 cfs @ 13.06 hrs, Volume= 13.067 af, Atten= 0%, Lag= 0.4 min
Primary = 46.30 cfs @ 13.06 hrs, Volume= 13.067 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 87.35' @ 13.06 hrs Surf.Area= 613 sf Storage= 419 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.1 min (937.4 - 937.4)

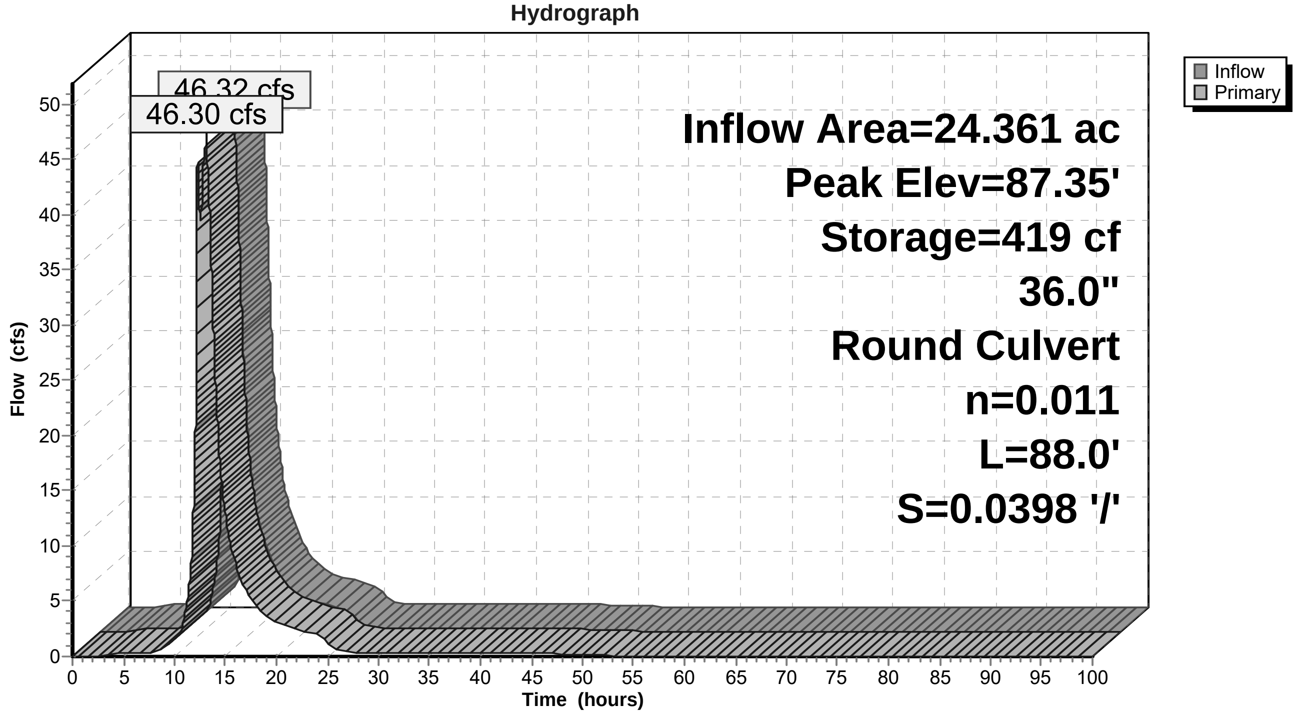
Volume	Invert	Avail.Storage	Storage Description
#1	84.00'	7,922 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
84.00	10	0	0
85.00	20	15	15
86.00	50	35	50
87.00	350	200	250
88.00	1,101	726	976
89.00	3,257	2,179	3,155
90.00	6,278	4,768	7,922

Device	Routing	Invert	Outlet Devices
#1	Primary	84.00'	**36.0" Round Culvert** L= 88.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 84.00' / 80.50' S= 0.0398 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=46.30 cfs @ 13.06 hrs HW=87.35' (Free Discharge)
└─**1=Culvert** (Inlet Controls 46.30 cfs @ 6.55 fps)

Pond 20P: POI 1



Summary for Pond 90P: POI 3

Inflow Area = 56.019 ac, 19.04% Impervious, Inflow Depth = 5.83" for 100 Year Saco event
Inflow = 150.41 cfs @ 12.65 hrs, Volume= 27.225 af
Outflow = 133.25 cfs @ 12.87 hrs, Volume= 27.225 af, Atten= 11%, Lag= 13.1 min
Primary = 133.25 cfs @ 12.87 hrs, Volume= 27.225 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 91.10' @ 12.87 hrs Surf.Area= 26,304 sf Storage= 35,099 cf

Plug-Flow detention time= 1.4 min calculated for 27.225 af (100% of inflow)
Center-of-Mass det. time= 1.4 min (888.0 - 886.7)

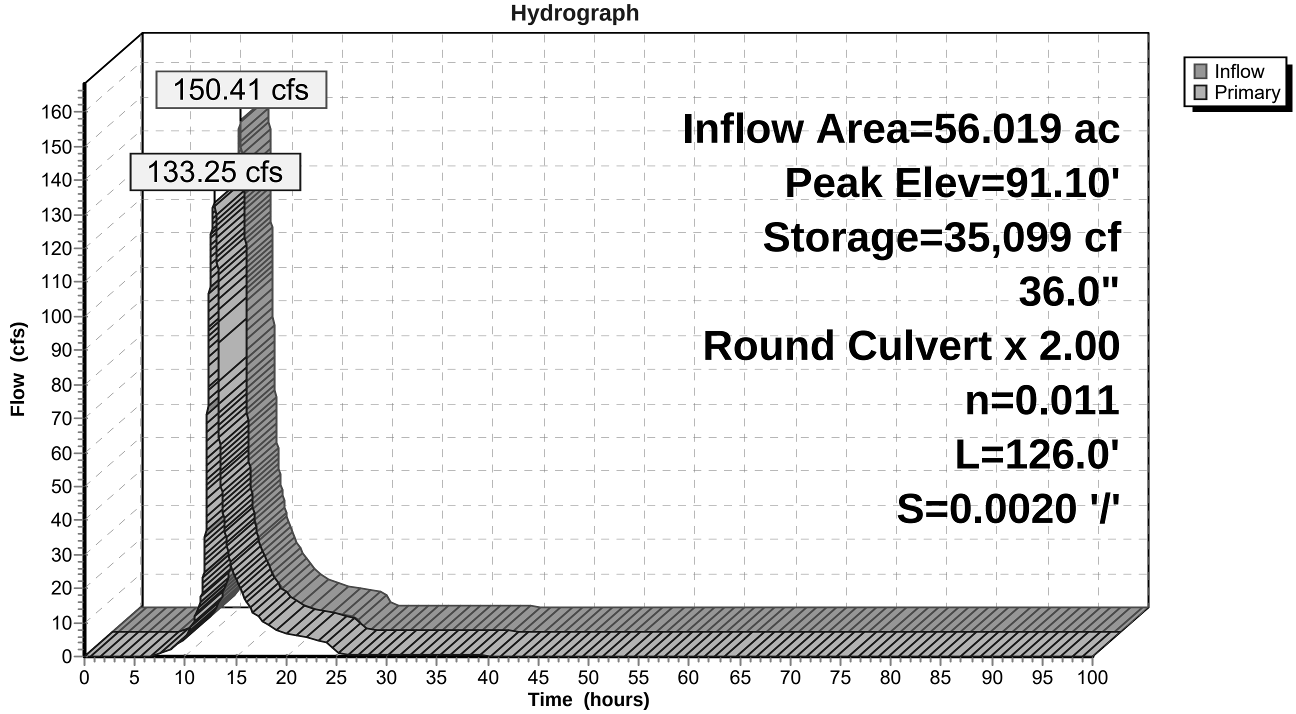
Volume	Invert	Avail.Storage	Storage Description
#1	83.45'	86,017 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
83.45	200	0	0
85.00	500	542	542
87.00	800	1,300	1,842
88.00	1,325	1,063	2,905
90.00	10,603	11,928	14,833
92.50	46,344	71,184	86,017

Device	Routing	Invert	Outlet Devices
#1	Primary	83.45'	**36.0" Round Culvert X 2.00** L= 126.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 83.45' / 83.20' S= 0.0020 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=133.25 cfs @ 12.87 hrs HW=91.10' (Free Discharge)
└─**1=Culvert** (Inlet Controls 133.25 cfs @ 9.43 fps)

Pond 90P: POI 3



Summary for Pond 91P: POI 2

Inflow Area = 12.330 ac, 45.25% Impervious, Inflow Depth = 7.13" for 100 Year Saco event
Inflow = 20.14 cfs @ 12.44 hrs, Volume= 7.328 af
Outflow = 5.20 cfs @ 14.73 hrs, Volume= 7.328 af, Atten= 74%, Lag= 137.3 min
Primary = 5.20 cfs @ 14.73 hrs, Volume= 7.328 af

Routing by Stor-Ind method, Time Span= 0.00-100.00 hrs, dt= 0.01 hrs
Peak Elev= 97.88' @ 14.73 hrs Surf.Area= 30,634 sf Storage= 49,191 cf

Plug-Flow detention time= 75.0 min calculated for 7.327 af (100% of inflow)
Center-of-Mass det. time= 75.0 min (1,343.7 - 1,268.7)

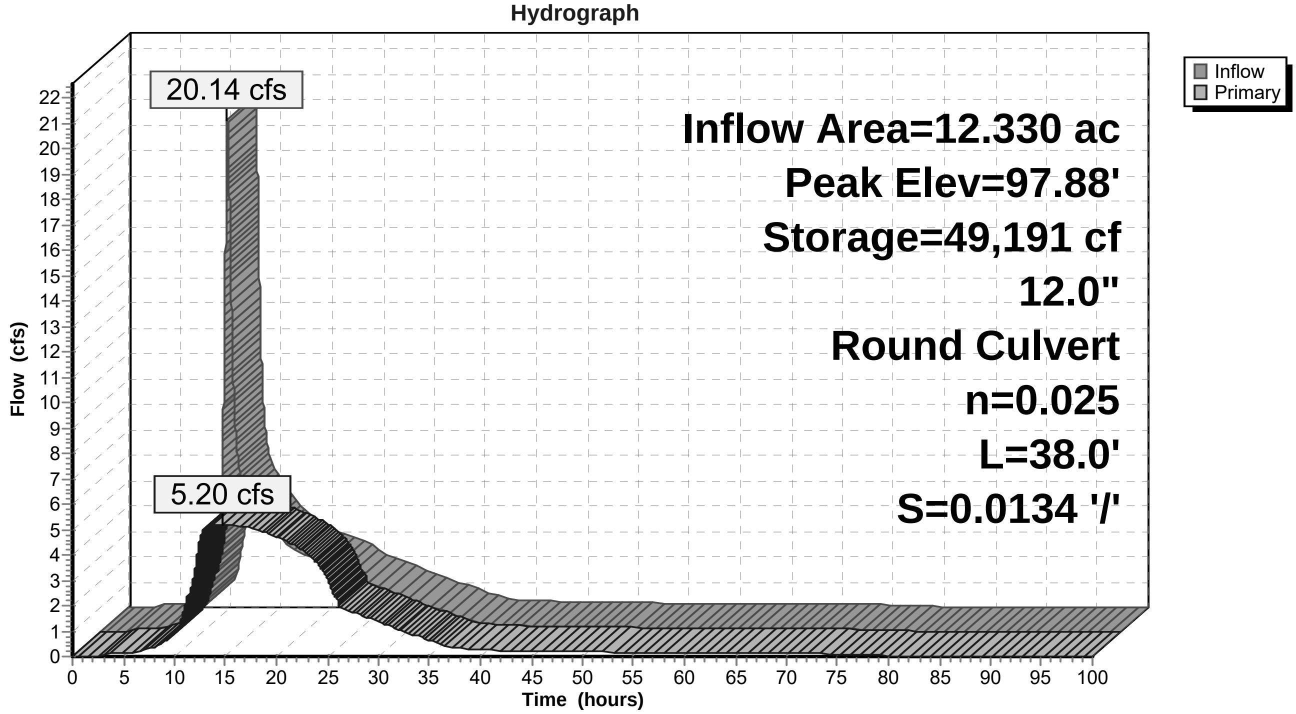
Volume	Invert	Avail.Storage	Storage Description
#1	93.00'	88,629 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.00	20	0	0
94.00	359	190	190
95.00	3,678	2,019	2,208
96.00	9,638	6,658	8,866
97.00	23,429	16,534	25,400
99.00	39,800	63,229	88,629

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 38.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 93.10' / 92.59' S= 0.0134 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=5.20 cfs @ 14.73 hrs HW=97.88' (Free Discharge)
└─**1=Culvert** (Barrel Controls 5.20 cfs @ 6.62 fps)

Pond 91P: POI 2



ATTACHMENT 8

ABILITY TO SERVE LETTERS – MWC & WRRD

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

August 5, 2022

Marcus Knipp
Maine Water
93 Industrial Park Road
Saco, Maine 04072

Re: Lincoln Village
321 Lincoln Street, Saco, Maine
Letter of Ability to Serve Request

Dear Mr. Knipp:

321 Lincoln Street Development, LLC has retained Gorrill Palmer to assist in the preparation of plans and permitting for the development of Lincoln Village located in Saco, Maine. The property is identified as Map 52 and Lot 19 on the Town of Saco's tax map. The development area is approximately 33 acres in size and is currently undeveloped. The proposed project will include a mixed residential development with a network of roadways and walkways, landscaped areas, trails and stormwater maintenance facilities. As required by the reviewing authorities, we are writing to request a letter indicating the ability of Maine Water to serve this project. Preliminary utility plans are enclosed for your review.

Project Description

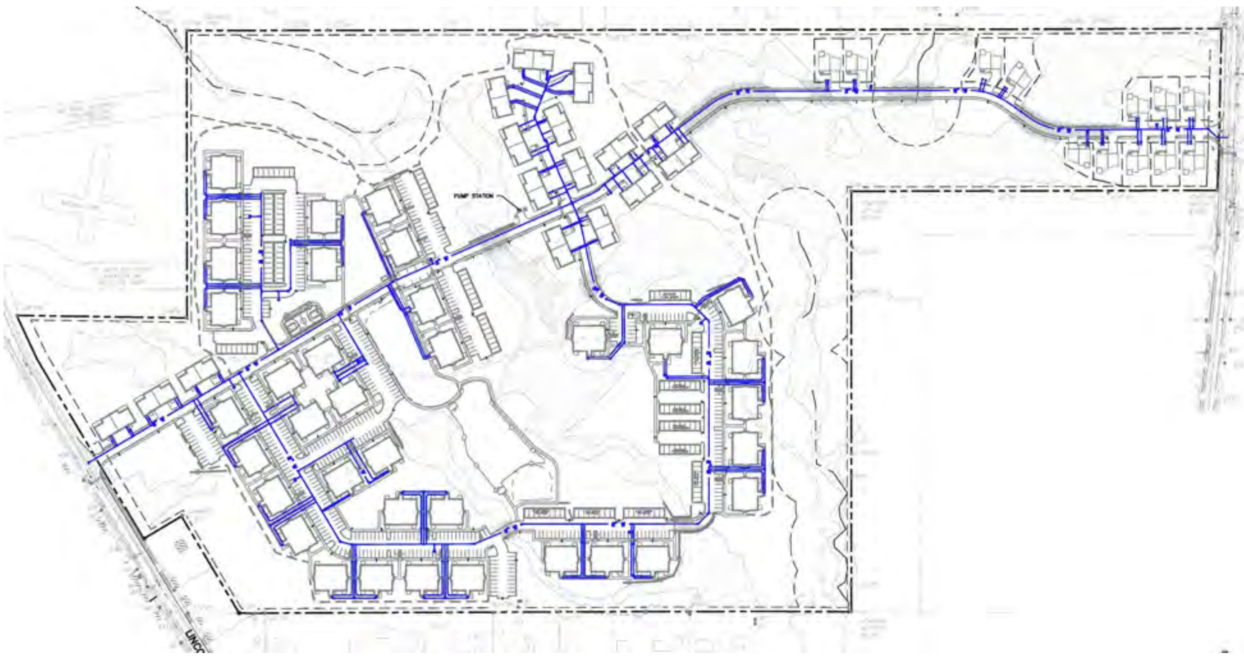
The proposed mixed residential development is expected to provide 332 units consisting of single-family, duplex, and multi-family with a roadway and walkway network. The existing site is bounded by Lincoln Street to the south, and Bradley Street to the north. The eastern and western sides of the site are bordered by single family lots along Skyline Drive (to the west) and Forest Street (to the east). The proposed mixed residential development is expected to provide 332 units as follows:

- 12 Single-Family Units
- 32 Duplex Units
- 288 Multi-Family Units

The development includes roadways and walkways within the site, as well as trails and landscaped areas. The site has a proposed main private road connecting Lincoln Street and Bradley Street, with an internally looped road connecting the southern and eastern portions of the site. Both the main road and the loop road have driveways and parking areas located off the roadways to provide access to each building. The development includes a sidewalk network along the proposed road and access drives, along with an internal trail network, with landscaped areas and stormwater maintenance facilities.

Existing and Proposed Service

There is an existing 8" public water main located in Bradley Street and Lincoln Street, adjacent to the site. The development is proposing an 8" private water main in the main roadway, with connections to these two public water mains on each side. Internally, the site will include a second 8" private water main along the looped road. Services to each building, including domestic and fire services, will be located off the proposed private mains, as well as hydrant services. The proposed water utility plan, seen below, has also been provided in Attachment A.



The design team met with Maine Water on June 8th, 2022 to discuss the proposed project. Based on this discussion, the following is incorporated into the project:

- Maine Water requests that a hydraulic assessment be performed for the surrounding development. 321 Lincoln Street Development, LLC has retained Tata & Howard, Inc. to perform this work. Maine Water provided recent fire flow tests to the team to aid in the analysis. Results of the assessment will be forwarded upon completion.
- We understand a maintenance agreement for the condo association to provide maintenance on the private water lines will be required. If templates that are acceptable to Maine Water are available, we are requesting these be sent to our office.
- Maine Water requested the 8-inch watermain connect to the existing stub on Bradley Street. This request has been incorporated into the preliminary utility plan. The stub was surveyed and is shown on the plan set.
- We understand that there will be one overall fire charge for the entire association. We also understand that each unit or building will be metered independently, since a meter pit for this size of development, in addition to the two connections, is not feasible.

In addition, the following design standards were confirmed and have been incorporated into the preliminary utility plans to the greatest extent practicable:

- 10 ft horizontal separation from sanitary sewer and gas mains.
- 18 inch minimum vertical crossing separation from other utilities, 12 inch minimum with rigid insulation provided.
- 5-5.5 ft preferred cover over the watermain.

Anticipated Flows

The anticipated wastewater generation for the proposed development was computed using the City of Saco Technical Design & Construction Standards. This article states that average flows shall be calculated based on 185 gallons per equivalent residential dwelling unit (EDU). This rate is then peaked by 600% based upon TR-16 guidelines for the peak daily generation. The table below is a summary of the Water Usage Calculation that is anticipated for the proposed development.

Anticipated Water Use Generation		
	Average Daily Wastewater Generation (gpd)	Peak Daily Wastewater Generation (gpd)
332 Units (>800 SF)	61,420	368,520
Total	61,420	**368,520**

The Water Use Calculation sheet has been provided in Attachment B.

Ability to Serve

In support of the applications to the reviewing authorities, we are writing to request a letter indicating that Maine Water has the ability to serve the proposed project. In addition, we are interested in receiving:

- An estimate for any work the Maine Water would perform within the right-of-way.
- Information as to any easement or maintenance agreements templates.
- Any other information that you believe would be useful as this project proceeds.

Please contact me if you have any questions relative to this matter at 772-2515 or at dgagnon@gorrillpalmer.com

Sincerely,

Gorrill Palmer

Drew Gagnon, PE
Project Manager

Attachments
Attachment A – Preliminary Utility Plans
Attachment B – Water Use Calculation Sheet

ATTACHMENT A

ATTACHMENT B

GORRILL PALMER

JOB	**Lincoln Village Development**		
SHEET NO.	1	OF	1
CALCULATED BY	TPG	DATE	5-19-22
CHECKED BY	DJG	DATE	5-19-22
SCALE	None		

Water Usage Calculations

Lincoln Village

Residential Units		
Units	332	
Flow Rate	185.0	gpd/unit
Subtotal	61,420	gallons/day
Subtotal Design Flow	**61,420**	**gallons/day**

Total Average Daily Design Flow	**61,420**	**gallons/day**

Peak Flow Calculation		
Subtotal Average Daily Design Flow	**61,420**	gallons/day
Peaking Factor	6	
Subtotal Peak Design Flow	**368,520**	**gallons/day**

APPROVAL LETTER

March 17th, 2023

Gorrill Palmer
ATTN: Drew Gagnon, PE
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106

Re: 321 Lincoln Street – Lincoln Village Development – Ability to Serve Determination

Dear Mr. Gagnon,

The Maine Water Company (MWC) has received your request for Ability to Serve Determination on behalf of your client, 321 Lincoln Street Development LLC, for the above referenced project. The Request indicates a development that will consist of 12 Single Family, 32 Duplex and 288 Multi-family style units. The request further indicates a domestic usage of approximately 61,420 gallons per day (GPD) or a peak domestic demand of approximately 270 gallons per minute (gpm). Based on the criteria provided and the hydraulic analysis report from Tata & Howard running the Biddeford Saco Division hydraulic model, the expected increase in water usage is within the water system's available capacity. The specific fire flow information for the buildings is not yet available. The static pressure in the area is approximately 45psi. Additional infrastructure improvements may be required at the expense of the developer to meet the overall needs of this project.

Conditions of Service

- The development will require a 12-inch water main inside of the development between Lincoln and Bradley Street as outlined in the Tata & Howard hydraulic analysis report. An updated utility sheet will be required to show utility placement and separation, including any hydrants, services, valves, blow off assemblies and other waterline appurtenances.
- MWC will require inspection during installation.
- Additional plan approval, paperwork and fees associated with services and main extensions in this area will require proper coordination with MWC. Maine Water requires upfront payment for inspection and paperwork to be fully completed before any construction on waterworks materials.
- Allow up to 30 days for the MWC utility review process to be completed before any construction on waterworks materials will be approved.
- A hydrant flow test must be conducted at the expense of the developer at the nearest hydrant and analyzed by Maine Water and the local Fire Department to ensure adequate public fire protection is available at the expense of the developer.
- Proposed fire hydrants inside of the development must be accepted by the City of Saco or local Fire Authority.
- An easement for access and operation of all water service valves on this property must be signed, notarized and registered with the county registry before activation.

Should a Customer Agreement for service not be executed within one year of the date of this letter, MWC reserves the right to reevaluate its ability to serve this project.

All work must be completed in accordance with MWC Terms and Conditions as well as material specifications. All appropriate paperwork must be completed and deposit paid prior to the start of construction. Please forward all design plan revisions as the project develops to prevent construction delays. Water service will be provided in accordance with Maine Public Utility Commission rules. If you have any additional questions, please do not hesitate to contact our office at 1-800-287-1643 or by email at Marcus.Knipp@mainewater.com. We look forward to working with you throughout design and construction.

Sincerely,
The Maine Water Company

Marcus Knipp, E.I.
Engineer

The Maine Water Company
93 Industrial Park Road
Saco, ME 04072
T: 207.282.1543
www.mainewater.com

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, ME 04106
207.772.2515

August 9, 2022

Mr. Howard Carter
Water Resource Recovery Department
65 Front Street
Saco, ME 04072

Subject: **Lincoln Village**
321 Lincoln Street, Saco, Maine
Letter of Ability to Serve Request

Dear Mr. Carter:

321 Lincoln Street Development, LLC has retained Gorrill Palmer to assist in the preparation of plans and permitting for the development of Lincoln Village located in Saco, Maine. The property is identified as Map 52 and Lot 19 on the Town of Saco's tax map. The development area is approximately 33 acres in size and is currently undeveloped. The proposed project will include a mixed residential development with a network of roadways and walkways, landscaped areas, trails, and stormwater maintenance facilities. As required by the reviewing authorities, we are writing to request a letter indicating the ability of the City of Saco Water Resource Recovery Department (WRRD) to serve this project. Preliminary utility plans are enclosed in Attachment A for your review. Additional supporting documentation includes:

- Description of Development Site
- Project Description
- Proposed Service Connections
- Proposed Sanitary Design & Service
- Pump Station Design
- Estimated Flows
- Offsite Capacity Analysis
- Proposed Offsite Sanitary Construction
- Project Approval Request

DESCRIPTION OF DEVELOPMENT SITE

The proposed new development is located between the existing Lincoln and Bradley Streets in Saco, ME. The site is currently undeveloped, consisting of a range of conditions including, dense brush, woods, and wetlands. Please refer to Attachment B for a project Location Map.

PROJECT DESCRIPTION

The proposed mixed residential development is expected to provide 332 units consisting of single-family, duplex, and multi-family units with a roadway and walkway network. The existing site is bounded by Lincoln Street to the south and Bradley Street to the north. The eastern and western sides of the site are bordered by single family lots along Skyline Drive (to the west) and Forest Street (to the east). Please see Table 1 below for a Unit Usage Summary.

Table 1 – Anticipated Residential Units		
Type	**Number of Buildings**	**Number of Units**
Single Family	12	12
Duplex	16	32
Multi-family	36	288
Total	64	332

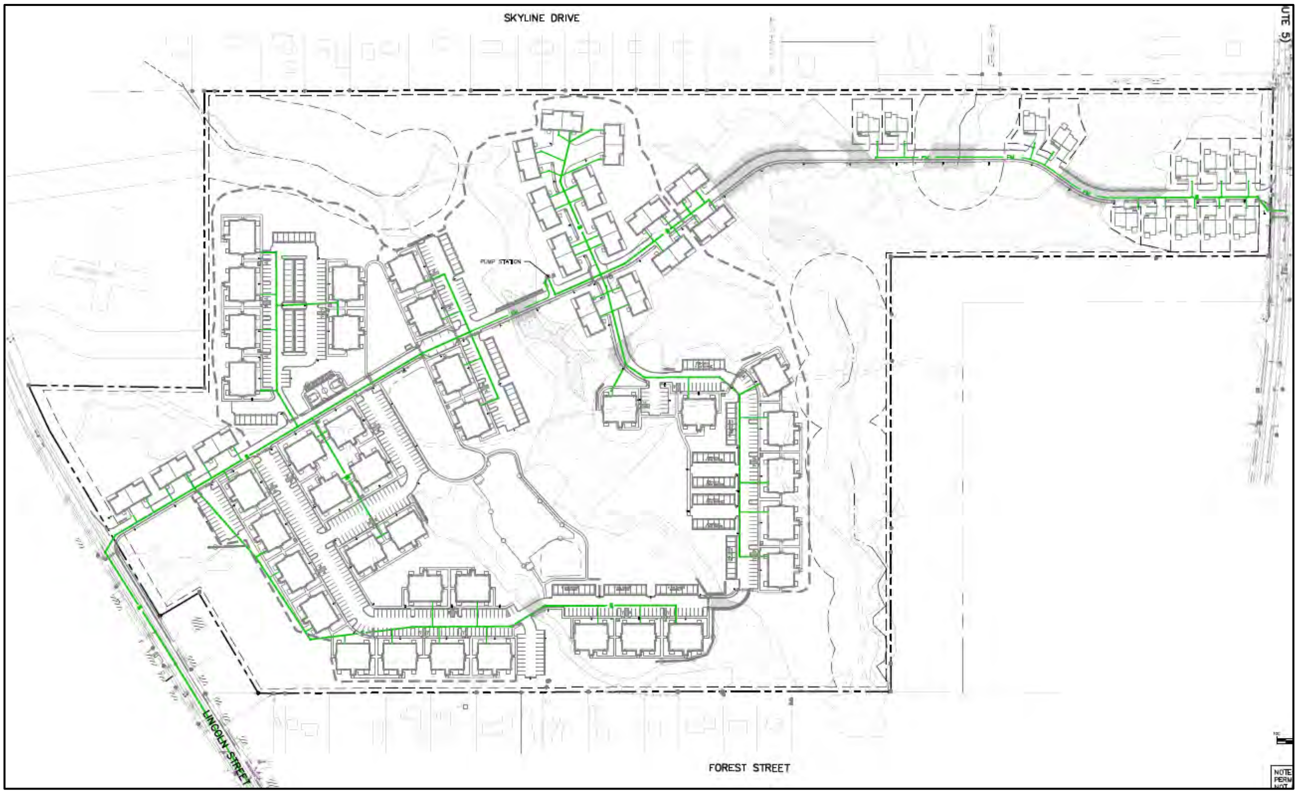
Additionally, the development includes roadways and walkways within the site, as well as trails and landscaped areas. The site has a proposed main private road connecting Lincoln Street and Bradley Street, with an internally looped road connecting the southern and eastern portions of the site. Both the main road and the loop road have driveways and parking areas located off the roadways to provide access to each building. The development includes a sidewalk network along the proposed road and access drives, along with an internal trail network, with landscaped areas and stormwater maintenance facilities.

PROPOSED SERVICE CONNECTIONS

A new private sewer main is anticipated to be constructed via connections with existing infrastructure in both Lincoln and Bradley Street. An 8 inch sewer main exists in Lincoln Street with direct frontage to the project which conveys sanitary flow east along Lincoln Street. The project proposes an 8-inch private main connection into an existing sewer manhole. This existing manhole is identified as Manhole 1202.111 according to City of Saco GIS. This portion of the project will receive flow from 320 residential units.

On Bradley Street, an 8-inch main exists alongside the project’s frontage. This sanitary main conveys sanitary flow southeast along Bradley Street. On the Northeastern side of the access drive, the project proposes connection to an existing 8 inch gravity sewer stub. This sewer stub is tributary to Manhole labeled 1037.114 according to City of Saco GIS. This portion of the project will only receive flow from 12 single family homes on site.

An excerpt of the proposed utility plan, with Sanitary Sewer highlighted in green, is shown below. The overall utility plan is also provided as part of Attachment A.



PROPOSED SANITARY DESIGN & SERVICE

The proposed project will utilize both gravity and pressure systems to convey sanitary flow to the surrounding sanitary network. The proposed breakdown of sewer shed for the project is as follows:

- Gravity flow to Lincoln Street – 238 units
- Pumped flow to Lincoln Street – 82 units
- Gravity flow to Bradley Street – 8 units
- Pumped flow to Bradley Street – 4 units

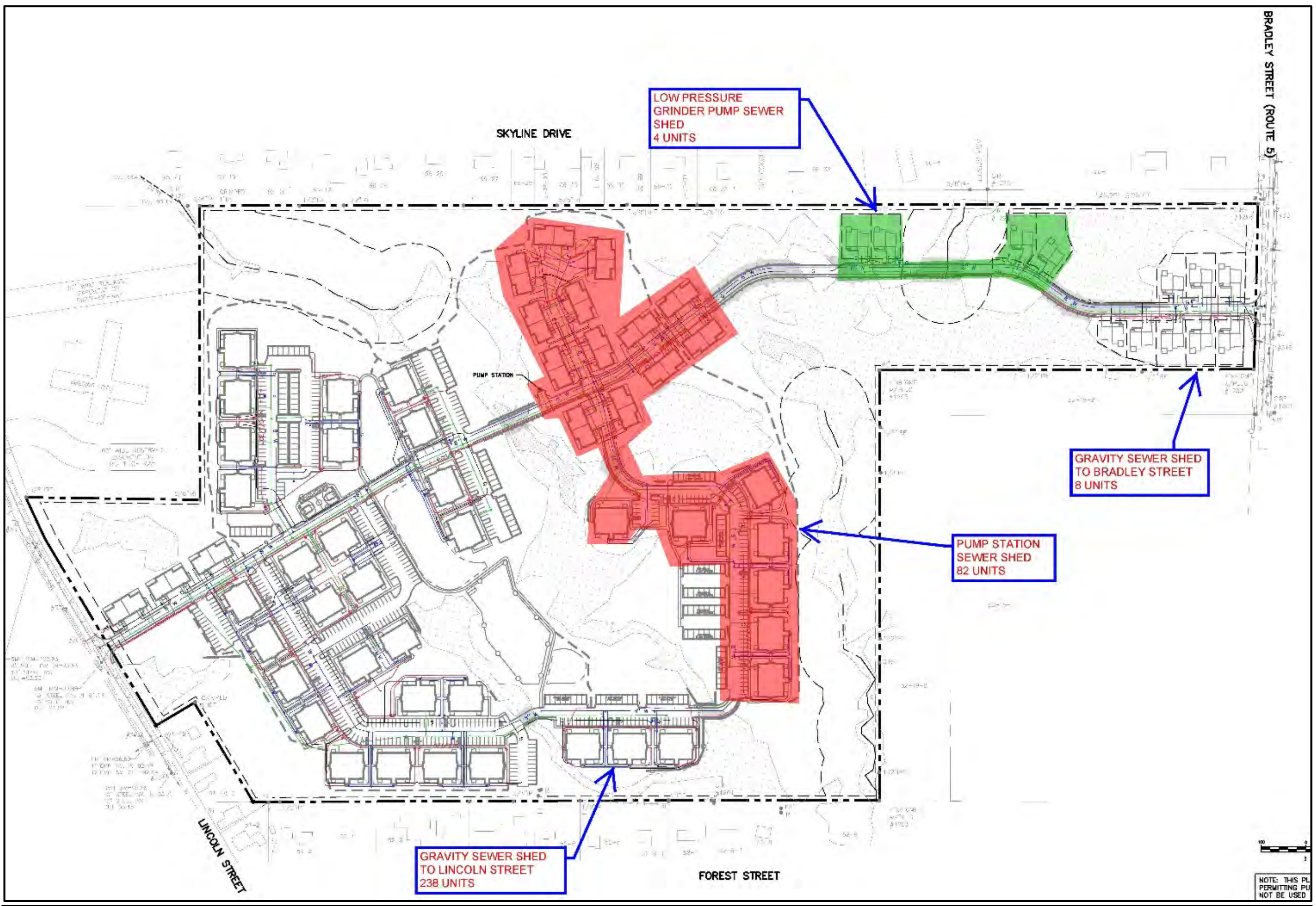
It should be noted that "pumped flow" to both public streets will enter terminus manholes and the flow will be conveyed to the public system via gravity prior to entering the City system.

Due to elevation, location and environmental constraints, the applicant proposes an approximate 600 ft 2-inch HDPE low-pressure force main that would convey 4 of the 12 single family house lots near the Bradley Street side of the project. The 4 single family homes are proposed to utilize an E-One DH 071 grinder pump system. A complete design report completed by F.R. Mahony & Associates is included in Attachment C. In addition, an 8-inch gravity line, with respective 6-inch laterals, will serve the last 8 single family homes closest to Bradley Street.

82 "pumped" units to Lincoln Street will be conveyed via an internal 8 inch private sanitary sewer line to the proposed Pump Station, near the center of the site. The private pump station will convey the flow via an

approximate 215 ft long 3 inch HDPE force main to a private terminus manhole located approximately 900 ft from Lincoln Street and within the private access road. The remaining Lincoln Street "gravity connection" units will connect to a network of 6 and 8-inch sewer lines that convey flow to the same Lincoln Street manhole.

The figure below graphically shows the sanitary sewer sheds for the proposed project.



The below table summarizes to total private sanitary sewer infrastructure on site:

Table 2 - Sanitary Infrastructure		
Sewer Main	**Main Size**	**Length (ft)**
Private (on site)	2"	602
	3"	229
	8"	5,222
Services	**Sanitary Laterals**	**Length (ft)**
Private (on site)	6"	2,964
Manholes		
Private (on site)		37
Public		3

PUMP STATION DESIGN

A privately owned and maintained pump station is proposed to serve 82 duplexes and multi-family units near the center of the parcel. It will handle approximately 15,930 gpd of average flow and 91,800 gpd at its peak. Based on previous discussions with you and the City Engineer, this station is proposed to be submersible pump station with an adjacent valve pit to contain the force main appurtenances and other mechanical items.

The proposed 6 ft diameter wet well will contain submersible duplex 4.1 HP HOMA GRP34 3 phase pumps operating at 3450 rpm maximum. The system is proposed as variable frequency driven (VFD) such that the electrical power supplied to the motor will change the motor speed to electrical delivery to single phase. The control panel and other electrical components are proposed to be set near the pump station access drive in an outdoor rated enclosure. The pumps are selected to operate at a design point of 100 GPM at 25 total dynamic head. A 3-inch force main is proposed exiting the pump station to the valve pit, and subsequently to the terminus manhole near station 10+70 in the main access road. Under the design point described above, this provides velocity in the force main at approximately 5.1 ft/s.

The applicant is prosing a standby generator for the pump station. Since the generator is proposed, the Emergency Storage time has been reduced to 1 hour. The emergency storage was calculated from the lead pump on elevation to the invert of the incoming 8-inch line.

Calculations supporting these numbers and proposed Pump Cut Sheets can be found in Attachment D.

ESTIMATED FLOWS

The anticipated wastewater generation for the development was computed utilizing the City of Saco WWRD Flow Schedule (Chapter 176 Appendix A). The flow rate was assumed at 185 gallons per day per unit since all units are greater than 800 square feet. The peak flow was calculated with an assumption of 6 for a peaking factor based on TR-16 and discussions with your office.

The table below is a summary of the wastewater generation that is anticipated for the 321 Lincoln Street Development Project.

Table 3 – Estimated Wastewater Generation

	Average Daily Wastewater Generation (gpd)	**Peak Daily Wastewater Generation (gpd)**
Multifamily Units (288)	53,280	319,680
Duplex Units (32)	5,920	35,520
Single Family (12)	2,220	13,320
Total	**61,420**	**368,520**

The Wastewater Generation Calculation Sheet has been provided in Attachment E.

OFFSITE CAPACITY ANALYSIS

Based on discussions with your office and per direction by the WRRD, the Applicant retained flow monitoring and metering services from Flow Assessment Services. It was determined that two manholes on Lincoln Street would need to be metered for 12 weeks to determine the existing baseline flow. The metering was completed December 10, 2021 to March 31, 2022.

The results of the testing were received on April 25th, 2022, from the City of Saco WRRD. Manhole 1's (ID 1202.109) flow meter was near Lincoln Street and Forest Street intersection. This manhole measured flow from an incoming 8" ACP sewer pipe and an outleting 8" ACP sewer pipe. Manhole 2's (ID 1202.104) flow meter was near 110. This manhole measured flow from an incoming 12" PVC pipe and an outleting 12" PVC pipe. The existing and baseline peak flow for the sanitary sewer pipes are summarized in Table 4 below:

Table 4 - Measured Peak Flow Rates			
Manhole 1 Location (8")		Manhole 2 Location (12")	
Maximum Peak Flow (gpd)	Maximum Peak Flow (gpm)	Maximum Peak Flow (gpd)	Maximum Peak Flow (gpm)
241,508	168	696,787	484

Given the results from Table 4 and working in coordination with the City Engineer, the designer analyzed the available capacity in the Lincoln Street system based on the proposed development. It was determined that the pump station flow was conservatively calculated as an instantaneous flow to the system and added to the anticipated peak gravity flow from the proposed project. As built and design plans were provided to GP from the City of Saco:

- *Boom Rd Sewer Extension "Record Drawing"* Plan Set by Jones & Beach Engineers, Inc dated October 1980
- *Lincoln Street Record Drawings* Plan Set by Atlantic Resource Consultants dated March 15, 2018

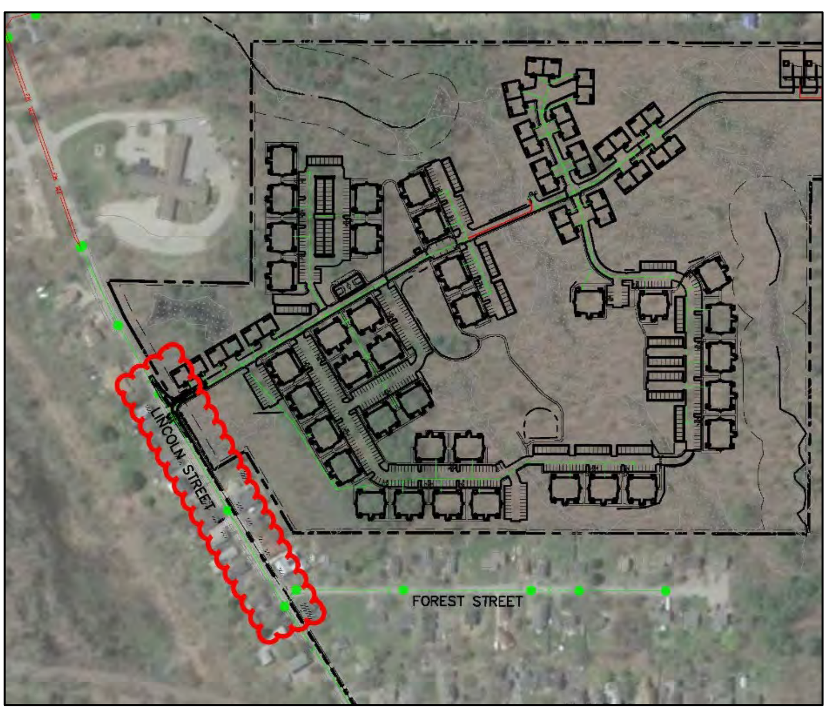
Based on these plans, the 8 inch pipe segments upstream and downstream of Manhole 1 were determined at 0.0085 ft/ft slope and the upstream and downstream pipes at Manhole 2 were determined at 0.0024 ft/ft slope. Table 5 below shows the results of the analysis:

Table 5 - Offsite Capacity Analysis		
	Manhole 1 Location (8" ACP)	Manhole 2 Location (12" PVC)
Proposed Flow from Development (Peak - GPM)	284	284
Measured Existing Max Flow Peak (GPM)	168	484
Total Proposed Flow in Pipe (Peak - GPM)	452	768
Capacity of Pipe (flowing full - GPM)	498	924
Remaining Capacity (Peak - GPM)	46	156
Percent Capacity Remaining	9%	17%

Calculations for existing pipe capacity can be found in Attachment F. The existing report from Flow Assessment Services was previously provided to the City and WRRD and a copy can be provided upon request.

PROPOSED OFFSITE SANITARY CONSTRUCTION

Based on discussions with the City Engineer and the WRRD, it was determined that the proposed development would require the existing Sanitary pipe in Lincoln Street to be upgraded from 8 inch to 10 inch in diameter between Manhole ID 1202.111 and 1202.109. This is due to the proposed development utilizing nearly 57% of the 8-inch pipe capacity. An excerpt of the pipe replacement is presented below.



The existing outlet pipe on Manhole 1202.109 appears to steepen to a grade that would allow for greater capacity in the sewer main, therefore it was determined to remain in place. The below table shows the offsite capacity of the Lincoln Street system subsequent to full buildout, occupancy and construction:

Table 6 - Offsite Capacity Analysis - Upgraded

	Manhole 1 Location (10" PVC)	Manhole 2 Location (12" PVC)
Proposed Flow from Development (Peak - GPM)	284	284
Measured Existing Max Flow Peak (GPM)	168	484
Total Proposed Flow in Pipe (Peak - GPM)	452	768
Capacity of Pipe (flowing full - GPM)	1069	924
Remaining Capacity (Peak - GPM)	617	156
Percent Capacity Remaining	58%	17%

Subsequent to the pipe upgrade, the proposed development would utilize approximately 27% of the capacity of the new pipe, which has been deemed acceptable by the City Engineer and WRRD. Calculations supporting the upgraded 10-inch pipe capacity are shown in Attachment F. Details showing the proposed removal and upsize of the existing Lincoln Street Sewer main for approximately 600 ft in length along the project's frontage is shown in the provided Plan set.

The Applicant is requesting the physical construction of the offsite sewer infrastructure described above occur when the Pump Station is activated for the site. Given that the Pump Station contributes to approximately 100 gpm and 20% of the 8-inch pipe capacity in Lincoln Street, it is our opinion that this Pump Station should trigger the construction and increase of offsite sewer.

PROJECT APPROVAL REQUEST

In support of the applications to the reviewing authorities, we are writing to request the City of Saco WRRD Approval for the proposed 321 Lincoln Street Development Project subsequent to the upgrades and design associated in this letter.

CLOSURE

Please contact me if you have any questions relative to this matter at 772-2515 or at dgagnon@gorrillpalmer.com

Sincerely,

GORRILL PALMER

Drew Gagnon, PE
Project Manager
Phone 207-772-2515 x288
dgagnon@gorrillpalmer.com

Attachments:
Attachment A – Utility Plans
Attachment B – Project Location Map
Attachment C - Low Pressure Sewer Design Report by FRMA
Attachment D – Pump Station Design Calculations & Cut Sheets
Attachment E – Wastewater Generation Calculation Sheet
Attachment F – Offsite Capacity Analysis – Lincoln Street

c: Loni Graiver, 321 Lincoln Street Development LLC

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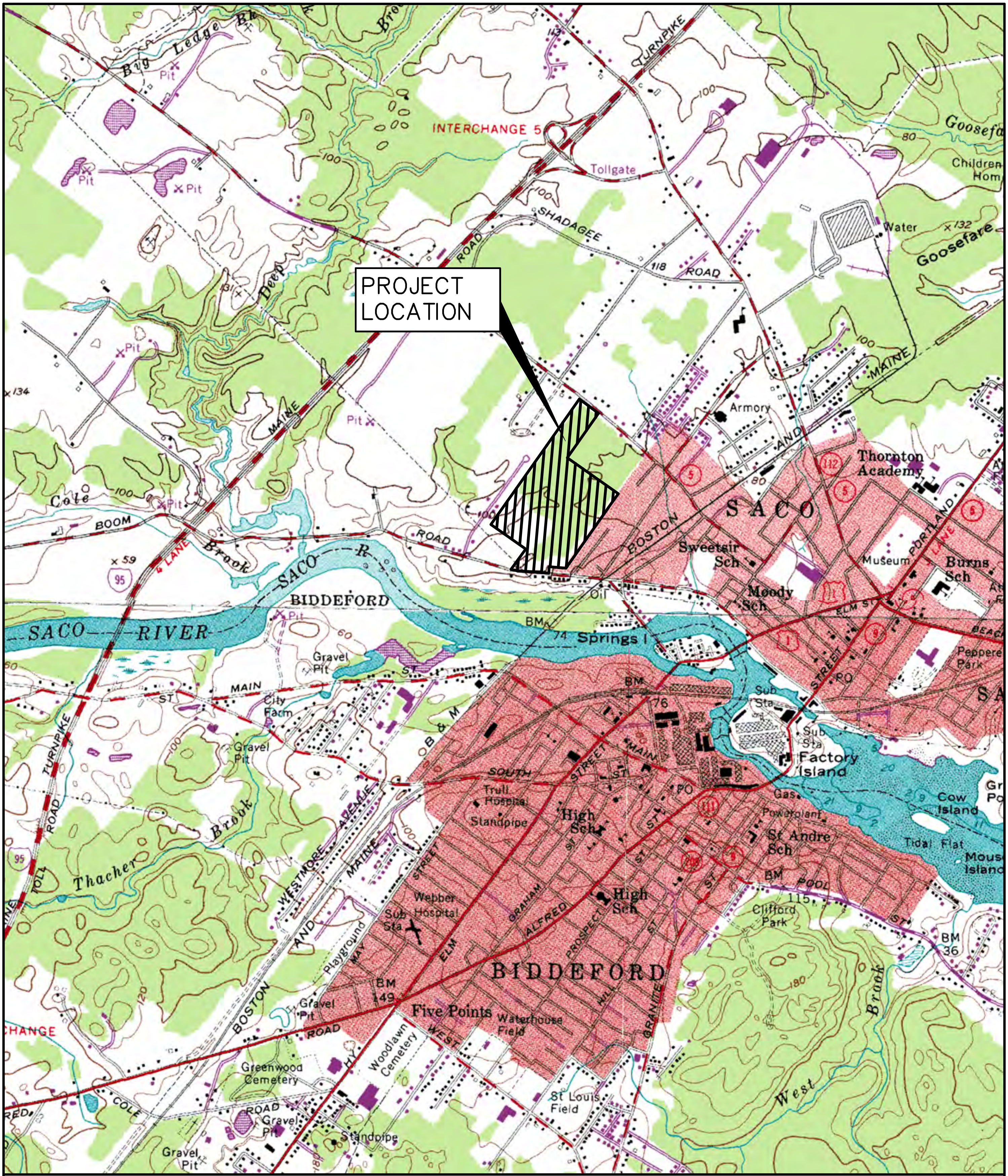
ATTACHMENT A

ATTACHMENT B



U.S.G.S. Location Map

Lincoln Street - Saco, Maine

U.S.G.S. Old Orchard Beach & Biddeford, State-7.5 Minute Series (Topographic)

Design: LL	Date: MARCH 2022	GORRILL PALMER — Relationships. Responsiveness. Results. www.gorrillpalmer.com 207.772.2515	Figure
Draft: CEH	Job No.: 3831		1
Checked: DJG	Scale: None		
File Name: 3831–LOCATION.dwg			

ATTACHMENT C

F.R. MAHONY & ASSOC.
A Division Of CUMMINS-WAGNER
100% Employee Owned

tel. 781.982.9300
fax. 781.982.1056

info@frmahony.com
www.frmahony.com

E/ONE Pressure System Design Report

For

Lincoln & Bradley Street Property

Saco, ME

April 25th, 2022

F.R. MAHONY & ASSOC.
frma
A Division Of
CUMMINS-WAGNER
100% Employee Owned

tel. 781.982.9300
fax. 781.982.1056

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April 25, 2022

Drew Gagnon
707 Sable Oaks Drive, Suite 30
South Portland, ME 04106
RE: Lincoln & Bradley Street Property, Saco ME

Dear Drew;

This preliminary design analysis examines the use of the E/One Pressure Sewer System for your project. E/One is celebrating 50 years of installation and O&M experience along with considerable research and development leading to continuous product and system improvements. E/One remains the worldwide industry standard and industry leader in the pressure sewer technology. The unique characteristics of the E/One Pressure Sewer approach provides not only a technical solution, but also an economic advantage to be realized with low up front and O&M costs.

System Analysis

This project proposes to collect wastewater from four (4) single family homes, and discharge to a gravity manhole on Bradley Street.

Using the information you provided, we ran the enclosed preliminary pressure sewer pipe sizing analysis. This was run through our Low Pressure Sewer Design Software that employs our Flow Velocity and Friction Head Loss vs. Pumps in Simultaneous Operation Spreadsheet. We have used the surface topography provided to make our analyses.

Zone Layout

Using your site plans we laid into one (1) flow zones using a 2” HDPE FM. Computations are based on the Hazen-Williams formula for friction loss, using calculations of cross-sectional area and flow rate to determine pipe sizes that create ”self-cleaning” velocities of 2.0 fps or higher. A "C" factor of 150, SDR 11 HDPE pipe and the average expected daily volumes for single family homes are also used in this analysis.

The highest Total Dynamic Head generated is approximately 20 feet which is comprised of static head and friction loss in the proposed pipelines. This is well below our pump’s continuous-run rating of 185 ft, and well within its intermittent, i.e., normal, operating range. Flow velocity throughout the system meets or exceeds 2 fps. These characteristics and low retention time indicate that this will be a reliable low-maintenance system.

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Design Flows & System Velocity

We normally use average daily flows for system designs rather than the peak design flows commonly used for gravity sewer sizing. We do this because the system is sealed and void of inflow and infiltration commonly allowed for in gravity sewer designs. We size the system for an average daily flow of 200+/- gpd generally for single family homes. The pumps selected are rated to flows up to 700 gpd thus peak flows are easily handled. We size the pipelines for the proper scouring velocity based on the pump's output which has a consistent flow rate over a wide range of head conditions. We then look at the pipeline retention time to optimize the line size for the lowest retention that will pass wastewater in a short period of time to reduce sediment in the lines and prevent odor issues. This makes for a very reliable and maintenance free wastewater collection system.

Often we are asked to use the published "State" design values from various flow tables in order to secure approval. We can do this; but then we run the reports based on the actual predicted average flow to optimize the line size as mentioned above.

Many of our installations have seen flows that more closely mirror the EPA water use goals of 70 gpd/capita. We also look at seasonal uses a little more closely due to greater reductions in flow in the offseason. In applications of this type we look to find the best for both seasons.

Appurtenances

- Cleanouts, Air/Vacuum Release

Our normal recommendations for valve placement are as follows: flushing connections at 1,000' to 1,500' intervals and at branch ends and junctions; isolation valves at branch junctions; and air release valves at peaks of 25 ft. or more and/or at intervals of 2,000 to 2,500 ft. None should be needed on this project.

For this project I would recommend one flushing manhole at SMH37 at Lot 12.

- Service Laterals and Check Valves

Common practice in pressure sewers requires the ability to isolate each lot with a

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corporation stop off the main and service lateral kit to the lot line. E/One now requires that each pump connection be isolated with a combination curb stop/redundant check valve.

E/One has developed a true wastewater rated check valve which is built in to our stainless steel lateral kit shown in this report. These components are rated to 235 psi and with standard connection fittings rated to 150 psi. These items are included in the budget analyses and shown in this report.

We strongly advise against the use of waterworks check valves as they are not rated for sewage environments. We do not like to recommend brass due to concerns for corrosion. **WEF Manual of Practice FD-12, Second Edition**, page 45 speaks to the limited success of brass or bronze alloys.

> "Besides corrosion considerations, brass is subject to de-alloying, while some bronze, such as 85-5-5, will give better performance. The terms *brass* and *bronze* are used loosely, despite having different meanings; the engineer is advised to evaluate these materials with caution."

We have also seen PVC body check valves with pressure rating to 150 psi that do not have the same rating for back pressure on the check valve. This can result in damage to the check valve and pumping issues as the check valve disc can become dislodged under pressure and then become a line obstruction.

- Corporation Stops/ Mainline Connections

Connections to the main pressure line do not require WYE type fittings. We commonly use a TEE or saddle connection. We isolate each connection to the main line with a stainless steel corporation valve in the same manner used for other utilities such as gas and water services.

We recommend that the service laterals connect to the mainline and do not need to enter a cleanout manhole or other structure. These connections are very similar to a connection of a water service off of a water main.

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Budget Notes

We show both our outdoor Model DH071-93 pumps and indoor pump Model IH091-IDU in this report We can formally quote when project gets closer.

Costs of pipeline excavation and pump installation are best obtained from sources in your region. You may be better able to determine these costs.

I am looking forward to working with you on this and future projects. Please contact me if you have any questions or require additional information.

Best regards,

Daryl Coppola
Outside Sales Engineer
781-820-5808
dcoppola@frmahony.com

Enclosures

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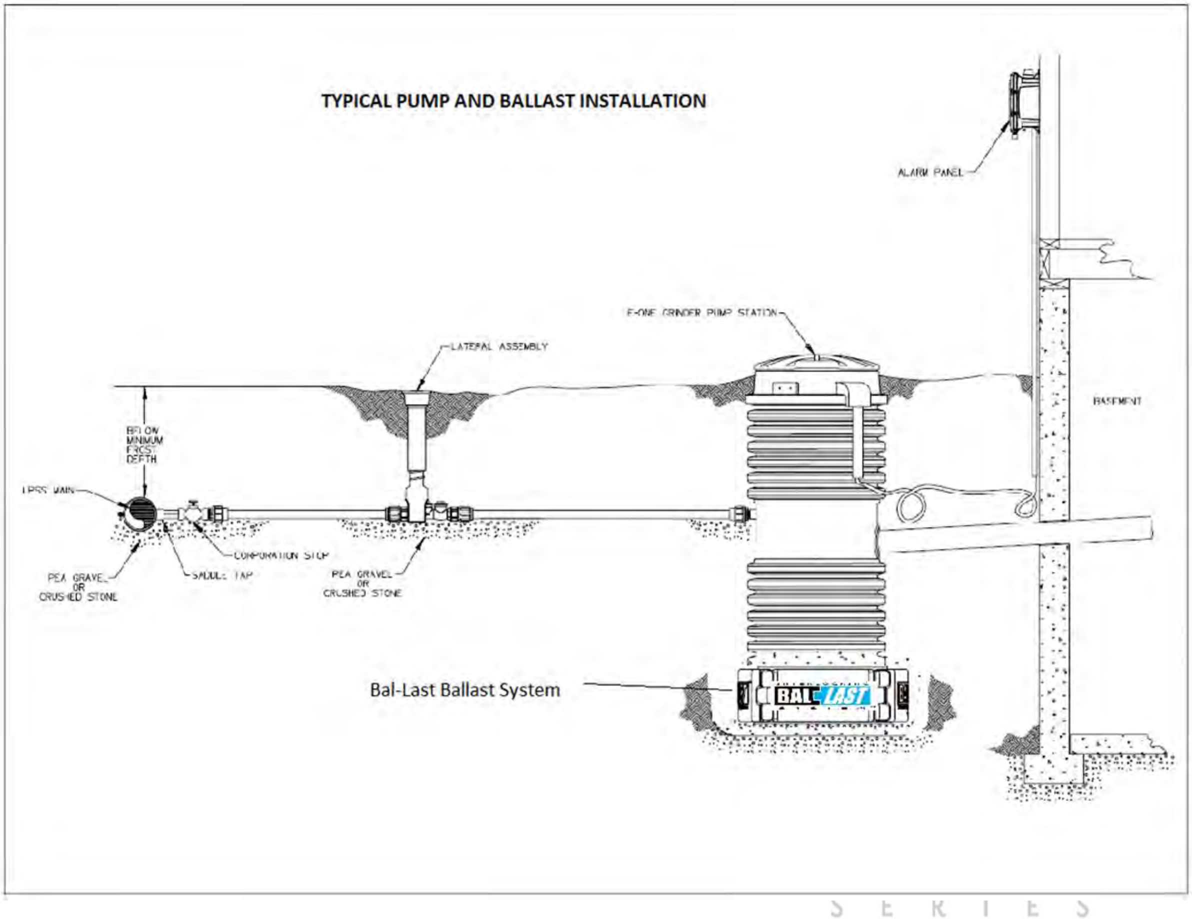

This image shows the typical layout of an outdoor pump unit for single-family home use. The pump unit is furnished complete, ready for installation. The installer needs to confirm the power cord length and discharge and inlet configuration. Standard products are supplied with 32 foot power supply cable. Standard inlets are 4-inch Schedule 40 Grommets (@ zero degrees) with 1-1/4 inch discharge (@ 180 degrees). Other configurations are available.

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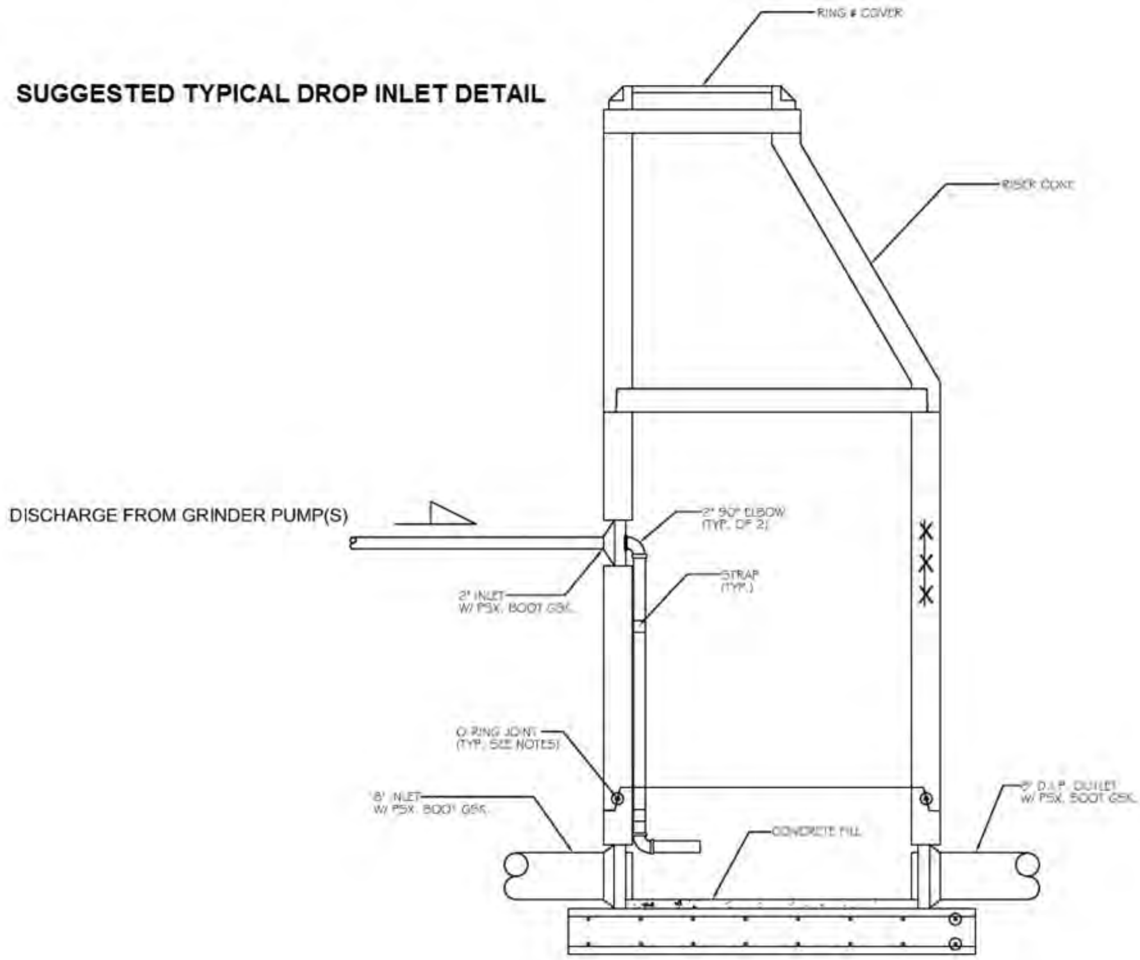
SUGGESTED TYPICAL DROP INLET DETAIL



IN-LINE MANHOLE
ELEVATION VIEW

This detail is shown as a concept sketch when major grade adjustments are required. We recommend that smaller inlet lines match the crown of outlet gravity sewer lines in all cases in order to direct flow to properly drain to the gravity sewer

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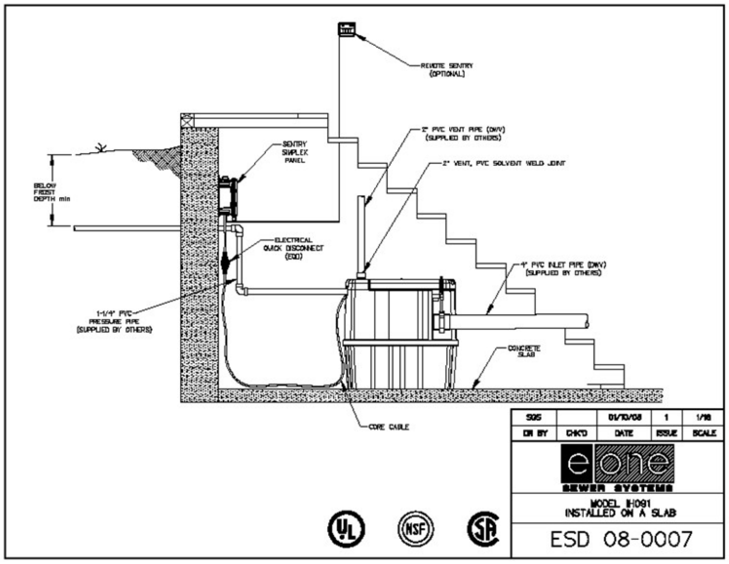
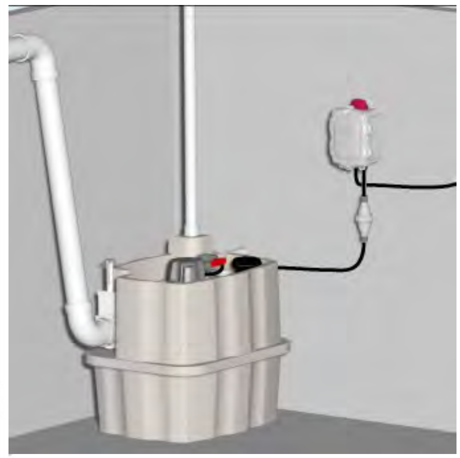
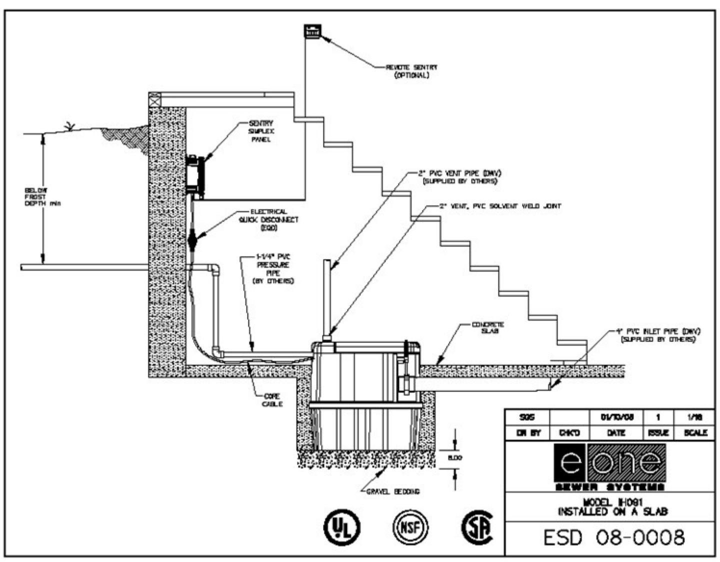
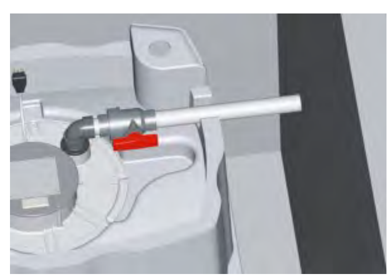
<u>Model IH091 Indoor Pump</u> Connection options for this station can be adapted to connect above the sill plumbing or below slab plumbing as seen in the sketches below.









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Standard alarm panels are the Sentry® panel mounted outside of the home as shown in the drawing (above).
Options include emergency generator connection (see photo) and Redundant alarm Remote Sentry® panel shown. Other panel configurations are available. See the partial listing of panel options below.

- Basic Panels include circuit breaker for the pump and separate breaker for the alarm. These panels include alarm light, alarm buzzer and alarm silence button. ***All F. R. Mahony panels are equipped with dry contacts to enable the connection of the Remote Sentry® (battery powered redundant alarm panel option)***

- Standard options include auto transfer generator connection shown above. This panel provides automatic power transfer without having to open the alarm panel or having to operate any manual transfer switching. This feature can be added to the basic panel or the panels offered below.

- Popular options include the **"Protection Package"** which monitors and protects the system from:
    - Pump Run Dry Condition (Pump running out of water)
    - Pump Overpressure Condition (Closed valve)
    - Brownout Condition (Main voltage under 12% of nameplate)
    - High Liquid Level

- The **"Protect Plus"** panel features offer the same items in the "Protection Package" plus the following:
    - High & Low Amperage draw by the pump
    - High & Low voltage to the pump
    - Extended Runtime by the pump (indicating wear or excessive flow) (field adjustable settings)
    - Monitoring of:
        - Real-time Pump Voltage and Current
        - Cycles & Hours (can be reset)
        - Minimum & Maximum Amperage (can be reset)
    - Minimum, Maximum, Average, and Last Run Cycle (in minutes, can be reset)

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Emergency Generator Transfer Options.

The indoor pump units may be furnished with a receptacle for connection of emergency power supplies. The image to the right shows the connection receptacle on the right side of our Sentry panels. This connection may be connected by your electrician to a remote connection port outside of the home.

Wiring must be performed by a licensed electrician and conforming to NEC and local electrical codes.

The box (left) is shown in the face view (face up) and is intended to be mounted on the outside wall to permit connection of a portable generator to the receptacle on the bottom. Generator operation must always be in well ventilated areas outside of any living space.

The pump may be operated under emergency power provided the automatic transfer option is selected with the Sentry® panel. Normal pump run times are short and should not require the continuous connection of a generator. A single portable generator may be used to service several homes effectively.

NEMA# L14-20R
20 Amp
1-120/240 VAC

SERVICE OPERATIONS
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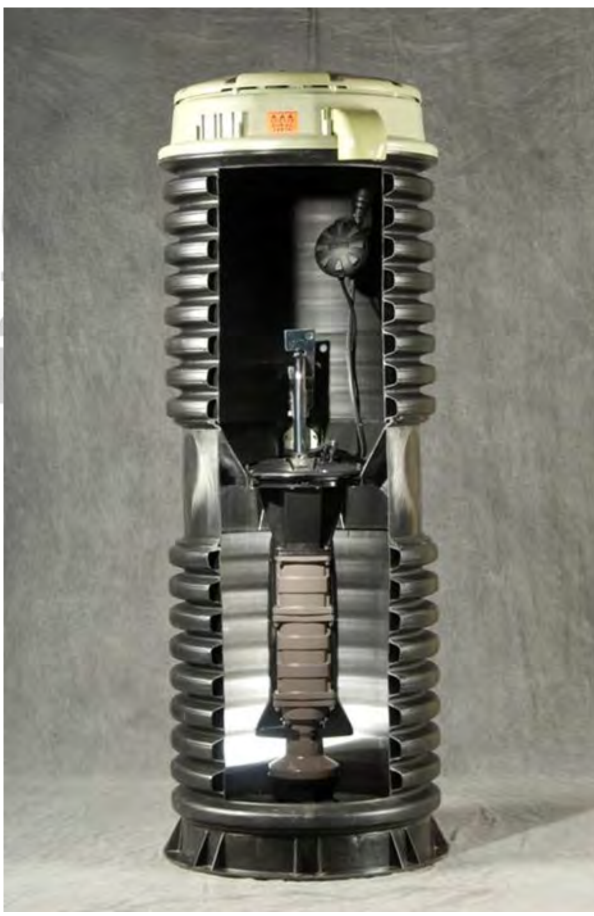
Pump models may be the DH071-93 (standard height) for outdoor use or the Model IH091 indoor unit. Both products are UL listed NSF and CSA certified and Massachusetts Plumbing Board Accepted.

Model DH071-93 Outdoor Pump With Bal-Last™

The outdoor model is complete - ready for installation and connection to exterior plumbing and power supply. This unit is fully tested for operation and factory leak tested. No assembly is required and there are no floats to adjust. The pump is furnished complete with the alarm panel and direct bury power supply cable. Standard cable length is 32 feet with 50, 75, and 100 and up to 150 foot cables available. (See Alarm Panel options above)



Other station configurations are available for higher flow requirements. Please contact us for more information. Additional information may be found at www.eone.com

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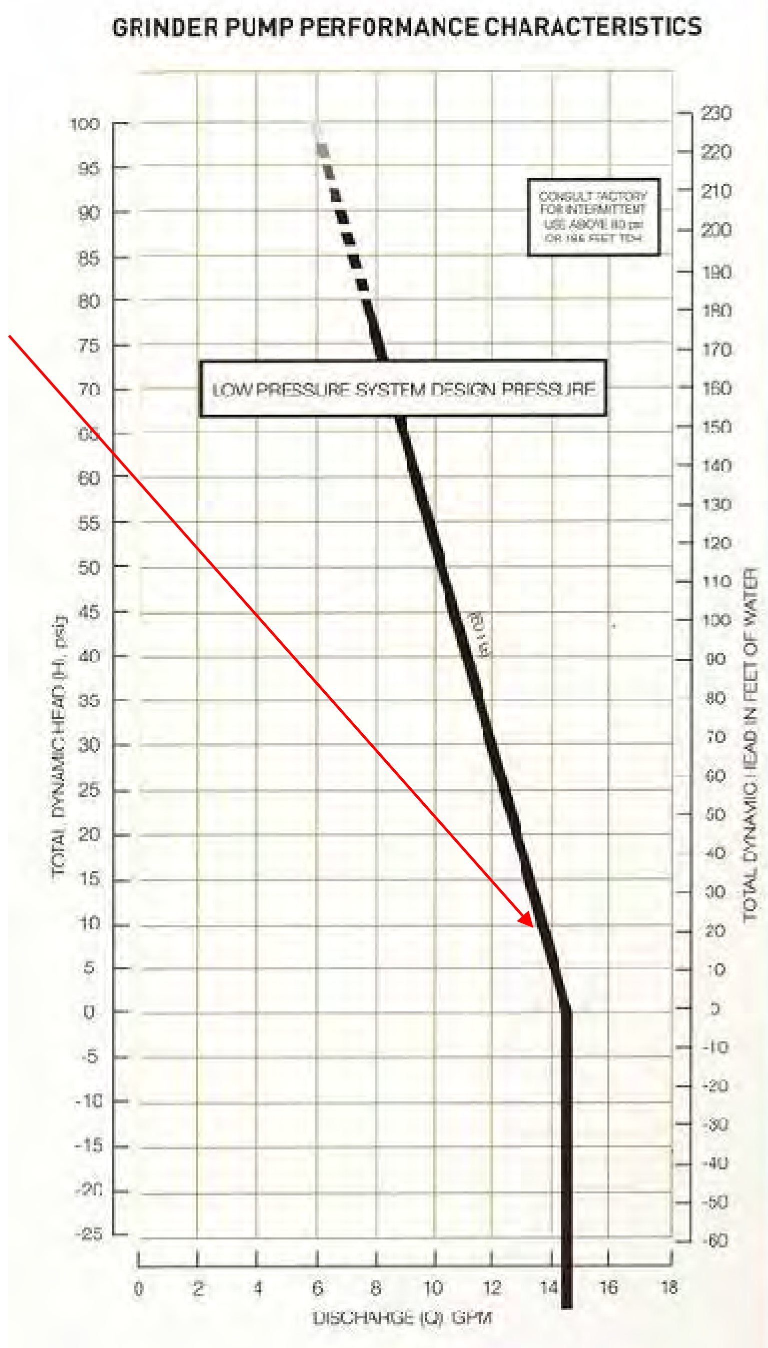
Operation Conditions

<u>20.50</u> Feet is the highest TDH at simultaneous operating conditions with the expected number of pumps operating in each zone, or the head of an individual pump operating in a single zone condition.



Operating range of E/One pumps from 0- 185 feet TDH and from 0 to -60 feet TDH. **<u>Your System Range</u>**

Anti-siphon valves in E/One cores provide for negative head pumping. In common systems with negative heads of 25-30 feet or more we recommend the use of combination air/vacuum release valves as described below.

e|one SEWER SYSTEMS

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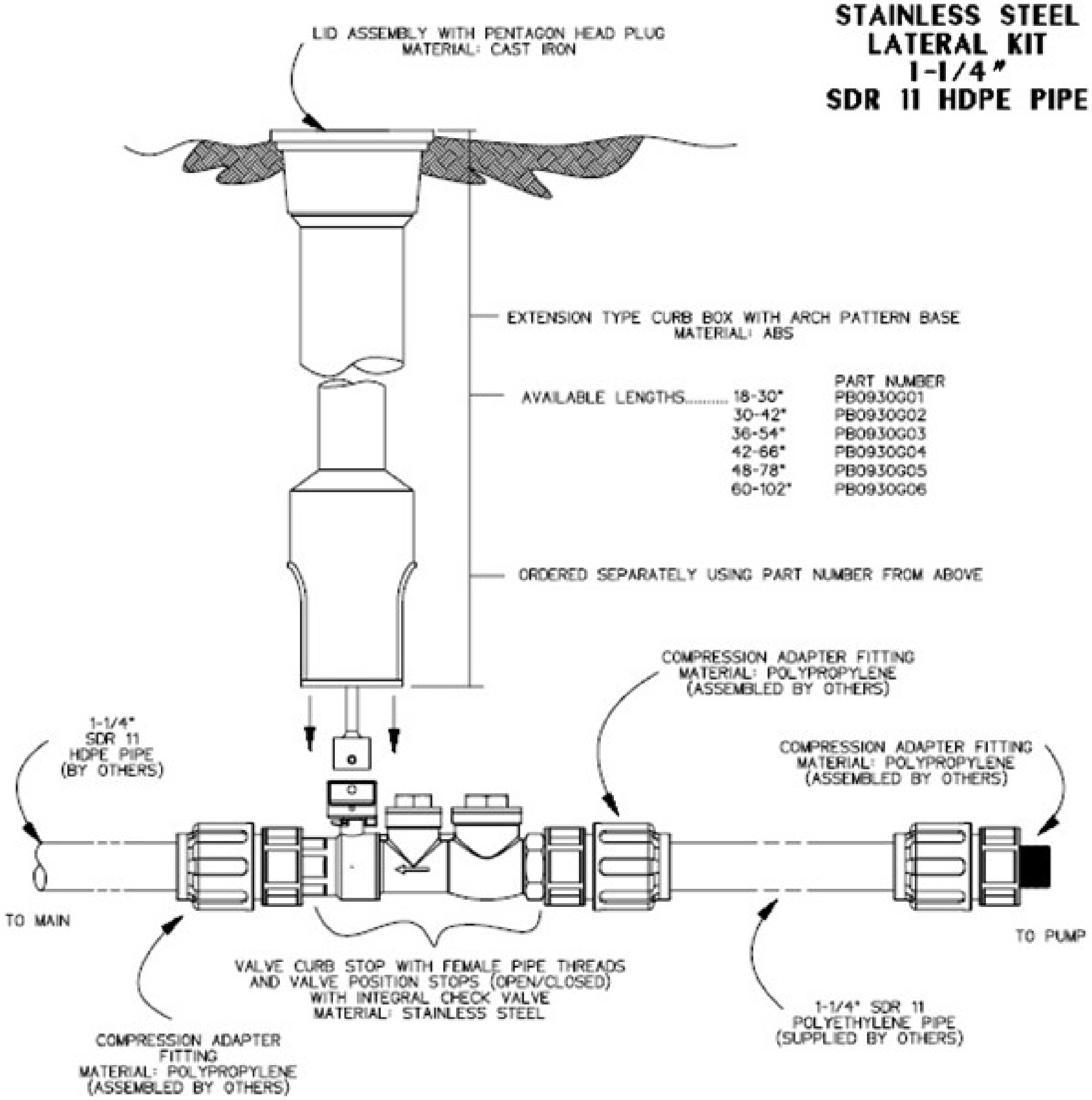
STAINLESS STEEL LATERAL KIT 1-1/4" SDR 11 HDPE PIPE



KIT PARTS ARE NOT ASSEMBLED

NOTES:

1. SS CURB STOP/CHECK VALVE AND FITTINGS ARE PROVIDED SEPARATELY, TO BE ASSEMBLED BY OTHERS
2. TO ASSEMBLE, APPLY A DOUBLE LAYER OF TEFLON TAPE, AND A LAYER OF PIPE DOPE (SUPPLIED BY OTHERS) TO THE THREADS ON THE PLASTIC FITTINGS AND INSTALL PER THE MANUFACTURER'S INSTRUCTIONS
3. ASSEMBLY IS TO BE PRESSURE TESTED (BY OTHERS)
4. ASSEMBLY IS TO BE USED WITH SDR11 HDPE PIPE
5. TO ORDER SS LATERAL KIT, USE PART NUMBER NC0193G01
6. CURB BOX IS TO BE ORDERED SEPARATELY, SEE ABOVE

SGS	DN	11/02/11	A	3/16
DR BY	CHK'D	DATE	ISSUE	SCALE

eone SEWER SYSTEMS

STAINLESS STEEL LATERAL KIT
1-1/4" SDR 11 HDPE PIPE

NA0330P02

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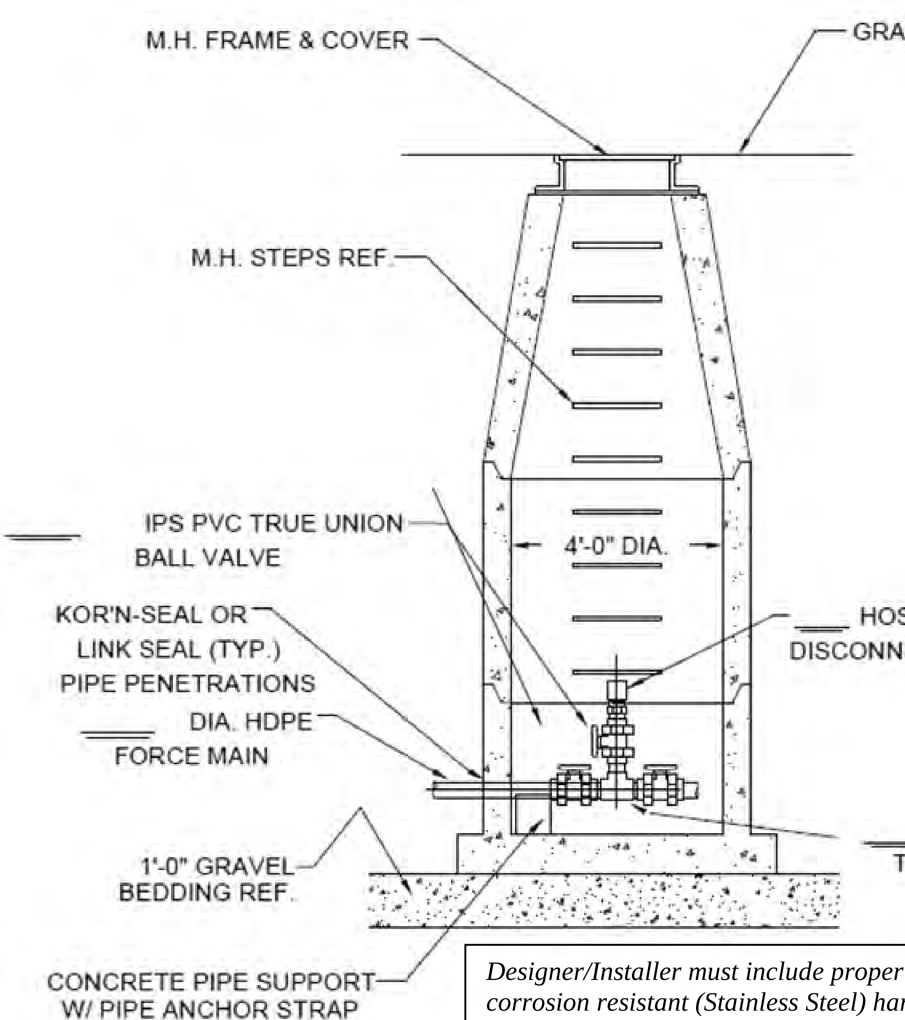
Example of Typical Cleanout Detail

(Optional Air/Vacuum Valve shown –right)



Designer/Installer must include proper pipe supports with corrosion resistant (Stainless Steel) hardware. Supports will vary depending on cleanout configuration.

Cleanout detail can be modified to match typical installation needs. Inline shut offs may be added to isolate flow direction. Image shown is flow through cleanout. These structures can be terminal end of line cleanouts, or junction cleanouts as may be required. Optional air and vacuum relief valves may be added when required.

Environment One Corporation

Pressure Sewer Preliminary

Cost and Design Analysis

For

Lincoln & Bradley Street Property

Prepared For:
Drew Gagnon Gorrill Palmer
707 Sable Oaks Drive, Suite 30
South Portland ME 04106
Tel: 207.653.8748
Fax:
Prepared By: D.Coppola
April 25, 2022

PRELIMINARY PRESSURE SEWER - PIPE SIZING AND BRANCH ANALYSIS

Lincoln & Bradley Street Property

Prepared By:
D.Coppola

April 25, 2022

Zone Number	Connects to Zone	Number of Pumps in Zone	Accum Pumps in Zone	Gals/day per Pump	Max Flow Per Pump (gpm)	Max Sim Ops	Max Flow (GPM)	Pipe Size (inches)	Max Velocity (FPS)	Length of Main this Zone	Friction Loss Factor (ft/100 ft)	Friction Loss This Zone	Accum Fric Loss (feet)	Max Main Elevation	Minimum Pump Elevation	Static Head (feet)	Total Dynamic Head (ft)
This spreadsheet was calculated using pipe diameters for:					SDR11HDPE					Friction loss calculations were based on a Constant for inside roughness "C" of:							150
1.00	1.00	4	4	200	11.00	3	33.00	2.00	3.57	655.00	2.52	16.50	16.50	105.00	101.00	4.00	20.50

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One.

\\CWMDFS02\Home - Remote\dcoppola\My Documents\EONE\Maine\Saco\Lincoln & Bradley St Property\Lincoln & Bradley St Property.EOne

PRELIMINARY PRESSURE SEWER - ACCUMULATED RETENTION TIME (HR)

Prepared By:

Lincoln & Bradley Street Property

D.Coppola

April 25, 2022

Zone Number	Connects to Zone	Accumulated Total of Pumps this Zone	Pipe Size (inches)	Gallons per 100 lineal feet	Length of Zone	Capacity of Zone	Average Daily Flow	Average Fluid Changes per Day	Average Retention Time (Hr)	Accumulated Retention Time (Hr)
This spreadsheet was calculated using pipe diameters for: SDR11HDPE								Gals per Day per Dwelling		200
1.00	1.00	4	2.00	15.40	655.00	100.89	800	7.93	3.03	3.03

Note: This analysis is valid only with the use of progressive cavity type grinder pumps as manufactured by Environment One

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ATTACHMENT D

GORRILL PALMER

JOB	Lincoln Village Pump Station		
SHEET NO.	1	OF	1
CALCULATED BY	DJG	DATE	7-14-22
CHECKED BY	DJG	DATE	7-14-22
SCALE	None		

Task: Compute Proposed Design Sanitary Flow to Pump Station

Wastewater Generation Calculations

Pump Station

Duplex Units		
Dwelling Units	26	
Flow Rate	185	gpd/unit
Subtotal	4,810	gallons/day
Subtotal Design Flow	**4,810**	**gallons/day**

Condominiums - 1 Bedroom (under 800 sf)		
Dwelling Units	0	
Flow Rate	92.5	gpd/unit
Subtotal	0	gallons/day
Subtotal Design Flow	**0**	**gallons/day**

Condominiums - 2 Bedroom (over 800 sf)		
Dwelling Units	56	
Flow Rate	185	gpd/unit
Subtotal	10,360	gallons/day
Subtotal Design Flow	**10,360**	**gallons/day**

Infiltration/Contingency		
Subtotal Average Daily Flow	15,170	
5% Infiltration/Contingency	5%	
	759	**gallons/day**

Total Average Daily Flow to Pump Station = 15,929 gallons/day

Peak Daily Flow

	Peaking Factor*
Residential Development	600%
Commercial, Industrial and Institutional Development	300%

**Peaking Factor from TR-16 Guides for Design of Wastewater Treatment Works - 2011 edition and revised in 2016*

	Subtotal Average Daily Flow	Peak Daily Flow
Residential Development	15,170	91020 gallons/day
Commercial, Industrial and Institutional Development	0	0 gallons/day
Infiltration/Contínengency	759	759 gallons/day

Total Peak Daily Flow to Pump Station = 91,779 gallons/day

LINCOLN VILLAGE PUMP STATION

PRELIMINARY INPUTS AND ASSUMPTIONS		
PUMP STATION DIAMETER	6	FT
TERMINUS MANHOLE OUTLET ELEVATION	100.9	
TOTAL AVG FLOW (PS SEWER SHED)	15,929	GPD
TOTAL PEAK FLOW	91,779	GPD
TOTAL PEAK FLOW	***91779***	***GPM***
USE PUMP RATE	***100***	***GPM***
STORAGE TIME	0.05	HR
EMERGENCY STORAGE	191.2	GAL
EMERGENCY STORAGE	25.6	CF
EMERGENCY STORAGE DEPTH	0.90	FT

63.7

MINIMUM VELOCITY IN PIPE	3.00	FPS
FORCE MAIN		
CROSS-SECTIONAL AREA OF FORCE MAIN	0.044	SF
MINIMUM FLOW TO MAINTAIN MIN. VELOCITY	0.131	CFS
DESIGN FLOW FOR PUMP	100	GPM
VELOCITY IN FORCE MAIN	5.12	FPS
FLOW IN FORCE MAIN	0.22	CFS

FORCE MAIN INPUTS				
FORCE MAIN				
FORCE MAIN DIAMETER		3	2.826	IN
FORCE MAIN LENGTH			246	FT
LOWEST POINT ON FORCE MAIN			85.26	
HIGHEST POINT ON FORCE MAIN			100.80	
HAZEN WILLIAMS C			150	
EQUIVALENT LENGTH FOR FORCE MAIN				
ITEM	QUANTITY	EQ LENGTH		
CHECK VALVE	1	20	20	FT
GATE VALVE (FULLY OPEN)	2	1.7	3.4	FT
45 BEND	1	3.75	3.75	FT
90 BEND	2	6.5	13	FT
TEE-SIDE	1	18	18	FT
EQUIVALENT LENGTH ADDITIONS OF FORCE MAIN			***58.15***	***FT***
FORCE MAIN FRICTION HEAD			***304.15***	***FT***
FORCE MAIN STATIC HEAD			***15.54***	***FT***

EMERGENCY STORAGE		
INV INTO PS	**90.26**	FT
LEAD PUMP ON	**87.26**	FT
VOLUME OF STORAGE	84.78	CF
	634.15	GAL
STORAGE TIME	1.0	HR

ULTIMATE FLOW		
FORCE MAIN		
FLOW	HEAD LOSS	TOTAL DYNAMIC HEAD
(GPM)	(FT)	(FT)
50	***2.65***	***18.19***
60	***3.72***	***19.26***
70	***4.95***	***20.49***
80	***6.33***	***21.87***
90	***7.87***	***23.41***
100	***9.57***	***25.11***
110	***11.41***	***26.95***
120	***13.41***	***28.95***
130	***15.55***	***31.09***
140	***17.83***	***33.37***
150	***20.26***	***35.80***
160	***22.83***	***38.37***

PUMP STATION ELEVATIONS				
PUMP STATION DIAMETER	6	FT		
PEAK FLOW	91779	GPD		
PUMP STATION RIM	105.8			
INV. IN AT PUMP STATION	90.26			
EMERGENCY STORAGE	2.00	FT		
LEAD PUMP ON ELEV	87.26			
PUMP OFF ELEVATION				
PUMP FLOW (q)	100.0	GPM		
MINUTES PER CYCLE (t)	10	MIN		
DRAWDOWN VOLUME (V)	250	GAL		
DRAWDOWN VOLUME (V)	33.4	CF		
DEPTH	1.18	FT		
LEAD PUMP OFF ELEV	86.08	FT	Use	85.26
BOTTOM OF WELL	84.33	FT	Use	83.26
PUMP OFF ELEVATION - ALTERNATIVE METHOD				
PUMP FLOW	100.0	GPM		
MINUTES PER CYCLE	10	MIN		
CYCLES PER DAY	144	CYC		
DRAWDOWN VOLUME (V)	111	GAL		
DRAWDOWN VOLUME (V)	14.8	CF		
DEPTH	0.52	FT		
LEAD PUMP OFF ELEV	86.74	FT	Use	85.26
BOTTOM OF WELL	85.24	FT	Use	83.26

ULTIMATE DESIGN POINT		
PUMP RATE	**100**	**GPM**
TOTAL DYNAMIC HEAD	**25**	**FT**

Technical Information

GRP34/3/C FM

Operating data

Flow	131 US g.p.m.
Head	38 ft
Shaft power P2	3.72 hp
Pump efficiency	34.2 %
Required pump NPSH	
Pumpe type	Single pump
No. of pumps	1
Fluid	Wastewater

Pump

Pump Code	GRP34/3/C FM
Impeller	Vane impeller with cutter sys.
Impeller size	$4^{13}/_{16}$"
Solid size	
Discharge port	2" M
Suction port	

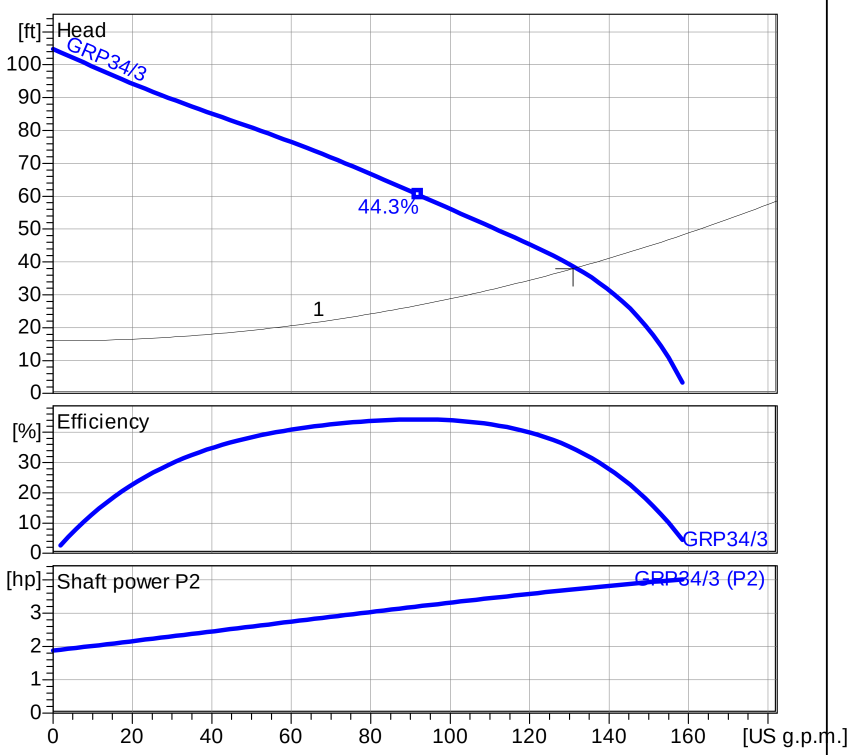
Motor

Rated voltage	230/ 460 V
Frequency	60 Hz
Rated power P2	4.1 hp
Rated speed	3450 rpm
Number of poles	2
Efficiency	83 %
Rated current	10.4 / 5,2 A
Degree of protection	IP 68

Materials

Motor housing	Cast Iron ASTM A48;Cl.40B
Pump housing	Cast Iron ASTM A48;Cl.40B
Motor bearing cover	Cast Iron ASTM A48;Cl.40B
Impeller	Cast Iron ASTM A48;Cl.40B
Cutting system	Hardened Stainless Stell HRC55
Motor shaft	AISI 430 F Stainless Steel
Bolts	AISI 304 Stainless Steel
O-Rings	Nitrile Rubber
Mechanical seal on medium side	SiC / SiC
Mechanical seal on motor side	SiC / SiC
Lower Bearing	Double row angular ball bearing
Upper Bearing	Deep Groove Ball Bearing

Testnorm: **HI Standard Sect. 11.6.5.4**



Wet well installation with coupling 2Z-1Z (GRP28...41)
Dimensions in mm [inch], letters see table

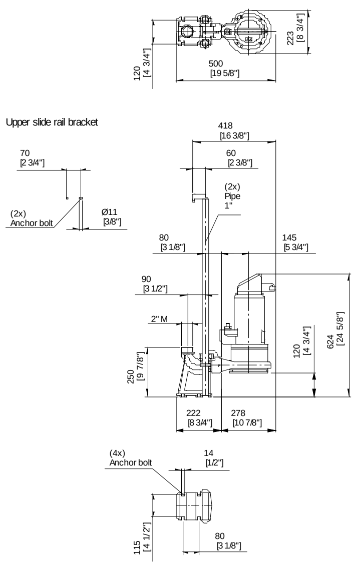


Table Dimensions
(inch)

2.0.1 - 03.12.2021 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			1	2022-05-16

Performance Curve

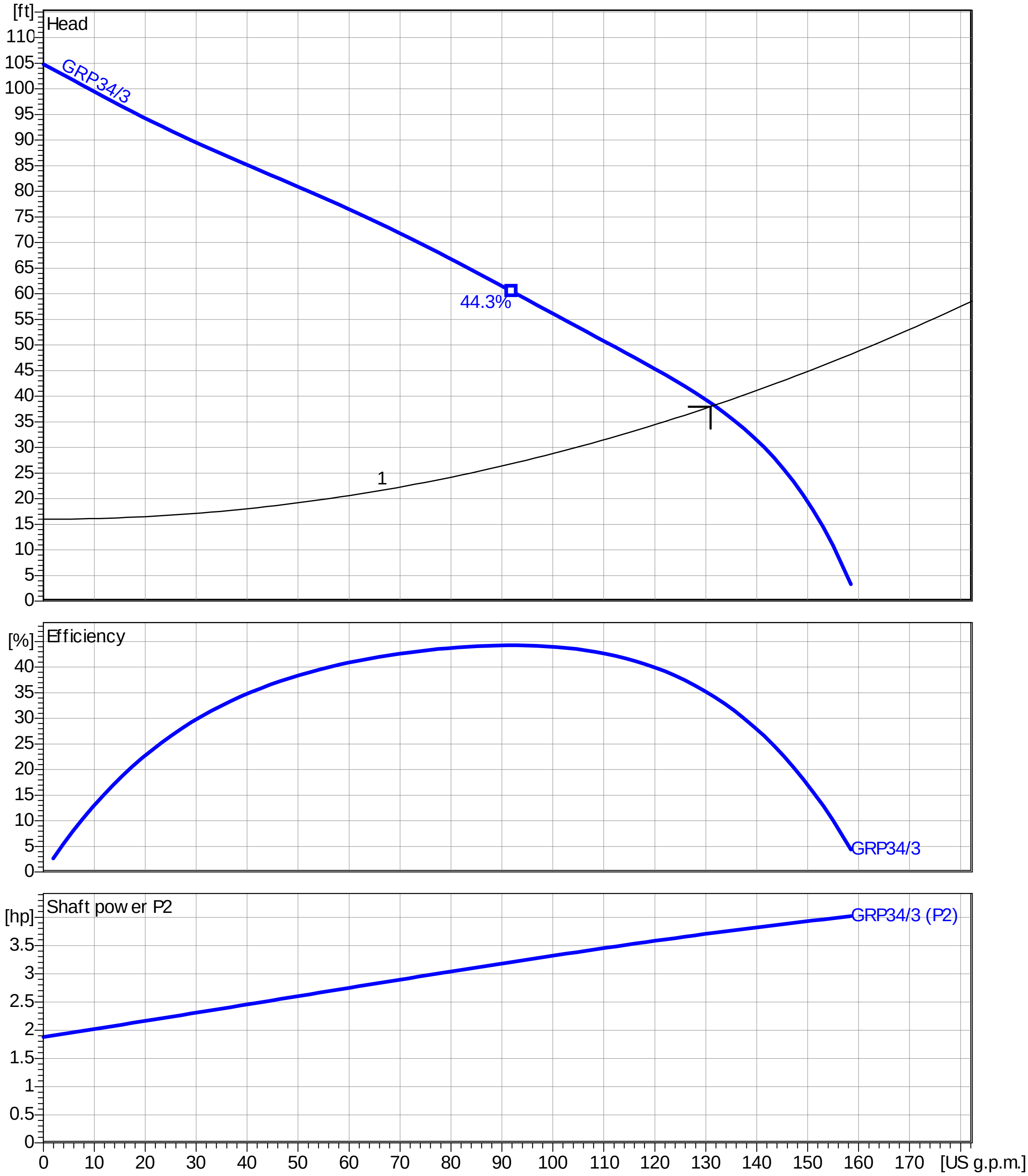
GRP34/3/C FM

Impeller					
Impeller type: Vane impeller with cutter sys.	Solid size Ø:	Max. Ø: 6 5/16"	Min. Ø: 6 5/16"	Sel. Ø: 4 13/16"	

Operating data				
Speed: **3450 rpm**	Frequency: **60 Hz**	Duty point: **Q =131 US g.p.m. H =38 ft**	Shaft power P2: **3.72 hp**	Discharge port: **2" M**

Power data referred to:
Water [100%] ; 68°F; 62.322lb/ft³; 1.0818E-5ft²/s

Testnorm: **HI Standard Sect. 11.6.5.4**



2.0.1 - 03.12.2021 (Build 147)

Project	Project no.:	Created by:	Page:	Date:
			2	**2022-05-16**

Dimensions

GRP34/3/C FM

Wet well installation with coupling 2Z-1Z (GRP28...41)
Dimensions in mm [inch], letters see table

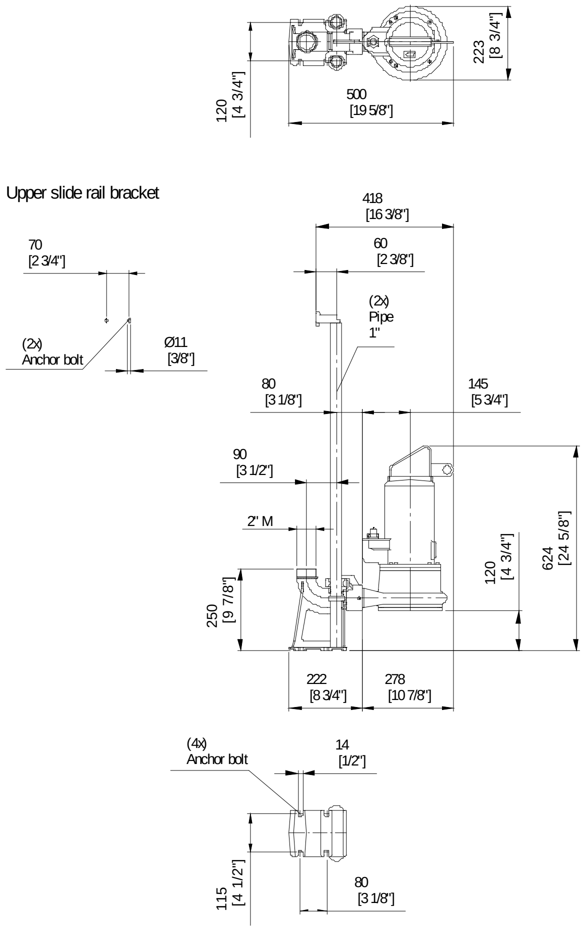


Table Dimensions (inch)

2.0.1 - 03.12.2021 (Build 147)

Technical Data

GRP34/3/C FM

HOMA
PUMPEN MIT SYSTEM

Operating data			
Flow	**131 US g.p.m.US g.p.m.**	**Head**	**38 ft ft**
Shaft power P2	**3.7 hp**	**Static head**	**16 ft**
Pump efficiency	**34.2 %**	**Required pump NPSH**	**ft**
Pumpe type	Single pump	No. of pumps	1
Fluid	Wastewater	Temperature	68 °F
Density	62.31 lb/ft³	Kin. viscosity	1.077E-5 ft²/s

Pump				
Pump Code	GRP34/3/C FM	Speed		3450 rpm
Suction port		Head	Max.	104.8 ft
Discharge port	2" M		Min.	3.3 ft
Impeller type	Vane impeller with cutter sys.	Flow	Max.	158.5 US g.p.m.
Solid size	inch	Pump efficiency max.		44.3 %
Impeller Ø	4.84 inch	Required rated power max. P2		4.0 hp

Motor				
Motor design	Submersible motor	Insulation class		H
Motor name	AM136.5,4/2/3	Degree of protection		IP 68
Frequency	60 Hz	Temperature class		T4
Rated power P2	4.1 hp	NEMA code		H
		Explosion protection		Class I, Div. 1, Grp. C&D
Rated speed	3450 rpm	Efficiency at % rated power	100%	83.0 %
Rated voltage	230 / 460 V 3~		75%	%
Rated current	10.4 / 5,2 A		50%	%
Starting current, direct starting	66.8 / 33,4 A	cos phi at % rated power	100%	0.84
Starting current, star-delta	2: A		75%	
Starting mode	Directly		50%	
Power cable	7X1,5 / 10G1,5	Control cable		2X1,5 / -
Type of power cable	NSSHÖU-J / H07RN8-F PLUS	Type of control cable		ÖLFLEX-EB / -
Cable length	32.8 ft	Service factor		1.15
Shaft seal	Mechanical seal on medium side	SiC / SiC		
	Mechanical seal on motor side	SiC / SiC		
Bearing	Lower Bearing	Double row angular ball bearing		
	Upper Bearing	Deep Groove Ball Bearing		
Remarks				

Materials / Weight			
Motor housing	Cast Iron ASTM A48;Cl.40B	Motor shaft	AISI 430 F Stainless Steel
Pump housing	Cast Iron ASTM A48;Cl.40B	Bolts	AISI 304 Stainless Steel
Motor bearing cover	Cast Iron ASTM A48;Cl.40B	O-Rings	Nitrile Rubber
Impeller	Cast Iron ASTM A48;Cl.40B		
Cutting system	Hardened Stainless Stell HRC55		
Weight aggregat	97.002 lb		

2.0.1 - 03.12.2021 (Build 147)

ATTACHMENT E

GORRILL PALMER

JOB	Lincoln Village		
SHEET NO.	1	OF	1
CALCULATED BY	DJG	DATE	7-14-22
CHECKED BY	DJG	DATE	7-14-22
SCALE	None		

Task: Compute Proposed Design Sanitary Flow for Lincoln Village Mixed Residential Project

Wastewater Generation Calculations

Duplex Units			
Dwelling Units		32	
Flow Rate		185	gpd/unit
	Subtotal	5,920	gallons/day
Subtotal Design Flow		**5,920**	**gallons/day**

Condominiums - 1 Bedroom (under 800 sf)			
Dwelling Units		0	
Flow Rate		92.5	gpd/unit
	Subtotal	0	gallons/day
Subtotal Design Flow		**0**	**gallons/day**

Single Family Units			
Dwelling Units		12	
Flow Rate		185	gpd/unit
	Subtotal	2,220	gallons/day
Subtotal Design Flow		**2,220**	**gallons/day**

Condominiums - 2 Bedroom (over 800 sf)			
Dwelling Units		288	
Flow Rate		185	gpd/unit
	Subtotal	53,280	gallons/day
Subtotal Design Flow		**53,280**	**gallons/day**

Infiltration/Contingency		
Subtotal Average Daily Flow	61,420	
5% Infiltration/Contingency	5%	
	3,071	gallons/day
Total Average Daily Flow =	**64,491**	**gallons/day**

Peak Daily Flow

	Peaking Factor*
Residential Development	600%
Commercial, Industrial and Institutional Development	300%

**Peaking Factor from TR-16 Guides for Design of Wastewater Treatment Works - 2011 edition and revised in 2016*

	Subtotal Average Daily Flow	Peak Daily Flow	
Residential Development	61,420	368,520	gallons/day
Commercial, Industrial and Institutional Development	0	0	gallons/day
Infiltration/Continengency	3,071	3,071	gallons/day

Total Peak Daily Flow = 371,591 gallons/day

ATTACHMENT F

JOB	Lincoln Street Sewer Analysis		
SHEET NO.	1	OF	3
CALCULATED BY	TPG	DATE	7-28-21
CHECKED BY	DJG	DATE	4-25-22
SCALE	None		

CAPACITY ANALYSIS

8" sewer pipe on Lincoln Street

EQUATIONS:

Manning's Equation, $V = (1.49/n)R^{2/3}S^{1/2}$

$Q = VA$

Froude Number $= V/(gd)^{1/2}$

INPUT:

Diameter (D) =	0.67	ft	
Depth of flow (d) =	0.67	ft	Flowing Full
Manning's n =	0.013		
Slope of pipe (s) =	0.0085	ft/ft	

OUTPUT:

Angle (a) =	0.00	radians				
Wet Perimeter (P) =	2.09	ft				
Area of Flow (A) =	0.35	sq. ft.				
Hydr. Radius (R) =	0.17	ft				
Velocity of Flow (V) =	3.2	fps				
Flow Capacity (Q) =	1.11	cfs	=	717,652 gpd	=	498 gpm
Froude Number (F) =	0.69	< 1, subcritical flow				

JOB	Lincoln Street Sewer Analysis		
SHEET NO.	2	OF	3
CALCULATED BY	TPG	DATE	7-28-21
CHECKED BY	DJG	DATE	7-14-22
SCALE	None		

CAPACITY ANALYSIS

10" propsoed sewer pipe on Lincoln Street

EQUATIONS:

Manning's Equation, $V = (1.49/n)R^{2/3}S^{1/2}$

$Q = VA$

Froude Number $= V/(gd)^{1/2}$

INPUT:

Diameter (D) =	0.83	ft	
Depth of flow (d) =	0.83	ft	Flowing Full
Manning's n =	0.011		
Slope of pipe (s) =	0.0085	ft/ft	

OUTPUT:

Angle (a) =	0.00	radians				
Wet Perimeter (P) =	2.62	ft				
Area of Flow (A) =	0.55	sq. ft.				
Hydr. Radius (R) =	0.21	ft				
Velocity of Flow (V) =	4.4	fps				
Flow Capacity (Q) =	2.38	cfs	=	1,538,913 gpd	=	1069 gpm
Froude Number (F) =	0.84	< 1, subcritical flow				

JOB	Lincoln Street Sewer Analysis		
SHEET NO.	3	OF	3
CALCULATED BY	TPG	DATE	7-28-21
CHECKED BY	DJG	DATE	4-25-22
SCALE	None		

CAPACITY ANALYSIS

12" sewer pipe on Lincoln Street

EQUATIONS:

Manning's Equation, $V = (1.49/n)R^{2/3}S^{1/2}$

$Q = VA$

Froude Number $= V/(gd)^{1/2}$

INPUT:

Diameter (D) =	1.00	ft	
Depth of flow (d) =	1.00	ft	Flowing Full
Manning's n =	0.011		
Slope of pipe (s) =	0.0024	ft/ft	

OUTPUT:

Angle (a) =	0.00	radians					
Wet Perimeter (P) =	3.14	ft					
Area of Flow (A) =	0.79	sq. ft.					
Hydr. Radius (R) =	0.25	ft					
Velocity of Flow (V) =	2.6	fps					
Flow Capacity (Q) =	2.06	cfs	=	1,330,529 gpd	=	924	gpm
Froude Number (F) =	0.46	< 1, subcritical flow					

Wastewater Discharge Application
Water Resource Recovery Department
300 Main Street, Saco, ME 04072
#207-282-3564 / EPrescott@sacomaine.org

Please complete this form if you plan to connect to any part of the City of Saco's sewer system. This form is used to help the WRRD understand potential impacts to the sewer system. The WRRD uses this form to assist businesses with any required industrial pretreatment and retains the data for sewer infrastructure planning.

Contact Information

Legal name of business or industry: Gorrill Palmer

Physical Facility Address: 321 Lincoln Street, Saco, ME 04072

Mailing Address: 707 Sable Oaks Drive, Suite 30, South Portland, ME 04106

Facility Contact (Name, title, work email, work phone): Drew Gagnon, PE
Project Manager
dgagnon@gorrillpalmer.com, 207-772-2515

Use Details

Type of Business / Use / Operations: Multi-Family

For Multi-family Only: Anticipated number of housing units: 332

Pump Station Required?: Yes

If multi-family housing, stop and skip to signature section.

Number of Employees:

Normal hours of operation:

Applicable industry classification codes (NAICS or SIC codes):

Hazardous or other types of chemicals stored or used at facility? No

Operational Details

Do you use water for purposes other than sanitary (toilet, shower) use? No
Do you discharge process wastewater to the public sewer system? Yes
Does the facility have a grease trap or oil/water separator? No

Grease trap size:
Location of grease trap within facility:
Maintenance schedule:
Hauler name:
Destination of intercepted waste:

Does the facility generate or receive any wastes? No

Material:
Amount (gallons or lbs./month):
Removal schedule:
Hauler name:
Describe storage method and location:

Wastewater Details

This section required only for light industrial, heavy industrial, processing facilities, and breweries/distilleries uses. If you do not know the answers to the below questions, please contact the Industrial Compliance Manager at the City of Saco Water Resource Recovery Department to discuss.

Biochemical Oxygen Demand (BOD) in mg/L:	
Total Suspended Solids (TSS) in mg/L:	
pH:	
Fats, Oils and Grease (FOG) in mg/L:	
Arsenic concentration in mg/L:	

Select all contaminants that may be in your wastewater: Choose an item

Will your process water have any kind of discoloration? No

Are you planning on treating your wastewater prior to discharge? No

Water and/or sewer account number(s), if applicable:

For Light Industrial, Heavy Industrial, Brewery/Distillery, Food Processing & Restaurant Uses: Attach site plans, floor plans, mechanical and pumping plans and details to show all sewers, sewer connections, inspection manholes, sampling chambers, and appurtenances by size, location and elevation, if applicable. All sources of discharge should be numbered and identified as being process flow, sanitary flow, or combinations thereof, if applicable.

Certification & Signature: *I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate, and complete. I understand per ARTICLE XV §176-74 of SACO CITY CODE that new, proposed dischargers shall file permit applications at least 90 days prior to connecting to the city's wastewater facilities. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Drew Gagnon

Signature

Project Manager

Title

Drew Gagnon

Printed Name

7-25-23

Date

APPROVAL LETTER

Water Resource Recovery Department (WRRD)
Saco City Hall
300 Main Street
Saco, Maine 04072-1538
Phone: (207) 282-3564 x. 211

Emily Cole-Prescott
Compliance Manager
Eprescott@sacomaine.org
Howard Carter
Director
Hcarter@sacomaine.org

To: Drew Gagnon, Gorrill Palmer (Consultant), Jason Garnham, City Planner & Shannon Chisholm, Assistant Planner
From: Saco Water Resource Recovery Department (WRRD)
Date: September 9, 2022 (rev. through 09/15/22)
Re: 321 Lincoln Street (Map 52 Lot 19): Proposed 322-unit residential development with associated site amenities

---

The WRRD has received a capacity to serve request and has been asked to review the planning board submission materials for preliminary subdivision, site plan, and site location of development applications. The WRRD offers the following:

Capacity to Serve: The applicant is planning to construct 332 dwelling units all over 800 square feet. Therefore, the anticipated flow rate is 61,420 gallons per day (GPD). The applicant has indicated that 320 dwelling units will connect to Manhole 1202.111 on Lincoln Street, and the remaining 12 single family homes will connect to Manhole 1037.114 on Bradley Street. The applicant has completed a flow monitoring assessment at the city's direction. Results of this assessment require replacing segments of 8" sewer main with 10" pipe between manholes 1202.111 and 1202.109, which will reduce the development's capacity utilization from 57% to 30%. The sewer offsite improvements are further outlined in the applicant's capacity to serve request and Drawing Nos. C200-C218 of the plan set.

The WRRD grants a conditional capacity to serve, which requires that the indicated offsite improvements are made. Please include the following condition on any subsequent reviews for this project:

- Condition: The applicant shall be required to upgrade the existing 8" sewer main to 10" sewer pipe between manhole IDs 1202.111 and 1202.109 prior to construction of the dwelling units that will be served by this section of the collections system. The applicant shall include construction costs for this upgrade in their financial guarantee, which financial guarantee amount shall be reviewed and approved by the City Planner, City Engineer, and WRRD Director before pre-con meeting is scheduled. The applicant shall coordinate this construction with the Public Works Department.

Impact Fees: This project is subject to impact fees. Currently, the WRRD impact fee is $33.60 per gallon. Therefore, the WRRD impact fee for this project is $2,063,712. If there are any questions about these impact fees, please contact WRRD directly.

Private Sewer Facilities:
Private Pump Station: The applicant proposes a private pump station to serve 82 duplexes and multi-family dwelling units as indicated in the site plan set. The pump station will be equipped with a standby generator and will be constructed per the details provided in the capacity to serve letter and Attachment D of the site plan set. The pump station is shown as limited to 100 gallons per minute (GPM); however, the pump curve submitted for the pump station indicates a slightly higher pump rate of 131 GPM. Final design of the pump station to be reviewed and approved by the City Engineer and WRRD Director before pre-con meeting.

Drawing No. C205 indicates that single family house lots 9-12 on low pressure sewer will utilize DH071-93 E/One Grinder pump shown on Drawing No. C405. This low pressure sewer and the associated E/One

Grinder pumps shall remain private; the city accepts no maintenance responsibility for this low pressure system and associated grinder pumps.

The sewer-related infrastructure proposed on this property shall remain in private ownership; the city accepts no maintenance responsibility for any of the sewer infrastructure shown on this site. Future homeowners shall be responsible for the maintenance of the pump station, grinder pumps, force mains, and all sewer lines on this site. The WRRD will require that a private sewer facilities maintenance agreement be signed and recorded for future owners to be aware of this requirement and referenced in each owner's deed. Any future approved site or subdivision plan should include a condition that all sewer facilities on this site are private. As such, please include the following conditions with any subsequent reviews:

- Condition: All sewer facilities shall remain in private ownership with the condominium association and future homeowners. A private sewer facilities agreement shall be drafted, reviewed, and approved by the WRRD Director, and shall be filed on the York County Registry. Additionally, each property deed shall include reference to the Private Sewer Facilities Maintenance Agreement. A sample property deed shall be provided to the WRRD for review and approval before sale of any dwelling unit. Lastly, the condo association documentation shall also include reference to the private sewer facilities maintenance agreement and shall be provided to the WRRD for review and approval.
- Condition: The future homeowners shall also have a maintenance agreement with a qualified third party to annually inspect the pump station and provide a report of such inspection to the WRRD, due at the annual anniversary of the completion of pump station construction.

Water Meters and Future Billing: The WRRD understands that all units will be sold to separate owners. Please include the following condition in any subsequent approval:

- Condition: Each single family and duplex unit shall be equipped with its own water meter and accompanying sewer account. Each 8-unit multifamily building shall be equipped with one water meter per building, and the condominium association documents shall reflect how the sewer account will be paid among the condominium owners. The condominium association language shall be reviewed and approved by the WRRD before building permits are issued.

STANDARD CONDITIONS:

1. If a shared community space with kitchen facilities is proposed, a grease trap will be required, designed to specifications reviewed and approved by the WRRD Director.
2. All connections must be made in accordance with specifications of the Technical Design Construction Standards Manual (TDCSM), Chapter 176 and Chapter 186 of the City's Ordinances, and any other applicable City, state, or federal standards, reviewed by the City Engineer and Saco Water Resource Recovery Director.

Feel free to contact the Saco WRRD with any questions about this review. Thank you.

ATTACHMENT 9

SOLID WASTE DISPOSAL PLAN

GORRILL PALMER

707 Sable Oaks Drive, Suite 30
South Portland, Maine 04106
207.772.2515

June 17, 2022

Bill Bennett
Pine Tree Waste Inc.
87 Pleasant Hill Road
Scarborough, ME 04074
Office: 207-833-9777
William.bennett@casella.com

Dear Mr. Bennett:

On behalf of 321 Lincoln Street Development, Gorrill Palmer has been retained to prepare plans and permit applications for a proposed mixed residential development in Saco, Maine. The parcel is approximately 56.70 ± acres and is proposed to have 64 buildings on site, which account for 332 units. The land is located between Lincoln and Bradley Street, which can be seen on the attached Location Map.

As required by Local Site and Subdivision Application reviewing authority, we are writing to request a letter indicating the ability of Pine Tree Waste Inc. to serve this project.

Using typical solid waste generation rates, it is anticipated that the construction of the new development may result in the following quantities:

- Stumps & Grubbing –13,200 C.Y.
- Construction Debris – 3,060 C.Y.
- Recyclable Waste – 920 C.Y. / Month
- Non-Recyclable Waste – 1,100 C.Y. / Month

According to typical waste generation rates, the development would produce an estimated average of 2,020 cubic yards of solid waste monthly after construction. We are writing to request the ability of Pine Tree Waste Inc. to serve the 321 Lincoln Street Mixed Residential Development following construction, as well as to serve this project for the collection and transport of the construction debris to an approved location licensed by the MDEP. It is our understanding that Pine Tree Waste Inc. would be able to provide the necessary containers for the collection of construction debris and can transport the waste to the licensed facility.

If you have any questions or require any further additional information, please contact our office.

Sincerely,
Gorrill Palmer

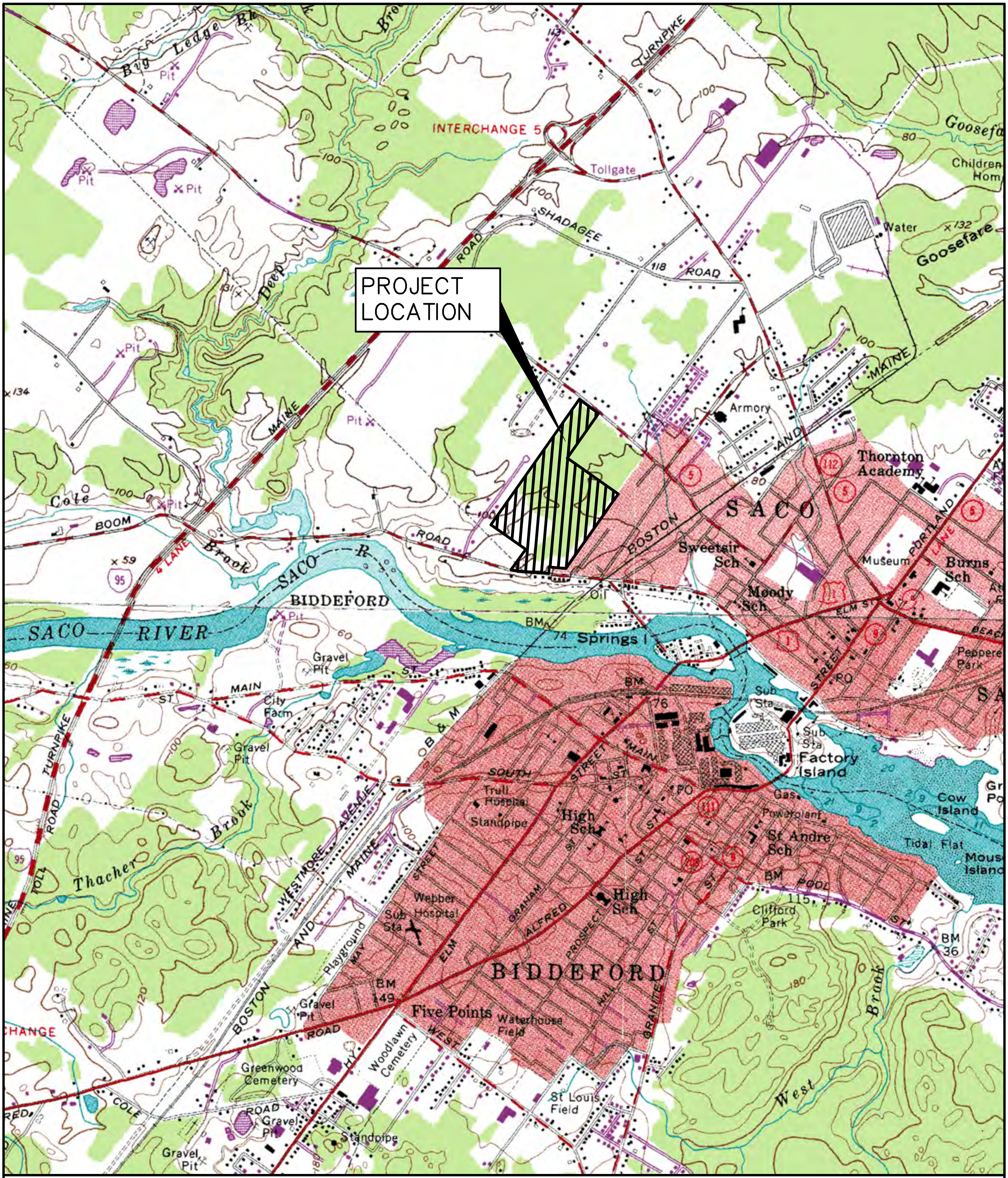
Lauren Labbay

Lauren Labbay
Design Engineer
207-772-2515 x240
llabbay@gorrillpalmer.com

Enclosure
u:\3831_helios_mixed residential development - lincoln & bradley - saco\p applications\local\site & subdivision application may 2022\ability to serve - solid waste.docx

ATTACHMENT I

PROJECT LOCATION MAP



U.S.G.S. Location Map

Lincoln Street - Saco, Maine

U.S.G.S. Old Orchard Beach & Biddeford, State-7.5 Minute Series (Topographic)

Design: LL	Date: MARCH 2022	GORRILL PALMER	Relationships. Responsiveness. Results. www.gorrillpalmer.com 207.772.2515	Figure 1
Draft: CEH	Job No.: 3831			
Checked: DJG	Scale: None			
File Name: 3831–LOCATION.dwg				

Lauren Labbay June 24, 2022
Gorrill Palmer
707 Sable Oaks Drive Suite 30
South Portland, ME 04106

RE: Ability to Serve for Lincoln Street Development Lincoln and Bradley Street, Saco ME

Dear Lauren,

This letter is to confirm that Pine Tree Waste Inc. located in Old Orchard Beach, Maine, has the capabilities to pick up, and dispose of annual volumes of (CDD) construction demolition debris as well as CDD material generated by proposed construction at Lincoln and Bradley Street, Saco, ME. The end site for this material will be:

Juniper Ridge Landfill
2828 Bennoch Road
Alton, Me 44088
MDEP Permit # S-020700-WD-N-A

Pine Tree Waste Inc can also transport volumes of non-hazardous MSW (Municipal Solid Waste). The end site for this material will be:

Juniper Ridge Landfill
2828 Bennoch Road
Alton, ME 44088

This letter is not a quote for service. It is a statement of capabilities. The sole purpose of this letter is to communicate the willingness and capabilities that Pine Tree Waste Inc. has towards providing this service as requested. If you have any questions or concerns, please do not hesitate to give me a call.

Sincerely,

Bill Bennett
Pine Tree Waste Inc.
87 Pleasant Hill Road
Scarborough, ME 04074
Cell: 653-4426
Office: 883-9777
Fax: 883-1954
William.bennett@casella.com

ATTACHMENT 10

EROSION AND SEDIMENTATION CONTROL REPORT

BASIC STANDARDS
EROSION AND SEDIMENTATION CONTROL REPORT

LINCOLN VILLAGE
SACO, MAINE

Prepared for
321 LINCOLN STREET DEVELOPMENT, LLC

SACO, ME 04074

Prepared by

Gorrill Palmer
707 Sable Oaks Drive – Suite 30
South Portland, Maine 04106
207.772.2515

AUGUST 2022

STATE OF MAINE
DREW J. GAGNON
No. 16111
LICENSED
PROFESSIONAL ENGINEER

8-10-22

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
14.0	Overview	1
14.1	Existing Conditions and Soil Types	1
14.2	Existing Erosion Problems	2
14.3	Protected Natural Resources	2
14.4	Critical Areas	2
14.5	Erosion Control Measures and Site Stabilization	2
A.	Dewatering	3
B.	Inspection and Construction Monitoring	3
C.	Temporary Erosion Control Measures	4
D.	Permanent Erosion Control Measures	6
14.6	Implementation Schedule	6
14.7	Erosion, Sedimentation and Stabilization Control Plan	8
14.8	Details and Specifications	8
14.9	Winter Stabilization Plan	8
14.10	Standards for Timely Stabilization of Construction Sites During Winter	10
14.11	Chapter 500: Appendix C – Good Housekeeping	12
14.12	Conclusion	12
14.13	Attachments	13

Attachments

Attachment A - Seeding Plan
Attachment B - Operation and Maintenance Plan
Attachment C - Inspection Report
Attachment D - Stormwater Facility Inspection and Maintenance Forms
Attachment E – Temporary Sediment Basin Calculations

MaineDEP SLDA SECTION 14

EROSION AND SEDIMENTATION CONTROL
BASIC STANDARDS
(LEVEL 2 REVIEW)

14.0 Overview

This exhibit demonstrates the developer has made adequate provision for controlling erosion and sedimentation.

Gorrill Palmer has been retained by 321 Lincoln Street Development LLC to prepare an Erosion and Sedimentation Control Report for a proposed 56.7 ± acre mix of residential housing, including single family, duplex, and condominium/apartment units. Areas determined suitable for development have been determined by avoiding large impacts to sensitive natural areas. Figure 1 is a map showing the project location.

The proposed development consists of 12 single family development windows ranging in size from 0.12 ac to 0.24 ac, 16 duplexes, and 288 condominium/apartment units. In addition, a main private roadway is proposed to connect the existing Lincoln and Bradley Streets. Stemming off this are proposed drives to provide full access to buildings. Utility and drainage infrastructure has been designed to meet or exceed requirements.

This narrative contains the general erosion and sedimentation control measures, which are appropriate for the construction of the project. Erosion and sedimentation control plans and details have also been prepared by Gorrill Palmer to accompany this report.

14.1 Existing Conditions and Soil Types

The proposed development is located between the existing Lincoln and Bradley Streets in Saco, ME. The lot is undeveloped and consists of mostly forested land. The development will create approximately 16.3 acres of new non-vegetated surface. The overall disturbed area is approximately 27.8 acres. Within the site, existing soil material will be utilized to create a trail throughout the area for recreational purposes, providing many opportunities for full interconnectivity within the community.

The topography and terrain for the planned development area varies in elevation from approximately 93 to 117 feet. For drainage purposes, the southern portion of the property drains to a series of streams and swales that drain south near Lincoln Street. The northern portion of the property generally drains to the central/eastern portion of the site to a tributary stream that conveys flow offsite and subsequently the Saco River. Most of the site contains slopes ranging from approximately 0.5% to 5%, and minimal area with steeper 30% slopes associated with the stream banks and existing quarry.

A High Intensity Soil Survey (HISS) was completed for the property by Flycatcher, LLC. Please refer to the Soil Report in Attachment 12, included with this application, for further details of the determined existing soils.

In addition to on-site soil classification, a Medium Intensity Soil Survey (MISS) for York County was used for the offsite locations surrounding the property to perform necessary runoff analysis calculations.

The susceptibility of soils to erosion is indicated on a relative "K" scale of values over a range of 0.17 to 0.49. The higher values are indicative of the more erodible soils. Table 1 lists the soils identified in the HISS and their K values:

TABLE 1 – K VALUE (HISS)		
Type	**Subsurface**	**Substratum**
Canandaigua silt loam (CaA)	0.49	0.49
Croghan-Naumburg Complex (CnA)	0.17	0.17
Croghan Fine Sandy Loam (CrA/CrB)	0.17	0.17
Elmwood-Swanton Complex (EsA/EsB/EsC)	0.32	0.32
Naumburg loamy fine sand (NsA)	0.17	0.17
Swanton Very Fine Sandy Loam (SpA/SpB/SsA/SsB)	0.32	0.32
Tubridge-Lyman Complex (TIA/TIB/TIC)	0.24/0.20	0.24/0.20

Based on Section 11's Soil Report, the on-site soils have moderate susceptibility to erosion. The following erosion and sedimentation control management plan will need to be closely followed by the Contractor to minimize erosion.

14.2 Existing Erosion Problems

Gorrill Palmer is not aware of any existing erosion problems at the project site.

14.3 Protected Natural Resources

Wetland delineation and vernal pool surveys were performed by Power Engineers, Inc. in September of 2018. In September and November of 2021, Flycatcher LLC also prepared a wetland delineation report. There were two vernal pools identified, neither of which met the NRPA definition of a Significant Vernal Pool. Their reports and a Wetland Impact Plan are included in the NRPA Tier II application as well as the City of Saco Site Plan Application. Based upon the FEMA maps, the proposed development is not located within a 100-year floodplain.

14.4 Critical Areas

Critical areas that would require special attention during construction that have been identified on-site include those with side slopes adjacent to any wetlands. A number of areas on the site will be critical during construction to implement and diligently maintain all erosion control measures that prevent sedimentation of adjacent wetlands. As directed by MaineDEP all disturbed areas upslope of wetlands shall be protected by a minimum of a double row of silt fence or mulch berm. Should field conditions dictate, additional measures shall be provided to protect adjacent wetlands.

14.5 Erosion Control Measures and Site Stabilization

The primary emphasis of the erosion/sedimentation control plan, which will be implemented for this project, is as follows:

- Development of a careful construction sequence.
- Rapid revegetation of denuded areas to minimize the period of soil exposure.
- Rapid stabilization of drainage paths to avoid rill and gully erosion.
- The use of on-site measures to capture sediment (sedimentation basins, hay bales/stone check dams/silt fence, etc.)

The following temporary and permanent erosion and sediment control devices will be implemented as part of the site development. These devices shall be installed as indicated on the plans or as described within this report. For further reference, see the latest edition of the Maine Erosion and Sediment Control Practices Field Guide for Contractors.

A. <u>Dewatering</u>

Water from construction trench dewatering shall pass first through a filter bag or secondary containment structure (e.g. hay bale lined pool) prior to discharge. The discharge site shall be selected to avoid flooding, icing, and sediment discharges to a protected resource. In no case shall the filter bag or containment structure be located within 50 feet of a protected natural resource.

B. <u>Inspection and Construction Monitoring</u>

Maintenance measures shall be applied as needed during the entire construction season. Before and within 24 hours after each wet weather event that produces more than 0.5 inch of rainfall in a consecutive 24-hour period, snowstorm, or period of thawing and runoff, the qualified contractor knowledgeable of DEP standards shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function. Additionally, inspections shall be performed at least once a week. Following the temporary and/or final seeding and mulching, the contractor shall in the spring inspect and repair any damages and/or unestablished spots. Established vegetative cover means a minimum of 90% of areas vegetated with vigorous growth.

The following standards must be met during construction.

1. **Inspection and corrective action**. An Engineer or someone with knowledge of erosion and stormwater standards as described in the conditions of the permit shall inspect disturbed and impervious areas, erosion control measures (including catch basin inlet protection measures, sediment filter measures, and stabilization of slopes), materials storage areas that are exposed to precipitation, and locations where vehicles enter or exit the site. Inspect these areas at least once a week as well as before and within 24 hours after a storm event (wet weather event that produces more than 0.5 inch in a consecutive 24-hour period), and prior to completing permanent stabilization measures. Upon final subdivision plans, the inspection log will be updated to reflect all structures.

2. **Maintenance**. If best management practices (BMPs) need to be repaired, the repair work should be initiated upon discovery of the problem but no later than the end of the next workday. The contractor is responsible for all maintenance associated with these inspections. If additional BMPs or significant repair of BMPs are necessary, implementation must be completed within 7

calendar days and prior to any storm event (wet weather event that produces more than 0.5 inch in a consecutive 24-hour period). All measures must be maintained in effective operating condition until areas are permanently stabilized.

3. **Documentation**. Keep a log (report) summarizing the inspections and any corrective action taken. The log must include the name(s) and qualifications of the person making the inspections, the date(s) of the inspections, and major observations about the operation and maintenance of erosion and sedimentation controls, materials storage areas, and vehicles access points to the parcel. Major observations must include BMPs that need maintenance, BMPs that failed to operate as designed or proved inadequate for a particular location, and location(s) where additional BMPs are needed. For each BMP requiring maintenance, BMP needing replacement, and location needing additional BMPs, note in the log the corrective action taken and when it was taken. The log must be made accessible to Department staff and a copy must be provided upon request. The permittee shall retain a copy of the log for a period of at least three years from the completion of permanent stabilization.

C. Temporary Erosion Control Measures

Excavation and earthwork shall be completed such that any area left exposed can be controlled by the contractor. Limit the exposed area to one acre at a time or no larger area that can be mulched in one day.

Typical Slope Restoration:

- Erosion control blankets required between 2:1 and 3:1 slopes
- Slopes steeper than 8% require Erosion Control Mulch
- Slopes steeper than 2:1 shall not use solely vegetated stabilization methods
- 1.5:1 slopes are prohibited.

The following measures are planned as temporary erosion/sedimentation control measures during construction:

1. A crushed stone-stabilized construction entrance shall be placed at the approved access drive on Bradley Street and Lincoln Street.
2. Siltation fence or wood waste compost berms shall be installed downstream of any disturbed areas to trap runoff- borne sediments until grass areas are revegetated. The silt fence and/or wood waste compost berms shall be installed per the details provided in this package and inspected at least once a week and before and immediately after a storm event of 0.5 inches or greater, and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence or berm line. If there are signs of undercutting at the center or the edges, or impounding of large volumes of water behind the fence or berm, the barrier shall be replaced with a stone check dam. **Wood waste compost berms are not to be used adjacent to wetland areas that are not to be disturbed, but it can be placed inside the silt fence as a secondary row.**

3. Nine (9) sedimentation basins are proposed for the development to aid in preventing migration of sediments resulting from construction. The sedimentation basins are designed for a 24-hour

delay time. A perforated riser shall be installed as the basin's outlet. The sediment basin shall remain in use until the tributary area has been stabilized. Calculations for the sedimentation basin are included in Attachment E.

4. Straw or hay mulch including hydroseeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15th and October 15th on slopes of less than 15 percent shall be anchored by applying water; mulch placed on slopes of equal to or steeper than 15 percent shall be covered by a fabric netting and anchored with staples in accordance with manufacturer's recommendation. Fabric netting and staples shall be used on disturbed areas within 50' of lakes, streams, and wetlands regardless of the upstream slope. Mulch placed between October 15th and April 15th on slopes equal to or steeper than 8 percent shall be covered with a fabric netting and anchored with staples in accordance with the manufacturer's recommendations. Slopes steeper than 3:1 and equal to or flatter than 2:1, which are to be revegetated, shall receive Curlex blankets by American Excelsior or equal. Slopes steeper than 2:1 shall receive riprap as noted on the plans. The mulch application rate for both temporary and permanent seeding is 75 lbs per 1000 sf as identified in Attachment A of this section. Mulch shall not be placed over snow.

5. Temporary stockpiles of stumps, grubbings, or common excavation will be protected as follows:

   a) Temporary stockpiles shall not be located within 50 feet of any wetlands which will not be disturbed and shall be located away from drainage swales.

   b) Stockpiles shall be stabilized within 7 days by either temporarily seeding the stockpile by a hydroseed method containing an emulsified mulch tackifier or by covering the stockpile with mulch, such as hay, straw, or erosion control mix.

   c) Stockpiles shall be surrounded by sedimentation barrier at the time of formation. Sediment barriers should be installed downgradient of stockpiles. Additionally, stormwater shall be prevented from running onto stockpiles.

6. All denuded areas that are within 50 feet of an undisturbed wetland, which have been rough graded and are not located within a building pad, parking area, or access drive subbase area, shall receive mulch or erosion control mesh fabric within 48 hours of initial disturbance of soil. All areas within 75 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window. In other areas, the time period may be extended to 7 days.

7. Lincoln and Bradley Street (undisturbed portions entering the project site) shall be swept to control mud and dust as necessary. Additional stone shall be added to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.

8. During grubbing operations stone check dams shall be installed at any evident concentrated flow discharge points and as directed on the Erosion Control Plans.

9. Silt fencing with a minimum stake spacing of 6 feet shall be used, unless the fence is supported by wire fence reinforcement of minimum 14 gauge and with a maximum mesh spacing of 6 inches, in which case stakes may be spaced a maximum of 10 feet apart. The bottom of the fence shall be anchored.

10. Wood waste compost/bark berms may be used in lieu of siltation fencing in areas not adjacent to wetlands, but can be used inside of silt fence as a secondary row. Berms shall be removed and spread in a layer not to exceed 3" thick once upstream areas are completed and a 90% catch of vegetation is attained.

11. Water and/or calcium chloride shall be furnished and applied in accordance with MDOT specifications – Section 637 – Dust Control.

12. Loam and seed is intended to serve as the primary permanent revegetative measure for all denuded areas not provided with other erosion control measures, such as riprap. Application rates are provided in Attachment A of this section. Seeding shall not occur over snow.

13. All catch basins shall be protected during construction with a catch basin inlet filter and, in cases of heavy flows, a stone sediment barrier as shown on Sheet C404.

D. Permanent Erosion Control Measures

The following permanent erosion control measures have been designed as part of the Erosion/Sedimentation Control Plan:

1. All areas disturbed during construction, but not subject to other restoration (paving, riprap, gravel subbase, etc.) will be loamed, limed, fertilized, mulched, and seeded. Fabric netting, anchored with staples, shall be placed over the mulch in areas as noted in **Temporary Erosion Control Measures** paragraph 4 of this report. All areas within 50 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48-hour window. Native topsoil shall be stockpiled and reused for final restoration when it is of sufficient quality.

2. All storm drain pipe outlets shall have riprap aprons at their outlet to protect the outlet and receiving channel from scour and deterioration. Installation details are provided in the plan set. The aprons shall be installed and stabilized to the extent practicable prior to directing runoff to the tributary pipe or culvert.

3. Catch basins shall be provided with sediment sumps and inlet hoods (the Snout) for all outlet pipes that are 18" in diameter or less.

14.6 Implementation Schedule

The following construction sequence shall be required to ensure the effectiveness of the erosion and sedimentation control measures are optimized:

It is anticipated that construction will begin in Fall/Winter 2022. The intent of construction is to follow a phased pattern, working from Bradley & Lincoln Street ends and working into the center of the project.

Note: For all grading activities, the contractor shall exercise extreme caution not to overexpose the site, this shall be accomplished by limiting the disturbed area. Area shall be limited to no more than the contractor can mulch in one day.

1. Install stabilized construction entrances at the approved locations.
2. Install perimeter silt fence and/or wood waste berms.
3. Install sediment basins, diversion dikes, or check dams (clear only those areas necessary to install BMP's)
4. Clear and grub site. Install stone check dams at any evident concentrated flow discharge points.
5. Commence installation of drainage appurtenances.
6. Commence earthwork for stormwater facilities.
7. Commence earthwork and grading to subgrade.
8. Commence installation of retaining walls (if necessary).
9. Commence installation of water and sewer lines.
10. Continue earthwork and grading to subgrade as necessary for construction.
11. Complete installation of underground utilities to within 5' of future buildings.
12. Install light pole foundations and light poles.
13. Complete remaining earthwork operations.
14. Complete installation of drainage appurtenances.
15. Install sub-base and base gravel within parking areas, walkways, and all driveways.
16. Install curbing in parking areas as needed.
17. Install base course paving for drives and parking area as well as concrete surfaces.
18. Loam, lime, fertilize, seed and mulch disturbed areas and complete all landscaping.
19. Install surface course paving for drives and parking areas. Stripe per plan.
20. Once the site is stabilized and a 90% catch of vegetation has been obtained, remove all temporary erosion control measures.
21. Touch up loam and seed.

Prior to construction of the project, the contractor shall submit to the owner a schedule for the completion of the work, which will satisfy the following criteria:

1. The above construction sequence should generally be completed in the specified order; however, several separate items may be constructed simultaneously. Work must also be scheduled or phased to reduce the extent of the exposed areas as specified below. The intent of this sequence is to provide for erosion control and to have structural measures such as silt fence and construction entrances in place before large areas of land are denuded.

2. The work shall be conducted in sections which shall:

   (a) Limit the amount of exposed area to those areas in which work is expected to be undertaken during the proceeding 30 days.

   (b) Revegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event; or temporarily stabilized within 48 hours of initial disturbance of soil for areas within 50 feet of an undisturbed wetland and 7 days for all other areas. Areas within 50 feet of an undisturbed wetland shall be mulched prior to any predicted rain event regardless of the 48 hour window.

   (c) Incorporate planned inlets and drainage system as early as possible into the construction phase. The ditches shall be immediately lined or revegetated as soon as their installation is complete.

14.7 Erosion, Sedimentation and Stabilization Control Plan

The Erosion Control information is included in the plan set.

14.8 Details and Specifications

The Erosion Control details and specifications are included in the plan set.

14.9 Winter Stabilization Plan

The winter construction period is from November 1 through April 15. If the construction site is not stabilized with pavement, a road gravel base, or riprap by November 15 then the site needs to be protected with over-winter stabilization. An area considered open is any area not stabilized with pavement; vegetation, mulching, erosion control mats, riprap or gravel base on a road.

Winter excavation and earthwork shall be completed such that any area left exposed can be controlled by the contractor. Limit the exposed area to one acre or an area that can be mulched in one day prior to any snow event.

All areas shall be considered to be denuded until the subbase gravel is installed in parking areas or the areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch rate shall be a minimum of 150 lbs./1,000 s.f. (3 tons/acre) and shall be properly anchored.

For work, which is conducted between October 15th and April 15th of any calendar year, all denuded areas, shall be covered with hay mulch or erosion control mix, applied at twice the normal application rate and anchored with a fabric netting. The time period for applying mulch shall be limited to 2 days for all areas.

The contractor shall install any added measures which may be necessary to control erosion/sedimentation from the site dependent upon the actual site and weather conditions. Continuation of earthwork operations on additional areas shall not begin until the exposed soil surface on the area being worked has been stabilized, in order to minimize areas without erosion control protection.

1. Soil Stockpiles
   Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or at 150 lbs/1,000 s.f. (3 tons per acre) or with a four-inch layer of woodwaste erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall. Any soil stockpile shall not be placed (even covered with hay or straw) within 50 feet from any natural resources.

2. Natural Resource Protection
   Any areas within 75 feet from any natural resources, if not stabilized with a minimum of 90% mature vegetation catch, shall be mulched by December 1 and anchored with plastic netting or protected with erosion control mats. During winter construction, a double line of sediment barriers (i.e. silt fence backed with hay bales or erosion control mix) shall be placed between any natural resource and the disturbed area. Projects crossing the natural resource shall be protected a minimum distance of 75 feet on either side from the resource. Existing projects not stabilized by December 1 shall be protected with the second line of sediment barrier to ensure functionality during the spring thaw and rains.

3. Sediment Barriers
   During frozen conditions, sediment barriers shall consist of wood waste filter berms as frozen soil prevents the proper installation of hay bales and sediment silt fences.

4. Mulching
   An area shall be considered denuded until areas of future loam and seed have been loamed, seeded and mulched. Hay and straw mulch shall be applied at a rate of 150 lb. per 1,000 square feet or 3 tons/acre (twice the normal accepted rate of 75-lbs./1,000 s.f. or 1.5 tons/acre) and shall be properly anchored. Mulch shall not be spread on top of snow. The snow shall be removed down to a one-inch depth or less prior to application. After each day of final grading, the area shall be properly stabilized with anchored hay or straw or erosion control matting. An area shall be considered to have been stabilized when exposed surfaces have been either mulched with straw or hay at a rate of 150 lb. per 1,000 square feet (3 tons/acre) and adequately anchored that ground surface is not visible though the mulch.

   Between the dates of November 1 and April 15, all mulch shall be anchored by peg line, mulch netting, asphalt emulsion chemical, or wood cellulose fiber. When ground surface is not visible through the mulch then cover is sufficient. After November 1st, mulch and anchoring of all bare soil shall occur at the end of each final grading workday.

5. Mulching on Slopes and Ditches
   Slopes shall not be left exposed for any extended time of work suspension unless fully mulched and anchored with peg and netting or with erosion control blankets. Mulching shall be applied at a rate of 230 lbs/1,000 s.f. on all slopes greater than 8%.

   Mulch netting shall be used to anchor mulch in all drainage ways with a slope greater than 3% for slopes exposed to direct winds and for all other slopes greater that 8%. Erosion control blankets shall be used in lieu of mulch in all drainage ways with slopes greater than 8%. Erosion control mix can be used to substitute erosion control blankets on all slopes except ditches.

6. Seeding
Between the dates of October 15 and April 1st, loam or seed will not be required. During periods of above freezing temperatures finished areas shall be fine graded and either protected with mulch or temporarily seeded and mulched until such time as the final treatment can be applied. If the date is after November 1st and if the exposed area has been loamed, final graded with a uniform surface, then the area may be dormant seeded at a rate of 3 times higher than specified for permanent seed and then mulched. Dormant seeding may be selected to be placed prior to the placement of mulch and fabric netting anchored with staples. If dormant seeding is used for the site, all disturbed areas shall receive 4" of loam and seed at an application rate of 5 lbs/1,000 s.f. All areas seeded during the winter shall be inspected in the spring for adequate catch. All areas insufficiently vegetated (less than 90% catch) shall be revegetated by replacing loam, seed and mulch. If dormant seeding is not used for the site, all disturbed areas shall be revegetated in the spring.

7. Winter Construction Inspection
After each rainfall, snow storm or period of thawing and runoff, the qualified contractor knowledgeable of DEP standards shall perform a visual inspection of all installed erosion control measures and perform repairs as needed to insure their continuous function. Inspections shall be performed a minimum of once per week and shall be conducted in accordance with the Erosion Control Measures and Site Stabilization within the Erosion Control Report.

14.10 Standards for Timely Stabilization of Construction Sites During Winter

Standard for the timely stabilization of ditches and channels - The applicant shall construct and stabilize all stone-lined ditches and channels on the site by November 15. The applicant shall construct and stabilize all grass-lined ditches and channels on the site by September 1. If the applicant fails to stabilize a ditch or channel to be grass-lined by September 1, then the applicant will take one of the following actions to stabilize the ditch for late fall and winter.

Install a sod lining in the ditch -- The applicant shall line the ditch with properly installed sod by October 1. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, watering the sod to promote root growth into the disturbed soil, and anchoring the sod with jute or plastic mesh to prevent the sod strips from sloughing during flow conditions.

Install a stone lining in the ditch --The applicant shall line the ditch with stone riprap by November 15. The applicant shall hire a registered professional engineer to determine the stone size and lining thickness needed to withstand the anticipated flow velocities and flow depths within the ditch. If necessary, the applicant shall regrade the ditch prior to placing the stone lining so to prevent the stone lining from reducing the ditch's cross-sectional area.

Standard for the timely stabilization of disturbed slopes -- The applicant shall construct and stabilize stone-covered slopes by November 15. The applicant shall seed and mulch all slopes to be vegetated by September 1. The department shall consider any area having a grade greater than 15% to be a slope. If the applicant fails to stabilize any slope to be vegetated by September 1, then the applicant shall take one of the following actions to stabilize the slope for late fall and winter.

Stabilize the soil with temporary vegetation and erosion control mats -- By September 1 the applicant shall seed the disturbed slope with winter rye at a seeding rate of 3 pounds per 1,000 square feet and apply erosion control mats over the mulched slope. The applicant shall monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 75% of the disturbed slope by November 1, then the applicant shall cover the slope with a layer of woodwaste compost as described in item iii of this standard or with stone riprap as described in item iv of this standard.

Stabilize the slope with sod -- The applicant shall stabilize the disturbed slope with properly installed sod by September 1. Proper installation includes the applicant pinning the sod onto the slope with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil. The applicant shall not use late-season sod installation to stabilize slopes having a grade greater than 33% (3H:1V).

Stabilize the slope with woodwaste compost -- The applicant shall place a six-inch layer of woodwaste compost on the slope by November 15. Prior to placing the woodwaste compost, the applicant shall remove any snow accumulation on the disturbed slope. The applicant shall not use woodwaste compost to stabilize slopes having grades greater than 50% (2H:1V) or having groundwater seeps on the slope face.

Stabilize the slope with stone riprap -- The applicant shall place a layer of stone riprap on the slope by November 15. The applicant shall hire a registered professional engineer to determine the stone size needed for stability and to design a filter layer for underneath the riprap.

Standard for the timely stabilization of disturbed soils -- By September 15 the applicant shall seed and mulch all disturbed soils on areas having a slope less than 15%. If the applicant fails to stabilize these soils by this date, then the applicant shall take one of the following actions to stabilize the soil for late fall and winter.

Stabilize the soil with temporary vegetation -- By September 1 the applicant shall seed the disturbed soil with winter rye at a seeding rate of 3 pounds per 1000 square feet, lightly mulch the seeded soil with hay or straw at 75 pounds per 1000 square feet, and anchor the mulch with plastic netting. The applicant shall monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or cover at least 90% of the disturbed soil before November 1, then the applicant shall mulch the area for over-winter protection as described below.

Stabilize the soil with sod -- The applicant shall stabilize the disturbed soil with properly installed sod by September 15. Proper installation includes the applicant pinning the sod onto the soil with wire pins, rolling the sod to guarantee contact between the sod and underlying soil, and watering the sod to promote root growth into the disturbed soil.

Stabilize the soil with mulch -- By November 15 the applicant shall mulch the disturbed soil by spreading hay or straw at a rate of at least 150 pounds per 1000 square feet on the area so that no soil is visible through the mulch. Prior to applying the mulch, the applicant shall remove any snow accumulation on the disturbed area. Immediately after applying the mulch, the applicant will anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

14.11 Chapter 500: Appendix C – Good Housekeeping

Authorized Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

a) Discharges from firefighting activity;

b) Fire hydrant flushings;

c) Vehicle washwater if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);

e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

f) Pavement washwater (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

g) Uncontaminated air conditioning or compressor condensate;

h) Uncontaminated groundwater or spring water;

i) Foundation or footer drain-water where flows are not contaminated;

j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));

k) Potable water sources including waterline flushings; and

l) Landscape irrigation.

Unauthorized non-stormwater discharges. The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

d) Toxic or hazardous substances from a spill or other release.

14.12 Conclusion

The Applicant has provided temporary and permanent erosion control measures as well as specifying a sequence of construction as measures to minimize erosion and sedimentation.

14.13 Attachments

Attachment A	Seeding Plan
Attachment B	Operation and Maintenance Plan
Attachment C	Inspection Report
Attachment D	Stormwater Facility Inspection and Maintenance Forms
Attachment E	Temporary Sediment Basin Calculations

ATTACHMENT A

SEEDING PLAN

SEEDING PLAN

Project: Lincoln Village

Site Location: Saco, ME

☐ Permanent Seeding ☒ Temporary Seeding

1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: _____# / acres, OR 138 # /M Sq. Ft.
3. Fertilize with _____ pounds of _____ N-P-K/ac. OR 13.8 pounds of 10-10-10 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:

   50% Winter Rye

   50% Annual Rye

6. Mulching instructions: Apply at the rate of _____per acre, OR 75 pounds per M. Sq. Ft.

	Amount	Unit # Tons. Etc.
7. TOTAL LIME	138	#/1000 sq. ft.
8. TOTAL FERTILIZER	13.8	#/1000 sq. ft.
9. TOTAL SEED	1.03	#/1000 sq. ft.
10. TOTAL MULCH	75	#/1000 sq. ft.
11. TOTAL other materials, seeds, etc.		
12. REMARKS		

Spring seeding is recommended; however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

SEEDING PLAN

Project: Lincoln Village

Site Location: Saco, ME

☒ Permanent Seeding ☐ Temporary Seeding

1. Instruction on preparation of soil: Prepare a good seed bed for planting method used.
2. Apply lime as follows: ______# / acres, OR 138 # /M Sq. Ft.
3. Fertilize with _____ pounds of _____ N-P-K/ac. OR 18.4 pounds of 10-20-20 N-P-K/M Sq. Ft.
4. Method of applying lime and fertilizer: Spread and work into the soil before seeding.
5. Seed with the following mixture:

   40% Creeping Red Fescue

   30% Charger II Perennial Ryegrass

   20% KenBlue Kentucky Bluegrass

   10% Tiffany Chewings Fescue
6. Mulching instructions: Apply at the rate of _____per acre, OR 75 pounds per M. Sq. Ft.

		Amount	Unit # Tons. Etc.
7.	TOTAL LIME	138	#/1000 sq. ft.
8.	TOTAL FERTILIZER	18.4	#/1000 sq. ft.
9.	TOTAL SEED	1.03	#/1000 sq. ft.
10.	TOTAL MULCH	75	#/1000 sq. ft.
11.	TOTAL other materials, seeds, etc.		
12.	REMARKS		

Spring seeding is recommended, however, late summer (prior to September 1) seeding can be made. Permanent seeding should be made prior to August 5 or as a dormant seeding after the first killing frost and before the first snowfall. If seeding cannot be done within these seeding dates, temporary seeding and mulching shall be used to protect the site. Permanent seeding shall be delayed until the next recommended seeding period.

ATTACHMENT B

OPERATION & MAINTENANCE PLAN

OPERATION AND MAINTENANCE PLAN

Prepared by:

- ❑ Professional Engineer:
  - o Print Name: Drew Gagnon______________________________
  - o Signature: ______________________________
  - o License #: 16111______________________________
- ❑ Landscape Architect:
  - o Print Name:______________________________
  - o Signature:______________________________
  - o License #:______________________________
- ❑ Certified ESC Professional:
  - o Print Name:______________________________
  - o Signature:______________________________
  - o License #:______________________________

Company:

Stamp:

STATE OF MAINE
DREW J.
GAGNON
No. 16111
LICENSED
PROFESSIONAL ENGINEER

OPERATION AND MAINTENANCE PLAN

Maintenance of Facilities

The anticipated maintenance responsibilities for Lincoln Village infrastructure is as follows:

Maintained by 321 Lincoln Street Development, LLC:
- Gravel Wetland 1
- Gravel Wetland 2
- Grassed Underdrain Soil Filter 1
- Grassed Underdrain Soil Filter 2
- Grassed Underdrain Soil Filter 3
- Grassed Underdrain Soil Filter 4
- Grassed Underdrain Soil Filter 5
- Grassed Underdrain Soil Filter 6
- Grassed Underdrain Soil Filter 7
- Grassed Underdrain Soil Filter 8
- Grassed Underdrain Soil Filter 9
- Level Lip Spreader at OCS 1
- Level Lip Spreader at OCS 2
- Level Lip Spreader at OCS 3
- Focal Points 1-4
- Subsurface Chambers 1 & 2
- Drip Edges for Single Family & Duplex Buildings

Maintained by City of Saco:
- Lincoln and Bradley Street Infrastructure

Long-term operation/maintenance recommended for the stormwater facilities are presented below.

Inspections shall be conducted by a person with knowledge of erosion and stormwater control, including the standards and conditions in the permit. The responsible party, which may be a contractor knowledgeable of standard stormwater and erosion control measures, may contract with such professionals as necessary in order to comply with this provision and may rely on the advice of such professionals in carrying out its duty hereunder, provided, that the following operation and maintenance procedures are hereby established as a minimum for compliance with this section. A maintenance log of the inspections shall be kept by the responsible party for a minimum of 5 years after construction. A rainfall event that produces more than a 1-inch storm in a consecutive 24-hour period shall prompt a post construction inspection.

City of Saco Annual Certifications:

Per MaineDEP and the City of Saco Post-Construction Stormwater Management Plan Code requirements, inspections of the stormwater and drainage infrastructure are due to the Department of Public Works by July 15th of each year. Below is a summary of the forms and logs to be completed by the applicant and returned to the Department of Public Works:

OPERATION AND MAINTENANCE PLAN

Inspection Form	Returned to Code Enforcement Officer (any given year)
- Stormwater Management Plan for City of Saco, Maine - Annual Stormwater Management Facilities Certification (Form 2) - Inspection and Maintenance Log	July 15th

Forms due by **July 15th** can be found in **Attachment 1** included with this O&M plan.

Inspection and Maintenance Frequency and Corrective Measures:

The following areas, facilities, and measures will be inspected, and the identified deficiencies will be corrected. Clean-out must include the removal and legal disposal of any accumulated sediments and debris.

Catch Basins:

Inspect catch basins 2 times per year (preferably in Spring and Fall) to ensure that the catch basins are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12" from invert of outlet. If the basin outlet is designed with a hood to trap floatable materials (i.e. Snout), check to ensure watertight seal is working. At a minimum, remove floating debris and hydrocarbons at the time of the inspection.

Field Inlets:

Inspect field inlets 2 times per year (preferably in Spring and Fall) to ensure that the field inlets are working in their intended fashion and that they are free of debris. Clean structures when sediment depths reach 12" from invert of outlet.

Culverts:

Inspect culverts 2 times per year (preferably in Spring and Fall) to ensure that the culverts are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the inlet, at the outlet, and within the conduit and repair any erosion damage at the culvert's inlet and outlet.

Vegetated Areas:

Inspect slopes and embankments early in the growing season to identify active or potential erosion problems. Replant bare areas or areas with sparse growth. Where rill erosion is evident, armor the area with an appropriate lining or divert the erosive flows to on-site areas able to withstand the concentrated flows. The facilities will be inspected after major storms and any identified deficiencies will be corrected.

Roadways and Parking Surfaces: Clear accumulations of winter sand in parking lots and along roadways at least once a year, preferably in the spring. Accumulations on pavement may be removed by pavement sweeping. Accumulations of sand along road shoulders may be removed by grading excess sand to the pavement edge and removing it manually or by a front-end loader. Repair potholes and other roadway obstructions and hazards. Plowing and sanding of paved areas shall be performed as necessary to maintain vehicular traffic safety.

OPERATION AND MAINTENANCE PLAN

Stormdrain Outlets:

Inspect outlets 2 times per year (preferably in Spring and Fall) to ensure that the outlets are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris at the outlet and within the conduit. Repair any erosion damage at the storm drain outlet.

Gravel Wetlands:

Operation and maintenance requirements similar to those for underdrained filter basins should be expected. The plant biomass should be harvested annually, and accumulated sediment removed at intervals of 5-10 years. These activities may disrupt the wetlands system and may require some vegetation re-establishment. The riser pipes may clog and will require annual clean-out (it should be done in the wintertime when one can walk on the wetland). Inspection frequency should occur after every major storm in the first year following construction. Inspect that the system drains within 24-48 hours. The plants may need watering, if necessary, during the first growing season. Revegetate if the vegetation is poorly establishing. Identify areas of erosion and make timely repairs. Check all inlets, outlets and subdrains for proper functioning. Risers may need to be cleaned. Inspection frequency should occur at least every 6 months and after every major storm. Check the cells for a dense root mat establishment of wetland vegetation. Check and clean the risers if there is evidence of standing water, discolored water or accumulated sediments in the cells. Check and clean the forebay for sediments, trash and debris. When sediments have accumulated to a depth of 12 inches, standing water is persistent or wetland vegetation become established, the forebay will need to be excavated and reformed. Verify that the cells drain within 24-48 hours. Sediment will need to be removed when an accumulation of 4 inches is evident over the wetland surface. Check and clean all outlets and overflow spillway if blocked or there is evidence of structural damage or erosion. Remove decaying vegetation, litter and debris. Check for foreign species. Particular care must be used to avoid the unintended introduction of invasive species such as purple loosestrife (Lythrum salicaria) and common reed (Phragmites australis). It is recommended that a qualified wetland biologist be consulted when these are found in the area of the gravel wetland.

Level Lip Spreaders:

Operation and maintenance requirements similar to those for sediment forebays should be expected. Level Lip Spreaders shall be inspected 2 times per year (preferably in Spring and Fall) to ensure the spreaders are working in their intended fashion, that they are free of debris and vegetative growth, that flow is not bypassing the stone berm, and that no signs of erosion are evident within the sediment forebay or downstream of the spreader. Any woody vegetation growing through riprap linings must be removed. Repair any slumping side slopes as soon as practicable. Sediment build-up shall be removed appropriately when sediment exceeds 25% of the capacity of the sediment forebay.

Soil Filter – Grassed Underdrained Soil Filter:

Inspect all upstream pre-treatment measures 2 times per year (preferably in Spring and Fall) for sediment and floatables accumulation. Remove and dispose of any sediments or debris.

Surface (Underdrain Filter, Swale or Bio-Filter):

The soil filters shall be inspected within the first three months after construction; thereafter the filters shall be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments shall be made to the outlet valve, by opening or closing valve, to ensure that the grassed underdrain soil filter drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected. Harvesting and weeding of excessive growth shall be performed as needed. Inspect for unwanted or invasive plants and remove as necessary.

Focal Point Treatment Devices:

A FocalPoint system will be used on site to treat surface runoff from impervious and landscaped area. Inspection of the filter should be performed after each major rainfall event to ensure that stormwater runoff is able to pass through the filters. The vegetation should be inspected and maintained regularly similar to other landscape features on site. The underdrain outlet should be inspected regularly. Inlets and pretreatment devices should be cleared of any debris and sediment. The system should be inspected semi-annually and maintained as instructed by manufacturer. The manufacturer typically commits to the first year of maintenance if their strict guidelines are followed for installation, which is highly encouraged to achieve peak performance. It is recommended that an outside agent who is familiar with the product be retained for future maintenance.

Subsurface Detention Chamber:

Inspect chambers per manufacturer's recommendation. At a minimum inspect chambers 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove sediment from the Isolator Row when depth of sediment reaches 3 inches.

Roofline Drip Edge Facilities:

The drip strip will be inspected within the first three months after construction; thereafter the filter will be inspected 2 times per year (preferably in Spring and Fall) to ensure that the filter is draining within 24 to 48 hours of a rain event equivalent to 1" or more. Adjustments will be made to the outlet valve to ensure that the drip strip drains within 24 to 48 hours. Failure to drain in 72 hours will require part or all of the soil filter media to be removed and replaced with new material meeting the soil filter gradation. The facilities will be inspected after major storms and any identified deficiencies will be corrected. Inspect for unwanted or invasive plants and remove as necessary. Remove debris from the surface. Since the Roofline Drip edge is part of the approved stormwater management plan, it cannot be paved over or altered in any way. Gutters shall not be installed along the roofline.

Inlet/Outlet Control Structures:

Inspect structures and piping 2 times per year (preferably in Spring and Fall) to ensure that the structures are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris within the structure. Ensure drop down weirs are in working order and no flow is improperly bypassing the weirs.

Ditches, Swales, and other Open Stormwater Channels:

Inspect 2 times per year (preferably in Spring and Fall) to ensure they are working in their intended fashion and that they are free of sediment and debris. Remove any obstructions to flow, including accumulated sediments and debris and vegetated growth. Repair any erosion of the ditch lining. Vegetated ditches will be mowed at least annually or otherwise maintained to control the growth of woody vegetation and maintain flow capacity. Any woody vegetation growing through riprap linings must also be removed. Repair any slumping side slopes as soon as practicable. If the ditch has a riprap lining, replace riprap on areas where any underlying filter fabric or underdrain gravel is showing through the stone or where stones have dislodged. Correct any erosion of the channel's bottom or side slopes. The facilities shall be inspected after major storms and any identified deficiencies shall be corrected.

OPERATION AND MAINTENANCE PLAN

Sediment Forebays:

Inspect sediment forebays 2 times per year (preferably in Spring and Fall) to ensure that the forebays are working in their intended fashion and that they are free of debris. Remove any obstructions to flow; remove accumulated sediments and debris in the forebay. Repair any erosion damage at the forebay outlet.

Recertification

As part of the Stormwater Permit, the applicant is required to meet the standards in Appendix B of the Chapter 500 Rules. Appendix B states that a project must submit a certification of the following to the department within three months of the expiration of each five-year interval from the date of issuance of the permit.

(a) Identification and repair of erosion problems. All areas of the project site have been inspected for areas of erosion, and appropriate steps have been taken to permanently stabilize these areas.

(b) Inspection and repair of stormwater control system. All aspects of the stormwater control system have been inspected for damage, wear, and malfunction, and appropriate steps have been taken to repair or replace the system, or portions of the system.

(c) Maintenance. The erosion and stormwater maintenance plan for the site is being implemented as written, or modifications to the plan have been submitted to and approved by the department, and the maintenance log is being maintained.

(d) Proprietary Systems. All proprietary systems have been maintained according to the manufacturer's recommendations. Where required by the Department, the permittee shall execute a 5-year maintenance contract with a qualified professional for the coming 5-year interval. The maintenance contract must include provisions for routine inspections, cleaning, and general maintenance.

(e) Post-construction inspection and maintenance documents shall be retained for at least five (5) years.

Housekeeping

The following procedures are hereby established as a minimum for compliance with this section. For further information on the procedures listed below, refer to MDEP Chapter 500 rules – Appendix C.

Spill prevention. Controls must be used to prevent pollutants from construction and waste materials stored on site to enter stormwater, which includes storage practices to minimize exposure of the materials to stormwater. The site contractor or operator must develop, and implement as necessary, appropriate spill prevention, containment, and response planning measures.

NOTE: Any spill or release of toxic or hazardous substances must be reported to the Department. For oil spills, call 1-800-482-0777 which is available 24 hours a day. For spills of toxic or hazardous material, call 1-800-452-4664 which is available 24 hours a day. For more information, visit the Department's website at :http://www.maine.gov/dep/spills/emergspillresp/

Groundwater protection. During construction, liquid petroleum products and other hazardous materials with the potential to contaminate groundwater may not be stored or handled in areas of the site draining to an infiltration area. An "infiltration area" is any area of the site that by design or as a result of soils, topography and other relevant factors accumulates runoff that infiltrates into the soil. Dikes, berms, sumps, and other forms of secondary containment that prevent discharge to groundwater may be used to isolate portions of the site for the purposes of storage and handling of these materials. Any project proposing infiltration of stormwater must provide adequate pre-treatment of stormwater prior to discharge of stormwater to the infiltration area, or provide for treatment within the infiltration area, in order to prevent the accumulation of fines, reduction in infiltration rate, and consequent flooding and destabilization. See Appendix D for license by rule standards for infiltration of stormwater.

NOTE: Lack of appropriate pollutant removal best management practices (BMPs) may result in violations of the groundwater quality standard established by 38 M.R.S.A. §465-C(1).

Fugitive sediment and dust. Actions must be taken to ensure that activities do not result in noticeable erosion of soils or fugitive dust emissions during or after construction. Oil may not be used for dust control, but other water additives may be considered as needed. A stabilized construction entrance (SCE) should be included to minimize tracking of mud and sediment. If off-site tracking occurs, public roads should be swept immediately and no less than once a week and prior to significant storm events. Operations during dry months, that experience fugitive dust problems, should wet down unpaved access roads once a week or more frequently as needed with a water additive to suppress fugitive sediment and dust.

NOTE: Dewatering a stream without a permit from the Department may violate state water quality standards and the Natural Resources Protection Act.

Debris and other materials. Minimize the exposure of construction debris, building and landscaping materials, trash, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials to precipitation and stormwater runoff. These materials must be prevented from becoming a pollutant source.

NOTE: To prevent these materials from becoming a source of pollutants, construction and post-construction activities related to a project may be required to comply with applicable provision of rules related to solid, universal, and hazardous waste, including, but not limited to, the Maine solid waste and hazardous waste management rules; Maine hazardous waste management rules; Maine oil conveyance and storage rules; and Maine pesticide requirements.

Excavation de-watering. Excavation de-watering is the removal of water from trenches, foundations, coffer dams, ponds, and other areas within the construction area that retain water after excavation. In most cases the collected water is heavily silted and hinders correct and safe construction practices. The collected water removed from the ponded area, either through gravity or pumping, must be spread through natural wooded buffers or removed to areas that are specifically designed to collect the maximum amount of sediment possible, like a cofferdam sedimentation basin. Avoid allowing the water to flow over disturbed areas of the site. Equivalent measures may be taken if approved by the Department.

NOTE: Dewatering controls are discussed in the "Maine Erosion and Sediment Control BMPs, Maine Department of Environmental Protection."

Authorized Non-stormwater discharges. Identify and prevent contamination by non-stormwater discharges. Where allowed non-stormwater discharges exist, they must be identified, and steps should be taken to ensure the implementation of appropriate pollution prevention measures for the non-stormwater component(s) of the discharge. Authorized non-stormwater discharges are:

a) Discharges from firefighting activity;

b) Fire hydrant flushings;

c) Vehicle wash water if detergents are not used and washing is limited to the exterior of vehicles (engine, undercarriage and transmission washing is prohibited);

d) Dust control runoff in accordance with permit conditions and Appendix (C)(3);

e) Routine external building washdown, not including surface paint removal, that does not involve detergents;

f) Pavement wash water (where spills/leaks of toxic or hazardous materials have not occurred, unless all spilled material had been removed) if detergents are not used;

g) Uncontaminated air conditioning or compressor condensate;

h) Uncontaminated groundwater or spring water;

i) Foundation or footer drain-water where flows are not contaminated;

j) Uncontaminated excavation dewatering (see requirements in Appendix C(5));

k) Potable water sources including waterline flushings; and

l) Landscape irrigation.

Unauthorized non-stormwater discharges. The Department's approval under this Chapter does not authorize a discharge that is mixed with a source of non-stormwater, other than those discharges in compliance with Appendix C (6). Specifically, the Department's approval does not authorize discharges of the following:

a) Wastewater from the washout or cleanout of concrete, stucco, paint, form release oils, curing compounds or other construction materials;

b) Fuels, oils or other pollutants used in vehicle and equipment operation and maintenance;

c) Soaps, solvents, or detergents used in vehicle and equipment washing; and

d) Toxic or hazardous substances from a spill or other release.

Attachments

1 - Annual Stormwater Management Facilities Certification (Stormwater Management Plan for City of Saco, ME - Form 2) and Inspection and Maintenance Log (Provided in Attachment C for Section 14)

ATTACHMENT I

ANNUAL STORMWATER MANAGEMENT FACILITIES CERTIFICATION

FORM 2

Annual Stormwater Management Facilities Certification
(to be completed by a Qualified Post-Construction Stormwater Inspector and sent to City of Saco Public Works Department)

I, ________________________________ (print or type name), a Qualified Post-Construction Stormwater Inspector, certify the following:

1. I am making this Annual Stormwater Management Facilities Certification for the following property: ____ (print or type name of subdivision, condominium or other development) located at ____ (print or type address), (the "Property");

2. The owner, operator, tenant, lessee or homeowners' association of the Property is: ____ (name(s) of owner, operator, tenant, lessee, homeowners' association or other party having control over the Property);

3. I have knowledge of erosion and stormwater control and have reviewed the approved Post-Construction Stormwater Management Plan for the Property;

4. On _____________, 20__, I inspected the Stormwater Management Facilities, including but not limited to parking areas, catch basins, drainage swales, detention basins and ponds, pipes and related structures required by the approved Post-Construction Stormwater Management Plan for the Property;

5. At the time of my inspection of the Stormwater Management Facilities on the Property, I identified the following need(s) for routine maintenance or deficiencies in the Stormwater Management Facilities:

____

____

6. On ____________, 20__, I took the following routine maintenance or the following corrective action(s) to address the deficiencies in the Stormwater Management Facilities stated in 5. above:

____

____

7. As of the date of this certification, the Stormwater Management Facilities are functioning as intended by the approved Post-Construction Stormwater Management Plan for the Property.

Date:____________________, 20__. By:_______________________________________

Signature

____

Print Name

STATE OF MAINE
_________________________, ss. ________________________, 20__

Personally appeared the above-named __________________________________, the __________________ of ______________________________, and acknowledged the foregoing Annual Certification to be said person's free act and deed in said capacity.

Before me, ______________________________________
Notary Public/Attorney at Law
Print Name: ______________________________________

1. The owner, operator, tenant, lessee, or other party having control over the Property shall sign below verifying the information above was completed by a Qualified Post-Construction Stormwater Inspector.

Date:_____________________, 20__. By:____
Signature

____
Print Name

STATE OF MAINE
_________________________, ss. ________________________, 20__

Personally appeared the above-named __________________________________, the __________________ of ______________________________, and acknowledged the foregoing Annual Certification to be said person's free act and deed in said capacity.

Before me, ______________________________________
Notary Public/Attorney at Law
Print Name: ______________________________________

Mail or hand deliver this certification to the City of Saco at the following address:
City of Saco c/o City Engineer
300 Main Street
Saco, ME 04072

ATTACHMENT C

INSPECTION LOG

Lincoln Village
Maintenance Log

Personnel:
Date:

Structure	Condition	Depth of Sediment	Inspection Comments	Maintenance Required
CB 1				
CB 2				
CB 3				
CB 4				
CB 5				
CB 6				
CB 7				
CB 8				
CB 9				
CB 10				
CB 11				
CB 12				
CB 13				
CB 14				
CB 15				
CB 16				
CB 17				
CB 18				
CB 19				
CB 20				
CB 21				
CB 22				
CB 23				
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CB 62				
CB 63				
CB 64				
CB 65				
CB 66				

CB 67				
CB 68				
CB 69				
CB 70				
CB 71				
CB 72				
CB 73				
CB 74				
DMH 1				
DMH 2				
DMH 3				
DMH 4				
DMH 5				
DMH 6				
DMH 7				
DMH 8				
DMH 9				
2' x 3' Culvert @ STA 11+74				
2' x 3' Culvert @ STA 12 +14				
2' x 3' Culvert @ STA 17+59				
2' x 3' Culvert @ STA 18+09				
2' x 3' Culvert @ STA 18+53				
2' x 3' Culvert @ STA 18+98				
2' x 3' Culvert @ STA 20+35				
2' x 3' Culvert @ STA 22+39				
2' x 3' Culvert @ STA 25+50				
2' x 3' Culvert @ STA 26+00				
3' x 2' Culvert near Building #27				
3' x 2' Culvert near Building #29				
3' x 2' Culvert near Building #36				
3' x 6' Culvert @ STA 22+66				
Plunge Pool at GW 2				
Gravel Wetland 1		**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes				
Vegetation				
Sediment Forebay				
Gravel Trench				
Storm Drain Outlet				
Overflow Spillway				
Embankment Stablization				
OCS 1				
OCS 2				
Gravel Wetland 2		**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes				
Vegetation				
Sediment Forebay				
Gravel Trench				
Storm Drain Outlet				
Overflow Spillway				
Embankment Stablization				
OCS 3				
OCS 4				
Level Lip Spreader from OCS 1		**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes				
Sedimet Forebay				
Level Lip Spreader Inlet				
Overflow Spillway				
Level Lip Spreader from OCS 2		**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes				
Sedimet Forebay				
Level Lip Spreader Inlet				
Overflow Spillway				
Level Lip Spreader from OCS 3		**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes				
Sedimet Forebay				
Level Lip Spreader Inlet				
Overflow Spillway				
Grassed Underdrained Soil Filter 1		**Condition**	**Inspection Comments**	**Maintenance Required**
OCS5				
Berm Slopes				
Vegetation				
Sediment Forebay				

Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 2	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS6			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 3	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS7			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 4	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS8			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 5	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS9			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 6	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS10			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 7	**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 8	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS11			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
Grassed Underdrained Soil Filter 9	**Condition**	**Inspection Comments**	**Maintenance Required**
OCS12			
Berm Slopes			
Vegetation			
Sediment Forebay			
Pond Inlet			
Storm Drain Outlet			
Overflow Spillway			
FocalPoint 1	**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes			
Plantings			
Sediment			
Rip Rap Apron			

Mulch Bedding			
Beehive Overflow			
Access Structures			
Rain Guardian			
Cultec 330XL Chambers			
FocalPoint 2	**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes			
Plantings			
Sediment			
Rip Rap Apron			
Mulch Bedding			
Beehive Overflow			
Access Structures			
Rain Guardian			
FocalPoint 3	**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes			
Plantings			
Sediment			
Rip Rap Apron			
Mulch Bedding			
Beehive Overflow			
Access Structures			
Rain Guardian			
FocalPoint 4	**Condition**	**Inspection Comments**	**Maintenance Required**
Berm Slopes			
Plantings			
Sediment			
Rip Rap Apron			
Mulch Bedding			
Beehive Overflow			
Access Structures			
Rain Guardian			
Cultec 330XL Chambers			
Roof Dripline Filter	**Condition**	**Inspection Comments**	**Maintenance Required**
Duplex Unit 1			
Duplex Unit 2			
Single Family Lot 1			
Single Family Lot 2			
Single Family Lot 3			
Single Family Lot 4			
Single Family Lot 5			
Single Family Lot 6			
Single Family Lot 7			
Single Family Lot 8			

ATTACHMENT D

STORMWATER FACILITY INSPECTION & MAINTENANCE FORMS

INSPECTION & MAINTENANCE FORM

Project: Lincoln Village
Client: 321 Lincoln Street Development, LLC
Field Rep:
Time on-site:

Visit Date:
Report Date:
Weather:
Temperature Range:

Distribution:

INSPECTION & MAINTENANCE FORM

GRAVEL WETLAND 1 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Wetland Bottom	
❑	❑	Dense root mat established	
❑	❑	Channel protection volume empties within 24-48 hours after storm.	
❑	❑	Risers are clean and no accumulated sediment in the cells	
❑	❑	Decaying vegetation has been removed and foreign species are not present	
❑	❑	Foreign species are not present	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Gravel Wetland Cells	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Gravel Wetland Cells are clear of trash debris.	
❑	❑	Gravel Wetland Cells are not being used for snow storage.	
		Outlet Control Structure 1 & 2	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRAVEL WETLAND 2 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Wetland Bottom	
❑	❑	Dense root mat established	
❑	❑	Channel protection volume empties within 24-48 hours after storm.	
❑	❑	Risers are clean and no accumulated sediment in the cells	
❑	❑	Decaying vegetation has been removed and foreign species are not present	
❑	❑	Foreign species are not present	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Gravel Wetland Cells	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Gravel Wetland Cells are clear of trash debris.	
❑	❑	Gravel Wetland Cells are not being used for snow storage.	
		Outlet Control Structure 3 & 4	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	

Other Comments:

INSPECTION & MAINTENANCE FORM

LEVEL LIP SPREADER FROM OCS 1 CHECKLIST:

Yes	No		Comments:
		Inlet	
❑	❑	Inlets is clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap aprons.	
❑	❑	Rip rap aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Forebay is free of debris such as leaf litter, branches, or trash debris.	
❑	❑	Sediment build-up within the forebay is less than 25% of design volume or channel capacity.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	

Other Comments:

LEVEL LIP SPREADER FROM OCS 2 CHECKLIST:

Yes	No		Comments:
		Inlet	
❑	❑	Inlets is clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap aprons.	
❑	❑	Rip rap aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Forebay is free of debris such as leaf litter, branches, or trash debris.	
❑	❑	Sediment build-up within the forebay is less than 25% of design volume or channel capacity.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	

❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	

Other Comments:

LEVEL LIP SPREADER FROM OCS 3 CHECKLIST:

Yes	**No**		**Comments:**
		Inlet	
❑	❑	Inlets is clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap aprons.	
❑	❑	Rip rap aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Forebay is free of debris such as leaf litter, branches, or trash debris.	
❑	❑	Sediment build-up within the forebay is less than 25% of design volume or channel capacity.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 1 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter is free of invasive/unwanted plants.	
❑	❑	Soil Filter surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 5	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 2 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 6	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 3 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 7	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 4 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 8	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 5 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 9	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 6 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 10	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 7 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 10	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 8 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 11	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1" or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

GRASSED UNDERDRAINED SOIL FILTER 9 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap outlet aprons.	
❑	❑	Rip rap outlet aprons are clear of woody and/or vegetative growth.	
		Sediment Forebay	
❑	❑	Forebay is free of vegetative or woody growth.	
❑	❑	Rip rap slopes appear to stable with no signs of erosion.	
❑	❑	Sediment forebay is not being used for snow storage.	
		Embankments/Soil Filter Surface	
❑	❑	Embankments appear to be stable with no signs of erosion.	
❑	❑	Embankments are free of woody growth on side slopes.	
❑	❑	Grass cover is greater than 90%.	
❑	❑	Soil Filter Surface is free of invasive/unwanted plants.	
❑	❑	Soil Filter Surface is clear of trash debris.	
❑	❑	Soil Filter is not being used for snow storage.	
		Outlet Control Structure 12	
❑	❑	Sump is clear of sediment accumulation.	
❑	❑	Inlet and outlets within structure are clear of debris/obstructions.	
❑	❑	Trash rack is clear of debris/obstructions.	
❑	❑	Outlet control valve set to allow filter to completely drain in 24 to 48 hours after 1” or greater storm.	

Other Comments:

INSPECTION & MAINTENANCE FORM

FOCAL POINT 1 CHECKLIST:

Yes	No		Comments:
		Focal Point	
❑	❑	Debris blocking orifice.	
❑	❑	Check overflow structure and clear debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter	
❑	❑	If applicable, flush underdrain pipe	

Other Comments:

FOCAL POINT 2 CHECKLIST:

Yes	No		Comments:
		Focal Point	
❑	❑	Debris blocking orifice.	
❑	❑	Check overflow structure and clear debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter	
❑	❑	If applicable, flush underdrain pipe	

Other Comments:

FOCAL POINT 3 CHECKLIST:

Yes	No		Comments:
		Focal Point	
❑	❑	Debris blocking orifice.	
❑	❑	Check overflow structure and clear debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter	
❑	❑	If applicable, flush underdrain pipe	

Other Comments:

INSPECTION & MAINTENANCE FORM

FOCAL POINT 4 CHECKLIST:

Yes	No		Comments:
		Focal Point	
❑	❑	Debris blocking orifice.	
❑	❑	Check overflow structure and clear debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter	
❑	❑	If applicable, flush underdrain pipe	

Other Comments:

SUBSURFACE CHAMBER 1 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	Inspection Port clear of debris	
❑	❑	Surface clear of trash and debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter.	
❑	❑	Check overflow structure and clear debris.	

Other Comments:

INSPECTION & MAINTENANCE FORM

SUBSURFACE CHAMBER 2 CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	Inspection Port clear of debris	
❑	❑	Surface clear of trash and debris.	
❑	❑	Clogging, or signs water is not draining freely through media filter.	
❑	❑	Check overflow structure and clear debris.	

Other Comments:

DRIPLINE FILTERS CHECKLIST:

Yes	No		Comments:
		Inlets and Outlets	
❑	❑	Inlets and Outlets are clear of debris/obstructions.	
❑	❑	No signs of erosion in rip rap inlet.	
❑	❑	Surface clear of trash and debris.	
❑	❑	Dripline is clear of invasive/unwanted plants.	
❑	❑	Dripline is not being used for snow storage.	

Other Comments:

ATTACHMENT E

TEMPORARY SEDIMENT BASIN CALCULATIONS

Sedimentation Basin 1 Calculations

Task: Determine Max. allowable discharge from Sedimentation Basin

Reference:
1. Maine Erosion and Sediment Control BMPs - 2016
2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer
3. Urban Hydrology for Small Watersheds (TR-55)

Assumptions:
1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches
2. Delay time within the Basin of 24 hours.
3. Assumed Time of Concentration (Tc) of 10 minutes

Calculations: Following the procedure in Ref 1 on Page 31

Area tributary to Basin (DA)		234733.84	Square Feet
		5.39	Acres
CN		94	
Tc		10	Minutes
P=10 - Year Rainfall		4.9	Inches
1. From TR-55	S= 1000/CN - 10	0.64	
	Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
2. Flow (Qi) =	From Attached HydroCAD Calcs	30.23	CFS
3	Qi / DA	5.61	CFS/Acre
4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.60	CFS
HydroCAD Discharge		0.55	CFS
Orifice Size	3 Discharge Multiplier, 1 Row	2	Inches

Sedimentation Basin 2 Calculations

Task: Determine Max. allowable discharge from Sedimentation Basin

Reference:
1. Maine Erosion and Sediment Control BMPs - 2016
2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer
3. Urban Hydrology for Small Watersheds (TR-55)

Assumptions:
1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches
2. Delay time within the Basin of 24 hours.
3. Assumed Time of Concentration (Tc) of 10 minutes

Calculations: Following the procedure in Ref 1 on Page 31

Area trbutary to Basin (DA)		132668.51	Square Feet
		3.05	Acres
CN		94	
Tc		10	Minutes
P=10 - Year Rainfall		4.9	Inches
1. From TR-55	S= 1000/CN - 10	0.64	
	Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
2. Flow (Qi) =	From Attached HydroCAD Calcs	17.08	CFS
3	Qi / DA	5.61	CFS/Acre
4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.34	CFS

HydroCAD Discharge		0.33	CFS
Orifice Size	4 Discharge Multiplier, 1 Row	1.3	Inches

Sedimentation Basin 3 Calculations

Task: Determine Max. allowable discharge from Sedimentation Basin

Reference:
1. Maine Erosion and Sediment Control BMPs - 2016
2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer
3. Urban Hydrology for Small Watersheds (TR-55)

Assumptions:
1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches
2. Delay time within the Basin of 24 hours.
3. Assumed Time of Concentration (Tc) of 10 minutes

Calculations: Following the procedure in Ref 1 on Page 31

Area trbutary to Basin (DA)		101577.11	Square Feet
		2.33	Acres
CN		94	
Tc		10	Minutes
P=10 - Year Rainfall		4.9	Inches
1. From TR-55	S= 1000/CN - 10	0.64	
	Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
2. Flow (Qi) =	From Attached HydroCAD Calcs	13.08	CFS
3	Qi / DA	5.61	CFS/Acre
4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.26	CFS
HydroCAD Discharge		0.25	CFS
Orifice Size	2 Discharge Multiplier, 1 Row	1.7	Inches

Sedimentation Basin 4 Calculations

Task:	Determine Max. allowable discharge from Sedimentation Basin			
Reference:	1. Maine Erosion and Sediment Control BMPs - 2016 2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer 3. Urban Hydrology for Small Watersheds (TR-55)			
Assumptions:	1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches 2. Delay time within the Basin of 24 hours. 3. Assumed Time of Concentration (Tc) of 10 minutes			
Calculations:	Following the procedure in Ref 1 on Page 31			
	Area trbutary to Basin (DA)		71886.33	Square Feet
			1.65	Acres
	CN		94	
	Tc		10	Minutes
	P=10 - Year Rainfall		4.9	Inches
	1. From TR-55	S= 1000/CN - 10	0.64	
		Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
	2. Flow (Qi) =	From Attached HydroCAD Calcs	9.26	CFS
	3	Qi / DA	5.61	CFS/Acre
	4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
	5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.19	CFS
	HydroCAD Discharge		0.18	CFS
	Orifice Size	3 Discharge Multiplier, 1 Row	1.2	Inches

Sedimentation Basin 5 Calculations

Task: Determine Max. allowable discharge from Sedimentation Basin

Reference:
1. Maine Erosion and Sediment Control BMPs - 2016
2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer
3. Urban Hydrology for Small Watersheds (TR-55)

Assumptions:
1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches
2. Delay time within the Basin of 24 hours.
3. Assumed Time of Concentration (Tc) of 10 minutes

Calculations: Following the procedure in Ref 1 on Page 31

Area trbutary to Basin (DA)		69917.44	Square Feet
		1.61	Acres
CN		94	
Tc		10	Minutes
P=10 - Year Rainfall		4.9	Inches
1. From TR-55	S= 1000/CN - 10	0.64	
	Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
2. Flow (Qi) =	From Attached HydroCAD Calcs	9	CFS
3	Qi / DA	5.61	CFS/Acre
4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.18	CFS
HydroCAD Discharge		0.16	CFS
Orifice Size	2 Discharge Multiplier, 1 Row	1.4	Inches

Sedimentation Basin 6 Calculations

Task:	Determine Max. allowable discharge from Sedimentation Basin			
Reference:	1. Maine Erosion and Sediment Control BMPs - 2016 2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer 3. Urban Hydrology for Small Watersheds (TR-55)			
Assumptions:	1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches 2. Delay time within the Basin of 24 hours. 3. Assumed Time of Concentration (Tc) of 10 minutes			
Calculations:	Following the procedure in Ref 1 on Page 31			
	Area trbutary to Basin (DA)		156294.22	Square Feet
			3.59	Acres
	CN		94	
	Tc		10	Minutes
	P=10 - Year Rainfall		4.9	Inches
	1. From TR-55	S= 1000/CN - 10	0.64	
		Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
	2. Flow (Qi) =	From Attached HydroCAD Calcs	20.13	CFS
	3	Qi / DA	5.61	CFS/Acre
	4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
	5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.40	CFS
	HydroCAD Discharge		0.37	CFS
	Orifice Size	2 Columns, 2 Rows, 2" Spacing	1.4	Inches

Sedimentation Basin 7 Calculations

Task: Determine Max. allowable discharge from Sedimentation Basin

Reference:
1. Maine Erosion and Sediment Control BMPs - 2016
2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer
3. Urban Hydrology for Small Watersheds (TR-55)

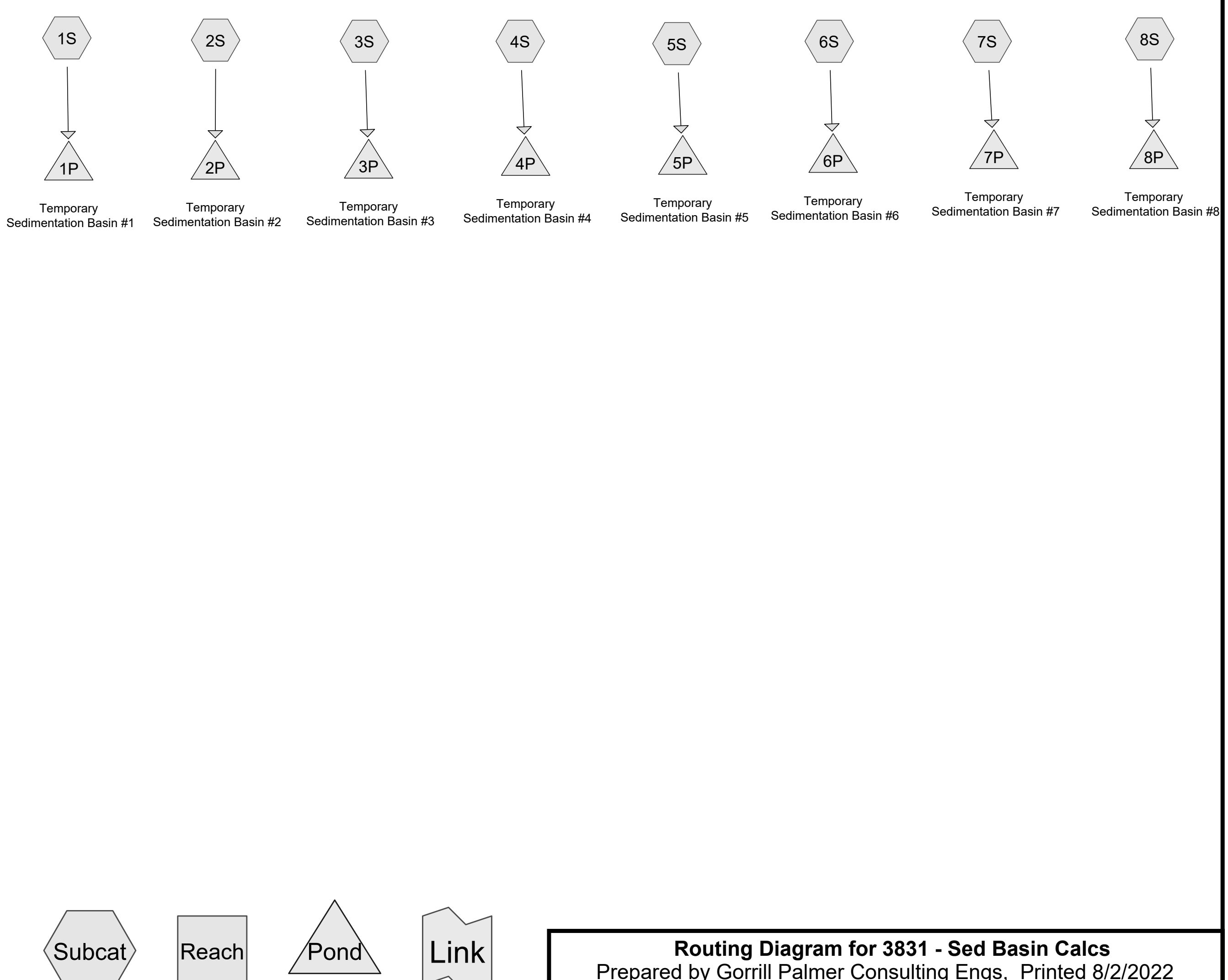
Assumptions:
1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches
2. Delay time within the Basin of 24 hours.
3. Assumed Time of Concentration (Tc) of 10 minutes

Calculations: Following the procedure in Ref 1 on Page 31

Area trbutary to Basin (DA)		125952.63	Square Feet
		2.89	Acres
CN		94	
Tc		10	Minutes
P=10 - Year Rainfall		4.9	Inches
1. From TR-55	S= 1000/CN - 10	0.64	
	Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
2. Flow (Qi) =	From Attached HydroCAD Calcs	16.22	CFS
3	Qi / DA	5.61	CFS/Acre
4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.32	CFS
HydroCAD Discharge		0.31	CFS
Orifice Size	3 Columns, 2 Rows	1.1	Inches

Sedimentation Basin 8 Calculations

Task:	Determine Max. allowable discharge from Sedimentation Basin			
Reference:	1. Maine Erosion and Sediment Control BMPs - 2016			
	2. Erosion and Sedimentation Control Plan for Scarborough Downs as prepared by Gorrill Palmer			
	3. Urban Hydrology for Small Watersheds (TR-55)			
Assumptions:	1. Sedimentation Basin is to be designed for a 10- Year Storm Event - 4.9 inches			
	2. Delay time within the Basin of 24 hours.			
	3. Assumed Time of Concentration (Tc) of 10 minutes			
Calculations:	Following the procedure in Ref 1 on Page 31			
	Area trbutary to Basin (DA)		130887.59	Square Feet
			3.00	Acres
	CN		94	
	Tc		10	Minutes
	P=10 - Year Rainfall		4.9	Inches
	1. From TR-55	S= 1000/CN - 10	0.64	
		Vr = (P - 0.2S)^2 / (P+0.8S)	4.21	Inches
	2. Flow (Qi) =	From Attached HydroCAD Calcs	16.92	CFS
	3	Qi / DA	5.63	CFS/Acre
	4. From Graph C.1. From Ref 1	Qo / Qi	0.02	
	5. Maximum Discharge	Qmax = Qo/Qi x Qi	0.34	CFS
	HydroCAD Discharge		0.34	CFS
	Orifice Size	4 Discharge Multiplier, 1 Row	1.5	Inches



Routing Diagram for 3831 - Sed Basin Calcs
Prepared by Gorrill Palmer Consulting Engs, Printed 8/2/2022
HydroCAD® 10.20-2d s/n 01265 © 2021 HydroCAD Software Solutions LLC

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment 1S: Runoff Area=234,734 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=30.23 cfs 82,340 cf

Subcatchment 2S: Runoff Area=132,669 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=17.08 cfs 46,537 cf

Subcatchment 3S: Runoff Area=101,577 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=13.08 cfs 35,631 cf

Subcatchment 4S: Runoff Area=71,886 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=9.26 cfs 25,216 cf

Subcatchment 5S: Runoff Area=69,917 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=9.00 cfs 24,525 cf

Subcatchment 6S: Runoff Area=156,294 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=20.13 cfs 54,825 cf

Subcatchment 7S: Runoff Area=125,953 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=16.22 cfs 44,182 cf

Subcatchment 8S: Runoff Area=131,389 sf 0.00% Impervious Runoff Depth=4.21"
Tc=0.0 min CN=94 Runoff=16.92 cfs 46,088 cf

Pond 1P: Temporary Sedimentation Peak Elev=100.62' Storage=63,713 cf Inflow=30.23 cfs 82,340 cf
Outflow=0.55 cfs 66,337 cf

Pond 2P: Temporary Sedimentation Peak Elev=101.87' Storage=35,346 cf Inflow=17.08 cfs 46,537 cf
Outflow=0.33 cfs 39,647 cf

Pond 3P: Temporary Sedimentation Peak Elev=105.97' Storage=27,235 cf Inflow=13.08 cfs 35,631 cf
Outflow=0.25 cfs 29,318 cf

Pond 4P: Temporary Sedimentation Basin Peak Elev=100.79' Storage=19,233 cf Inflow=9.26 cfs 25,216 cf
Outflow=0.18 cfs 20,683 cf

Pond 5P: Temporary Sedimentation Basin Peak Elev=101.77' Storage=19,015 cf Inflow=9.00 cfs 24,525 cf
Outflow=0.16 cfs 19,593 cf

Pond 6P: Temporary Sedimentation Basin Peak Elev=97.79' Storage=42,170 cf Inflow=20.13 cfs 54,825 cf
Outflow=0.37 cfs 45,154 cf

Pond 7P: Temporary Sedimentation Peak Elev=100.65' Storage=33,989 cf Inflow=16.22 cfs 44,182 cf
Outflow=0.31 cfs 35,435 cf

Pond 8P: Temporary Sedimentation Basin Peak Elev=98.98' Storage=35,396 cf Inflow=16.92 cfs 46,088 cf
Outflow=0.34 cfs 35,048 cf

Total Runoff Area = 1,024,419 sf Runoff Volume = 359,344 cf Average Runoff Depth = 4.21"
100.00% Pervious = 1,024,419 sf 0.00% Impervious = 0 sf

Summary for Subcatchment 1S:

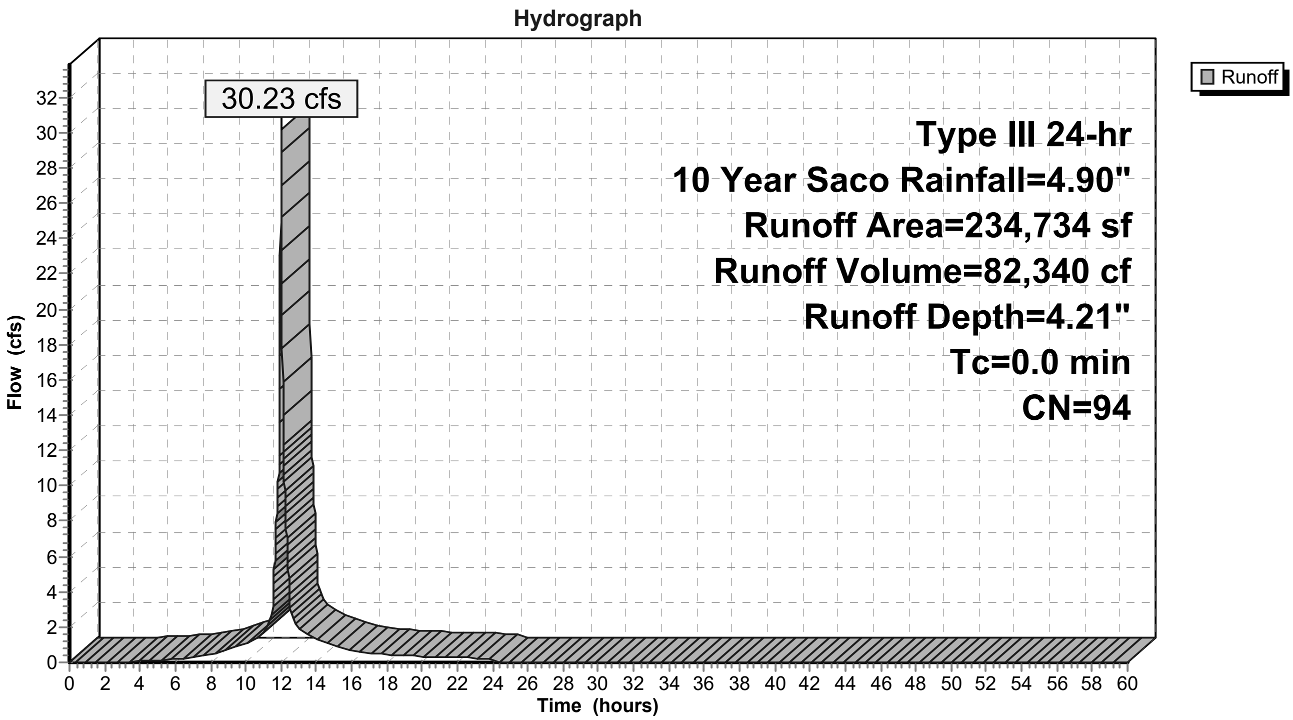
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 30.23 cfs @ 12.00 hrs, Volume= 82,340 cf, Depth= 4.21"
Routed to Pond 1P : Temporary Sedimentation Basin #1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
234,734	94	Newly graded area, HSG D
234,734		100.00% Pervious Area

Subcatchment 1S:



Summary for Subcatchment 2S:

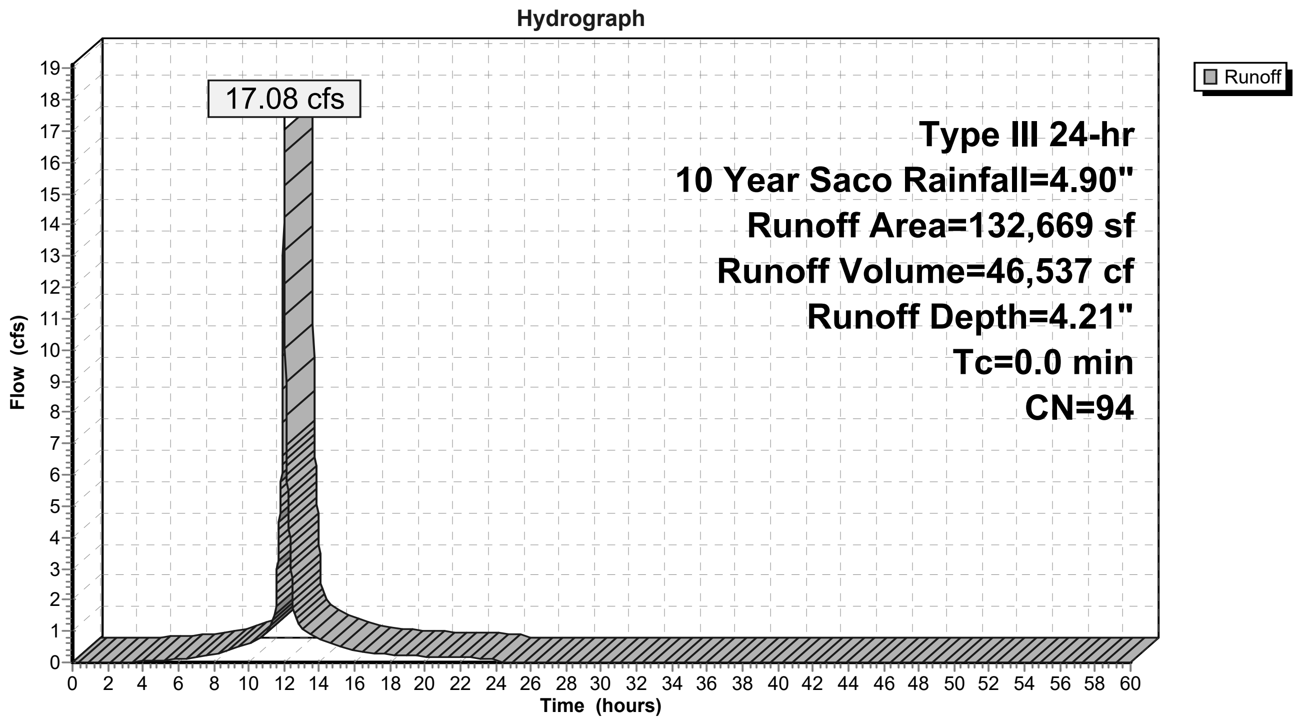
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 17.08 cfs @ 12.00 hrs, Volume= 46,537 cf, Depth= 4.21"
Routed to Pond 2P : Temporary Sedimentation Basin #2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
132,669	94	Newly graded area, HSG D
132,669		100.00% Pervious Area

Subcatchment 2S:



Summary for Subcatchment 3S:

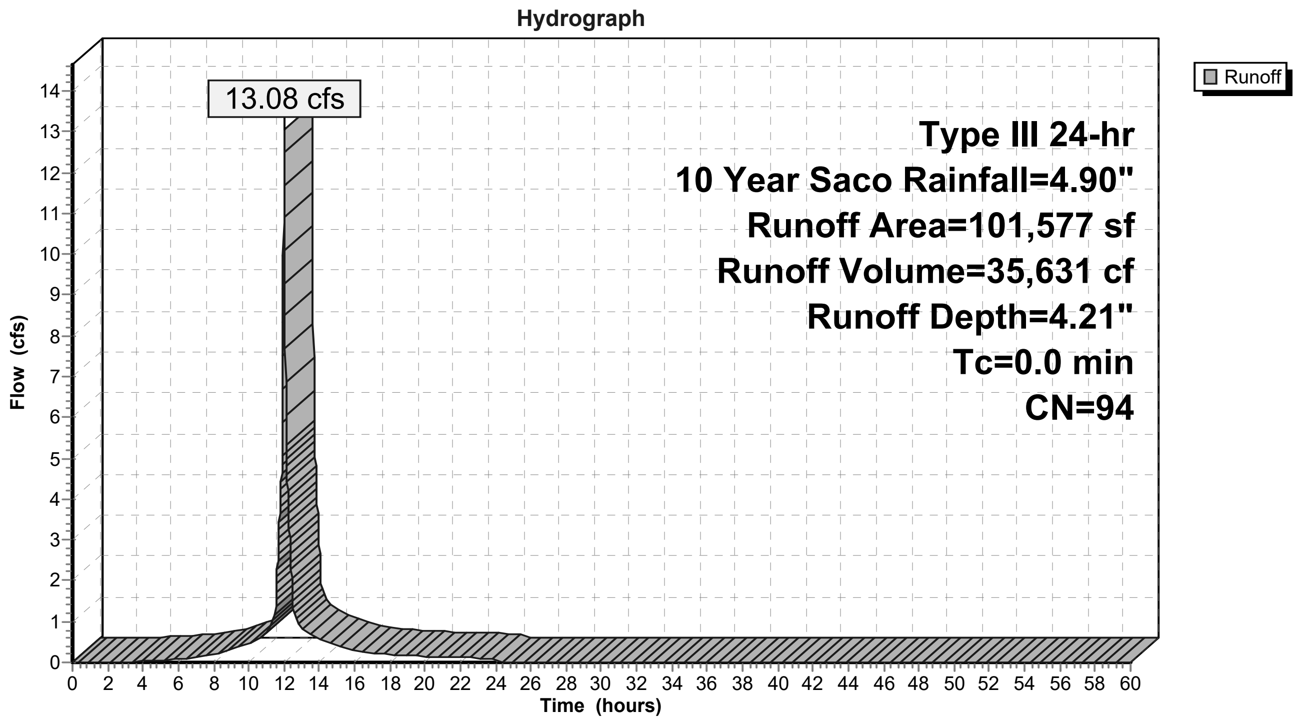
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 13.08 cfs @ 12.00 hrs, Volume= 35,631 cf, Depth= 4.21"
Routed to Pond 3P : Temporary Sedimentation Basin #3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
101,577	94	Newly graded area, HSG D
101,577		100.00% Pervious Area

Subcatchment 3S:



Summary for Subcatchment 4S:

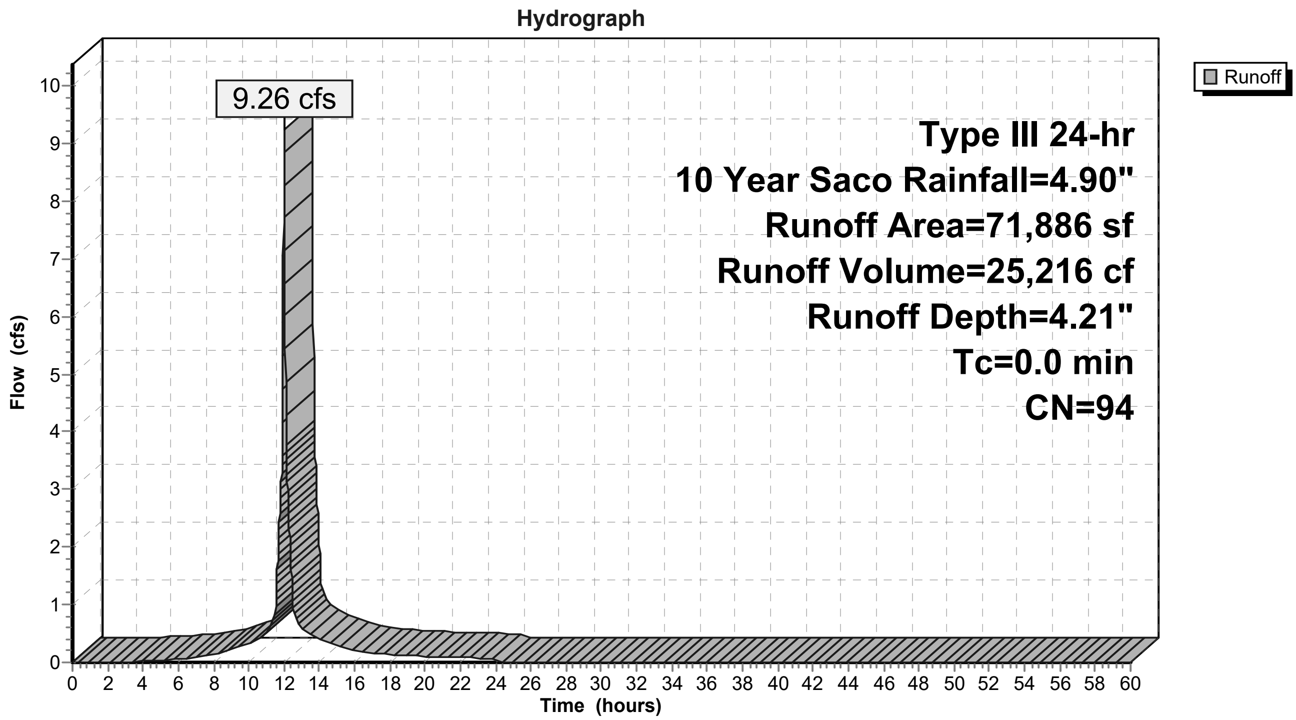
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 9.26 cfs @ 12.00 hrs, Volume= 25,216 cf, Depth= 4.21"
Routed to Pond 4P : Temporary Sedimentation Basin #4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
71,886	94	Newly graded area, HSG D
71,886		100.00% Pervious Area

Subcatchment 4S:



Summary for Subcatchment 5S:

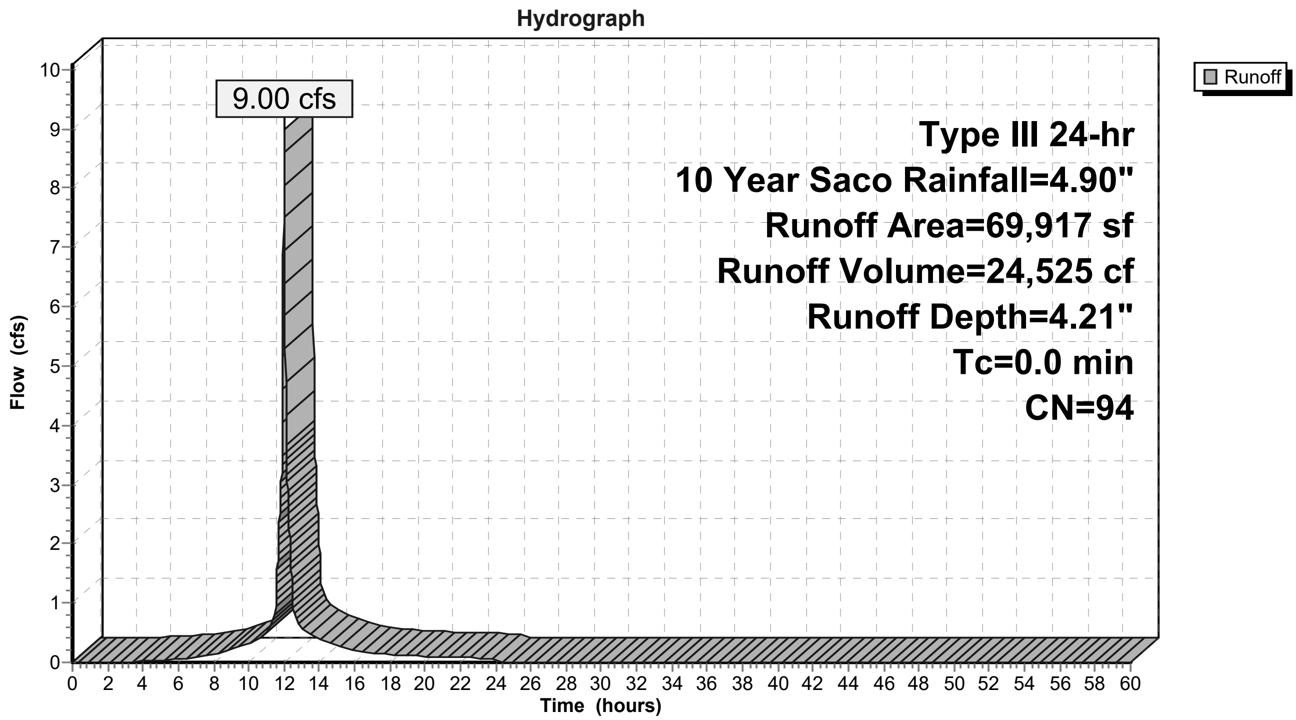
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 9.00 cfs @ 12.00 hrs, Volume= 24,525 cf, Depth= 4.21"
Routed to Pond 5P : Temporary Sedimentation Basin #5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
69,917	94	Newly graded area, HSG D
69,917		100.00% Pervious Area

Subcatchment 5S:



Summary for Subcatchment 6S:

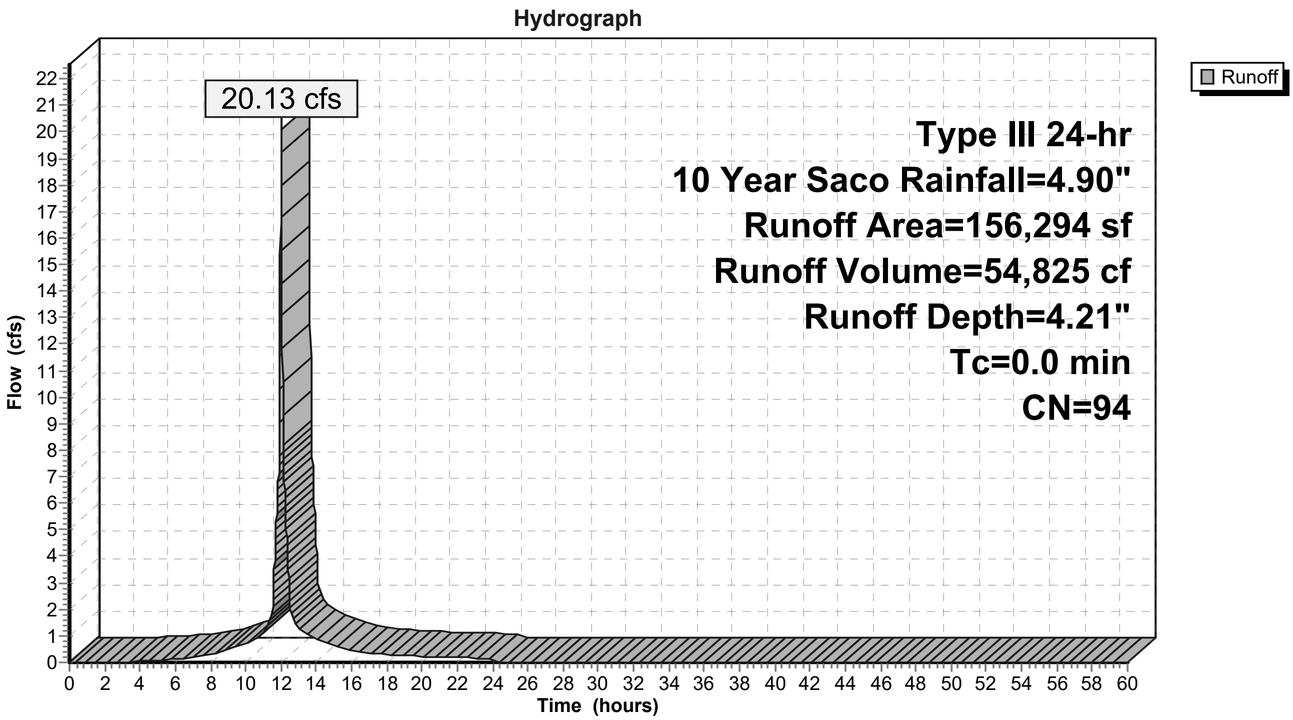
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 20.13 cfs @ 12.00 hrs, Volume= 54,825 cf, Depth= 4.21"
Routed to Pond 6P : Temporary Sedimentation Basin #6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
156,294	94	Newly graded area, HSG D
156,294		100.00% Pervious Area

Subcatchment 6S:



Summary for Subcatchment 7S:

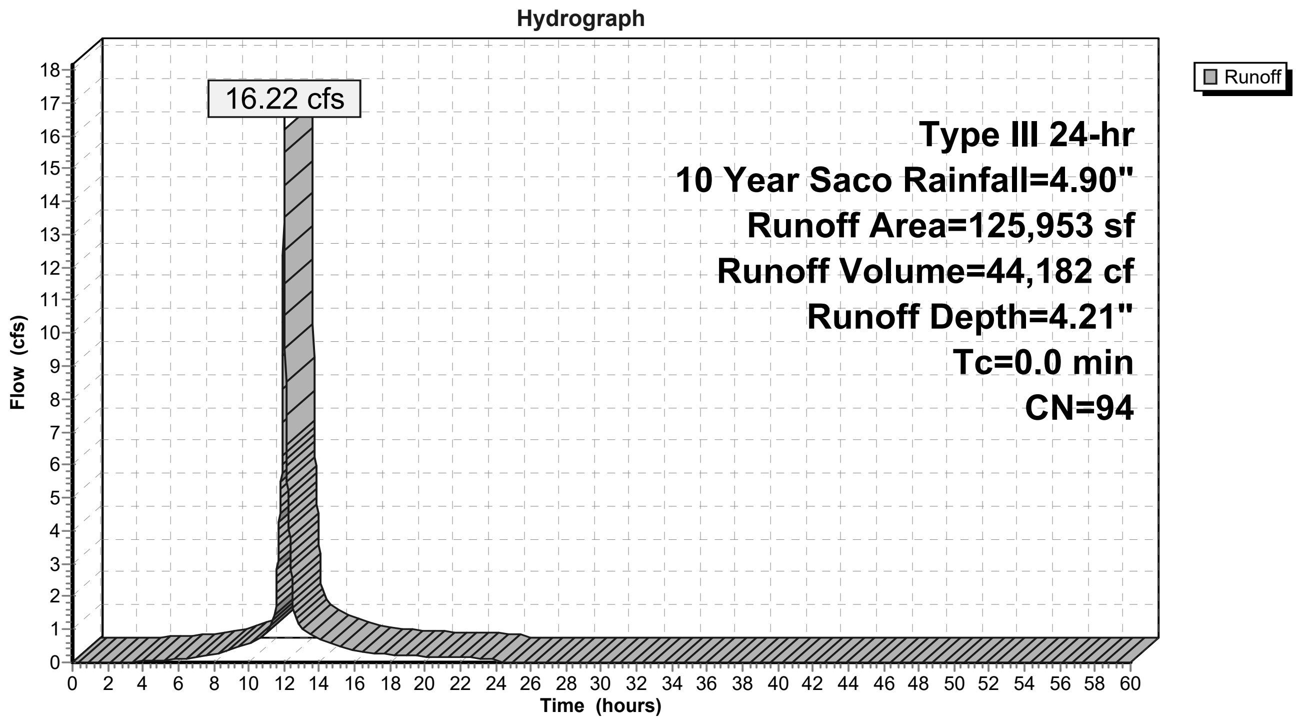
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 16.22 cfs @ 12.00 hrs, Volume= 44,182 cf, Depth= 4.21"
Routed to Pond 7P : Temporary Sedimentation Basin #7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
125,953	94	Newly graded area, HSG D
125,953		100.00% Pervious Area

Subcatchment 7S:



Summary for Subcatchment 8S:

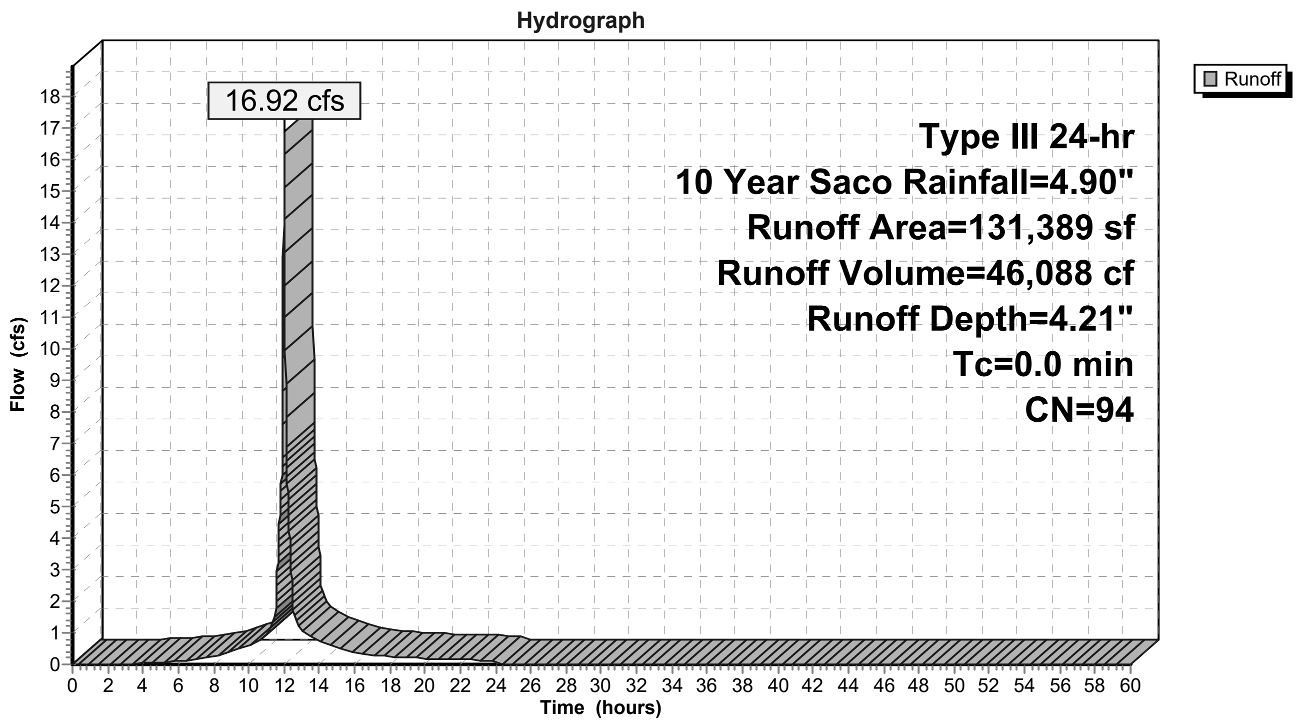
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 16.92 cfs @ 12.00 hrs, Volume= 46,088 cf, Depth= 4.21"
Routed to Pond 8P : Temporary Sedimentation Basin #8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Type III 24-hr 10 Year Saco Rainfall=4.90"

Area (sf)	CN	Description
131,389	94	Newly graded area, HSG D
131,389		100.00% Pervious Area

Subcatchment 8S:



Summary for Pond 1P: Temporary Sedimentation Basin #1

Inflow Area = 234,734 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 30.23 cfs @ 12.00 hrs, Volume= 82,340 cf
Outflow = 0.55 cfs @ 17.01 hrs, Volume= 66,337 cf, Atten= 98%, Lag= 300.5 min
Primary = 0.55 cfs @ 17.01 hrs, Volume= 66,337 cf
Routed to nonexistent node 4R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 100.62' @ 17.01 hrs Surf.Area= 18,998 sf Storage= 63,713 cf

Plug-Flow detention time= 1,165.4 min calculated for 66,337 cf (81% of inflow)
Center-of-Mass det. time= 1,091.2 min (1,859.7 - 768.5)

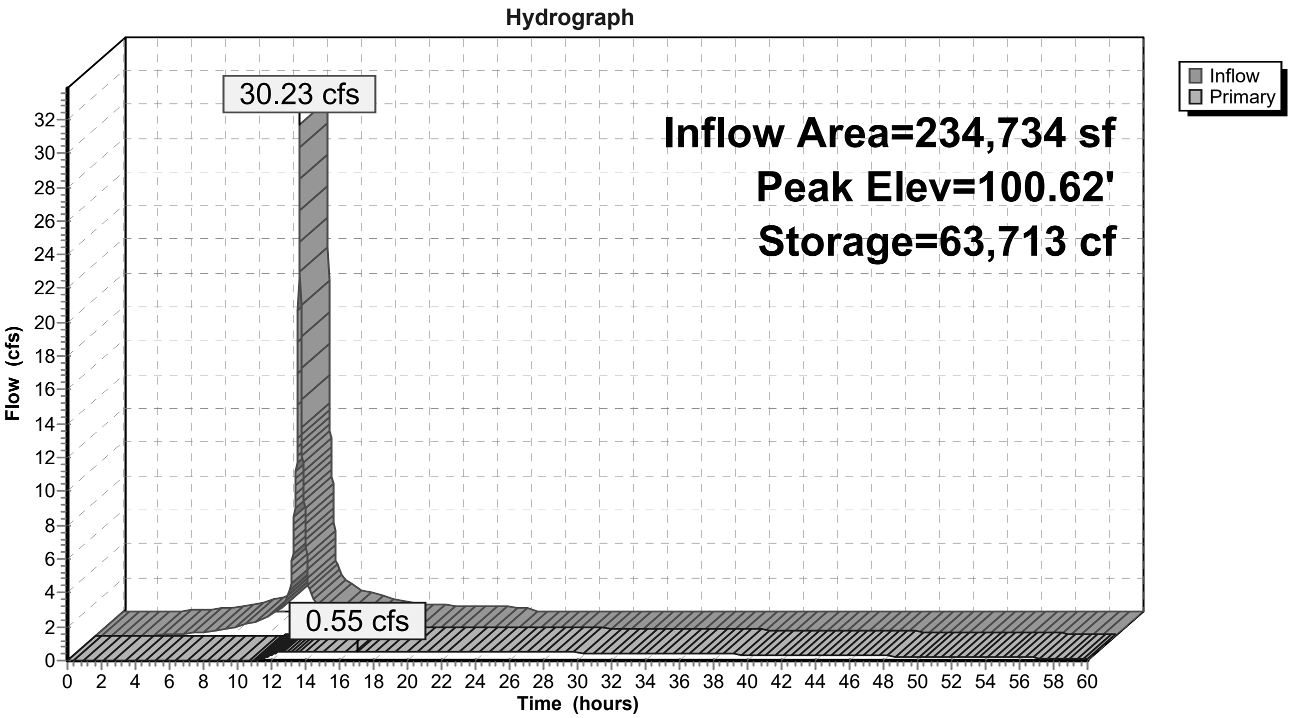
Volume	Invert	Avail.Storage	Storage Description
#1	93.33'	91,761 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.33	12,072	0.0	0	0
96.17	12,072	0.0	0	0
96.49	12,072	0.0	0	0
96.50	12,072	100.0	121	121
97.00	12,858	100.0	6,233	6,353
98.00	14,474	100.0	13,666	20,019
99.00	16,151	100.0	15,313	35,332
100.00	17,890	100.0	17,021	52,352
101.00	19,689	100.0	18,790	71,142
102.00	21,549	100.0	20,619	91,761

Device	Routing	Invert	Outlet Devices
#1	Primary	97.50'	**36.0" Round Culvert** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.50' / 97.00' S= 0.0179 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 7.07 sf
#2	Device 1	97.50'	**2.0" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.55 cfs @ 17.01 hrs HW=100.62' (Free Discharge)
└─**1=Culvert** (Passes 0.55 cfs of 41.65 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.55 cfs @ 8.39 fps)

Pond 1P: Temporary Sedimentation Basin #1



Summary for Pond 2P: Temporary Sedimentation Basin #2

Inflow Area = 132,669 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 17.08 cfs @ 12.00 hrs, Volume= 46,537 cf
Outflow = 0.33 cfs @ 16.69 hrs, Volume= 39,647 cf, Atten= 98%, Lag= 281.4 min
Primary = 0.33 cfs @ 16.69 hrs, Volume= 39,647 cf
Routed to nonexistent node 1R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 101.87' @ 16.69 hrs Surf.Area= 10,101 sf Storage= 35,346 cf

Plug-Flow detention time= 1,122.3 min calculated for 39,641 cf (85% of inflow)
Center-of-Mass det. time= 1,059.2 min (1,827.7 - 768.5)

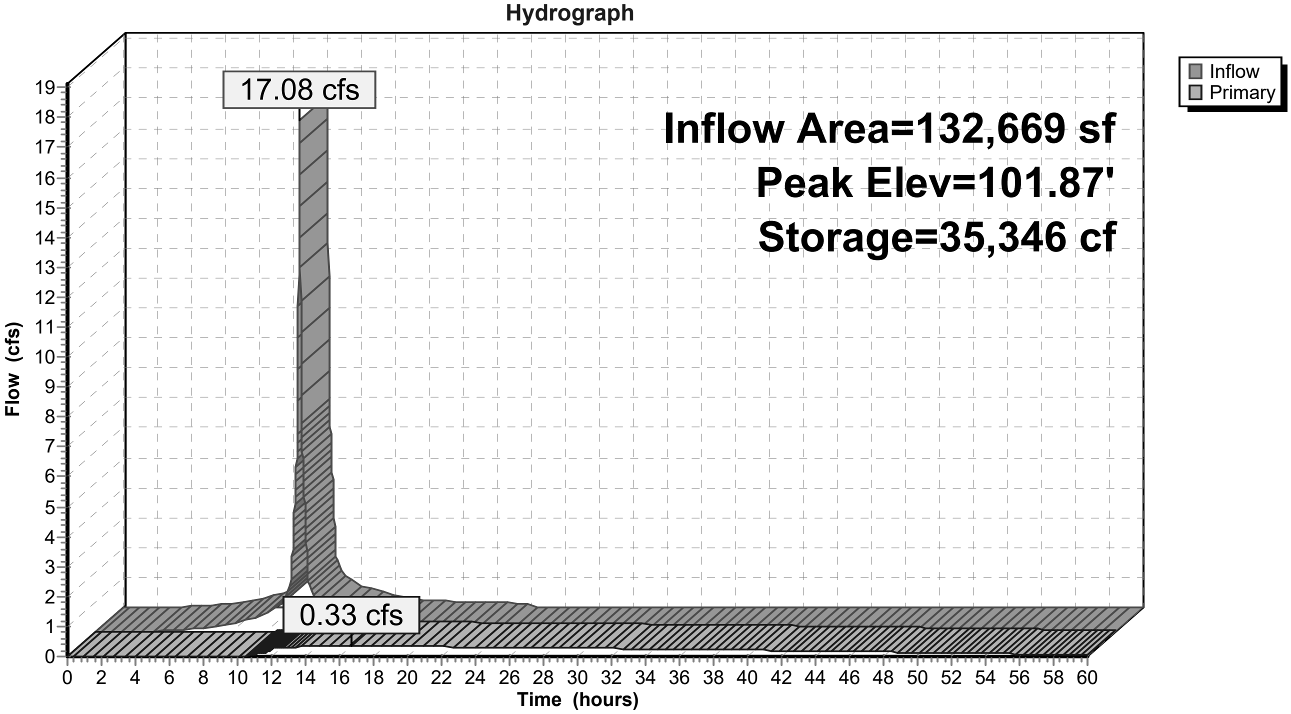
Volume	Invert	Avail.Storage	Storage Description
#1	95.09'	36,618 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
95.09	5,486	0.0	0	0
97.28	5,486	0.0	0	0
97.29	5,486	100.0	55	55
98.00	6,122	100.0	4,121	4,176
99.00	7,067	100.0	6,595	10,770
100.00	8,068	100.0	7,568	18,338
101.00	9,126	100.0	8,597	26,935
102.00	10,240	100.0	9,683	36,618

Device	Routing	Invert	Outlet Devices
#1	Primary	98.29'	**18.0" Round Culvert** L= 58.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.29' / 98.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	98.29'	**1.3" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 16.69 hrs HW=101.87' (Free Discharge)
└─**1=Culvert** (Passes 0.33 cfs of 11.31 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.33 cfs @ 9.05 fps)

Pond 2P: Temporary Sedimentation Basin #2



Summary for Pond 3P: Temporary Sedimentation Basin #3

Inflow Area = 101,577 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 13.08 cfs @ 12.00 hrs, Volume= 35,631 cf
Outflow = 0.25 cfs @ 16.70 hrs, Volume= 29,318 cf, Atten= 98%, Lag= 282.0 min
Primary = 0.25 cfs @ 16.70 hrs, Volume= 29,318 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 105.97' @ 16.70 hrs Surf.Area= 8,974 sf Storage= 27,235 cf

Plug-Flow detention time= 1,109.4 min calculated for 29,313 cf (82% of inflow)
Center-of-Mass det. time= 1,039.2 min (1,807.7 - 768.5)

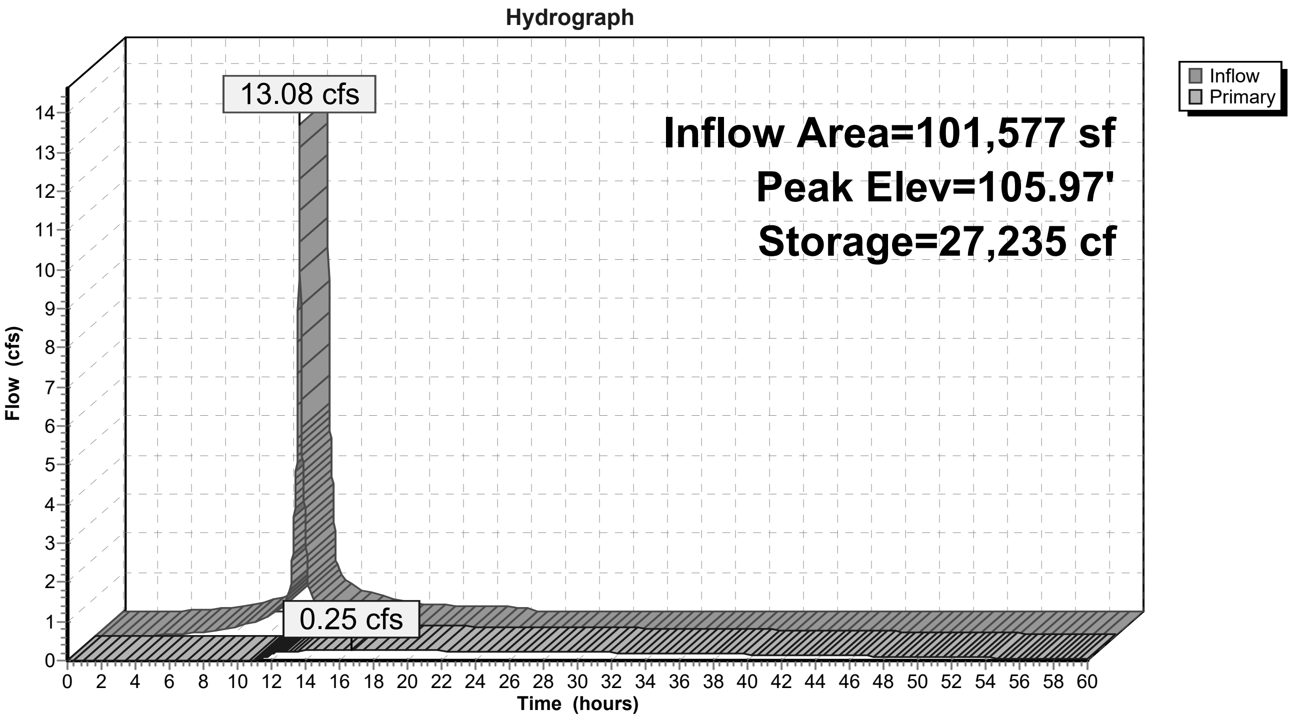
Volume	Invert	Avail.Storage	Storage Description
#1	99.87'	27,509 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
99.87	5,142	0.0	0	0
102.07	5,142	0.0	0	0
102.08	5,142	100.0	51	51
103.00	5,968	100.0	5,111	5,162
104.00	6,923	100.0	6,446	11,608
105.00	7,936	100.0	7,430	19,037
106.00	9,007	100.0	8,472	27,509

Device	Routing	Invert	Outlet Devices
#1	Primary	103.08'	**18.0" Round Culvert** L= 15.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 103.08' / 103.00' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	103.08'	**1.7" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.25 cfs @ 16.70 hrs HW=105.97' (Free Discharge)
└─**1=Culvert** (Passes 0.25 cfs of 9.83 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.25 cfs @ 8.08 fps)

Pond 3P: Temporary Sedimentation Basin #3



Summary for Pond 4P: Temporary Sedimentation Basin #4

Inflow Area = 71,886 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 9.26 cfs @ 12.00 hrs, Volume= 25,216 cf
Outflow = 0.18 cfs @ 16.62 hrs, Volume= 20,683 cf, Atten= 98%, Lag= 277.2 min
Primary = 0.18 cfs @ 16.62 hrs, Volume= 20,683 cf
Routed to nonexistent node 2R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 100.79' @ 16.62 hrs Surf.Area= 6,766 sf Storage= 19,233 cf

Plug-Flow detention time= 1,090.2 min calculated for 20,679 cf (82% of inflow)
Center-of-Mass det. time= 1,019.5 min (1,788.0 - 768.5)

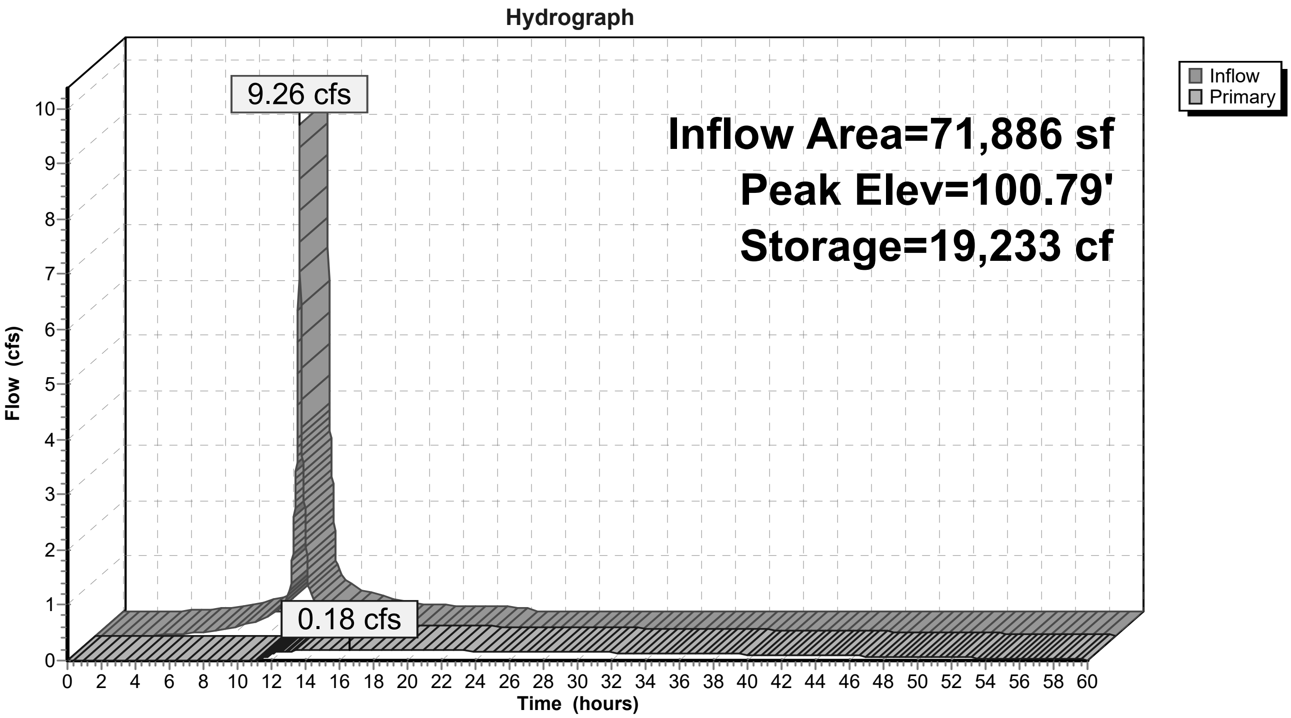
Volume	Invert	Avail.Storage	Storage Description
#1	94.92'	20,687 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
94.92	3,822	0.0	0	0
97.11	3,822	0.0	0	0
97.12	3,822	100.0	38	38
98.00	4,458	100.0	3,643	3,681
99.00	5,234	100.0	4,846	8,527
100.00	6,066	100.0	5,650	14,177
101.00	6,954	100.0	6,510	20,687

Device	Routing	Invert	Outlet Devices
#1	Primary	98.12'	**18.0" Round Culvert** L= 24.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 98.12' / 98.00' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	98.12'	**1.2" Vert. Orifice/Grate X 3.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.18 cfs @ 16.62 hrs HW=100.79' (Free Discharge)
└─**1=Culvert** (Passes 0.18 cfs of 9.30 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.18 cfs @ 7.79 fps)

Pond 4P: Temporary Sedimentation Basin #4



Summary for Pond 5P: Temporary Sedimentation Basin #5

Inflow Area = 69,917 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 9.00 cfs @ 12.00 hrs, Volume= 24,525 cf
Outflow = 0.16 cfs @ 17.03 hrs, Volume= 19,593 cf, Atten= 98%, Lag= 302.0 min
Primary = 0.16 cfs @ 17.03 hrs, Volume= 19,593 cf
Routed to nonexistent node 3R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 101.77' @ 17.03 hrs Surf.Area= 7,049 sf Storage= 19,015 cf

Plug-Flow detention time= 1,163.4 min calculated for 19,593 cf (80% of inflow)
Center-of-Mass det. time= 1,087.7 min (1,856.2 - 768.5)

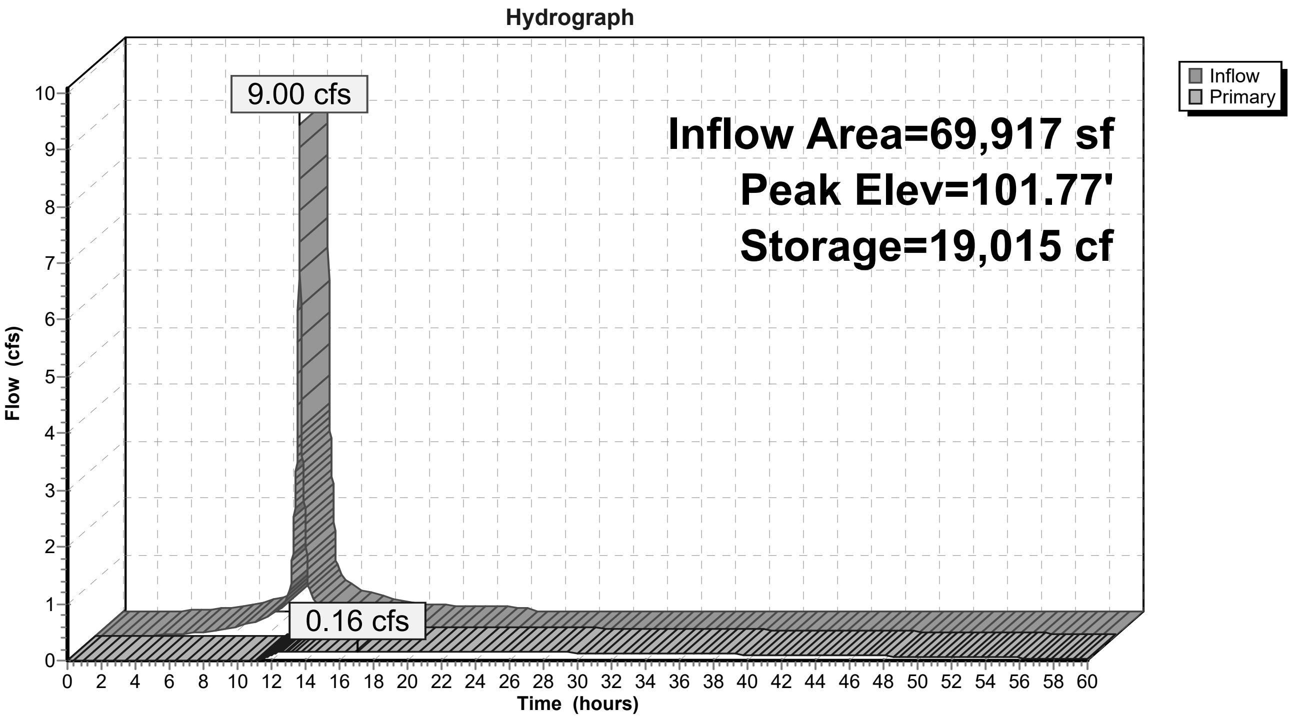
Volume	Invert	Avail.Storage	Storage Description
#1	96.02'	20,662 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
96.02	3,758	0.0	0	0
98.21	3,758	0.0	0	0
98.22	3,758	100.0	38	38
99.00	4,418	100.0	3,189	3,226
100.00	5,316	100.0	4,867	8,093
101.00	6,270	100.0	5,793	13,886
102.00	7,281	100.0	6,776	20,662

Device	Routing	Invert	Outlet Devices
#1	Primary	99.22'	**18.0" Round Culvert** L= 43.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 99.22' / 99.00' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	99.22'	**1.4" Vert. Orifice/Grate X 2.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.16 cfs @ 17.03 hrs HW=101.77' (Free Discharge)
└─**1=Culvert** (Passes 0.16 cfs of 9.01 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.16 cfs @ 7.60 fps)

Pond 5P: Temporary Sedimentation Basin #5



Summary for Pond 6P: Temporary Sedimentation Basin #6

Inflow Area = 156,294 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 20.13 cfs @ 12.00 hrs, Volume= 54,825 cf
Outflow = 0.37 cfs @ 16.92 hrs, Volume= 45,154 cf, Atten= 98%, Lag= 295.4 min
Primary = 0.37 cfs @ 16.92 hrs, Volume= 45,154 cf
Routed to nonexistent node 5R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 97.79' @ 16.92 hrs Surf.Area= 12,460 sf Storage= 42,170 cf

Plug-Flow detention time= 1,155.1 min calculated for 45,154 cf (82% of inflow)
Center-of-Mass det. time= 1,084.8 min (1,853.3 - 768.5)

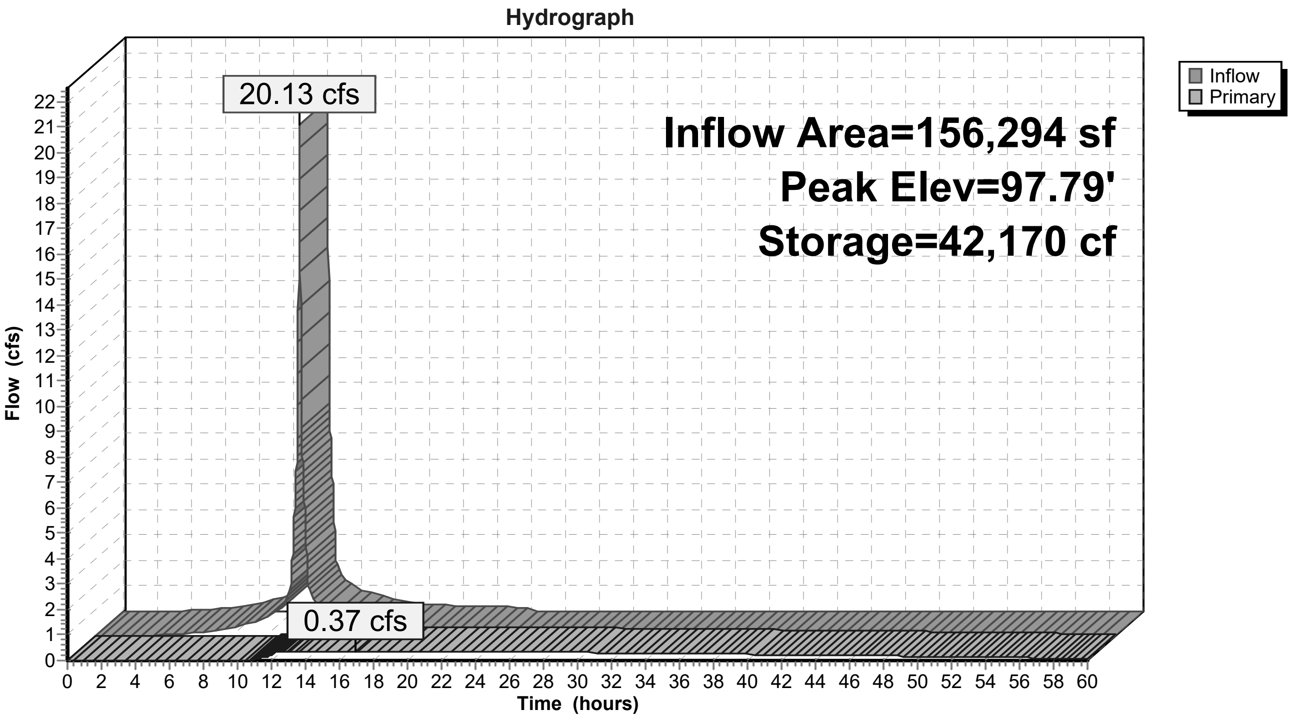
Volume	Invert	Avail.Storage	Storage Description
#1	91.17'	44,825 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
91.17	6,774	0.0	0	0
93.36	6,774	0.0	0	0
93.37	6,774	100.0	68	68
94.00	7,516	100.0	4,501	4,569
95.00	8,740	100.0	8,128	12,697
96.00	10,022	100.0	9,381	22,078
97.00	11,359	100.0	10,691	32,769
98.00	12,754	100.0	12,057	44,825

Device	Routing	Invert	Outlet Devices
#1	Primary	94.37'	**18.0" Round Culvert** L= 39.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 94.37' / 94.17' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	94.37'	**1.4" Vert. Orifice/Grate X 2.00 columns** X 2 rows with 2.0" cc spacing C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.37 cfs @ 16.92 hrs HW=97.79' (Free Discharge)
└─**1=Culvert** (Passes 0.37 cfs of 10.98 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.37 cfs @ 8.72 fps)

Pond 6P: Temporary Sedimentation Basin #6



Summary for Pond 7P: Temporary Sedimentation Basin #7

Inflow Area = 125,953 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 16.22 cfs @ 12.00 hrs, Volume= 44,182 cf
Outflow = 0.31 cfs @ 16.81 hrs, Volume= 35,435 cf, Atten= 98%, Lag= 288.7 min
Primary = 0.31 cfs @ 16.81 hrs, Volume= 35,435 cf
Routed to nonexistent node 2R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 100.65' @ 16.81 hrs Surf.Area= 11,665 sf Storage= 33,989 cf

Plug-Flow detention time= 1,116.9 min calculated for 35,435 cf (80% of inflow)
Center-of-Mass det. time= 1,041.9 min (1,810.4 - 768.5)

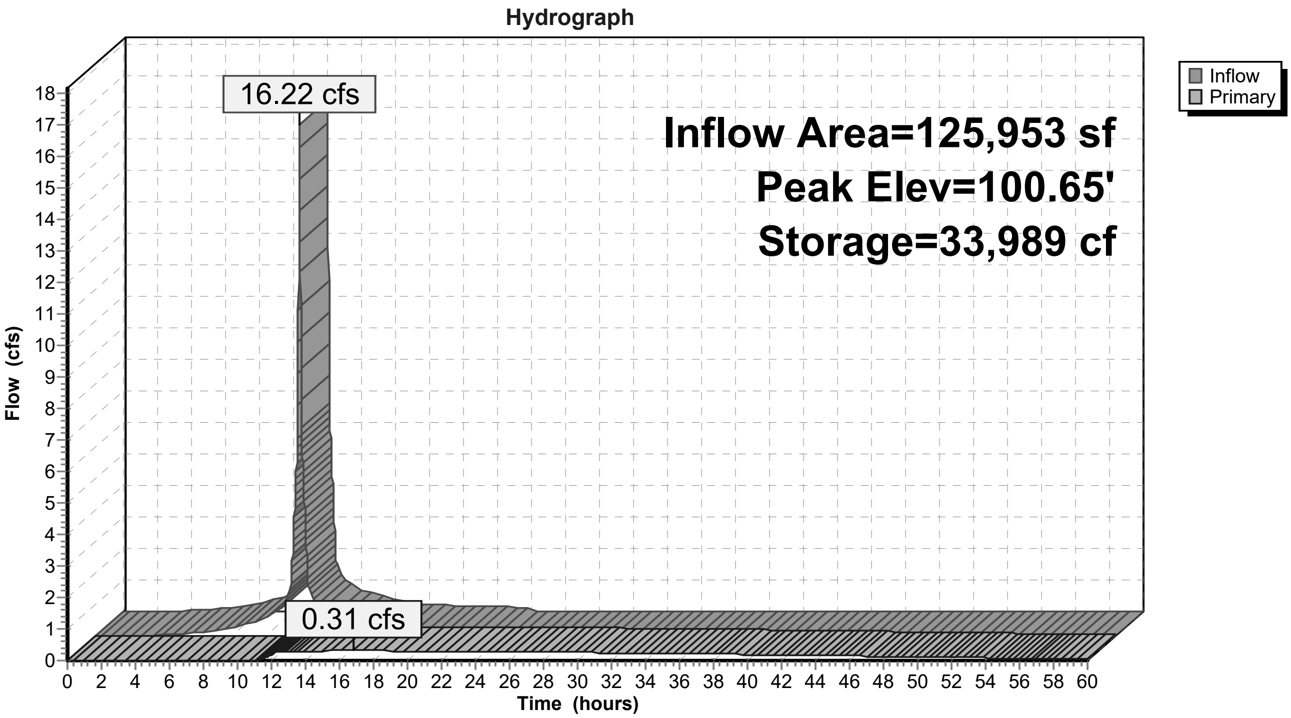
Volume	Invert	Avail.Storage	Storage Description
#1	93.74'	38,127 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.74	6,607	0.0	0	0
96.58	6,607	0.0	0	0
96.90	6,607	0.0	0	0
96.91	6,607	100.0	66	66
97.00	6,719	100.0	600	666
98.00	7,986	100.0	7,353	8,018
99.00	9,317	100.0	8,652	16,670
100.00	10,713	100.0	10,015	26,685
101.00	12,172	100.0	11,443	38,127

Device	Routing	Invert	Outlet Devices
#1	Primary	97.91'	**24.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 97.91' / 97.82' S= 0.0053 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 3.14 sf
#2	Device 1	97.91'	**1.1" Vert. Orifice/Grate X 3.00 columns** X 2 rows with 2.0" cc spacing C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.31 cfs @ 16.81 hrs HW=100.65' (Free Discharge)
└─**1=Culvert** (Passes 0.31 cfs of 17.58 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.31 cfs @ 7.78 fps)

Pond 7P: Temporary Sedimentation Basin #7



Summary for Pond 8P: Temporary Sedimentation Basin #8

Inflow Area = 131,389 sf, 0.00% Impervious, Inflow Depth = 4.21" for 10 Year Saco event
Inflow = 16.92 cfs @ 12.00 hrs, Volume= 46,088 cf
Outflow = 0.34 cfs @ 16.62 hrs, Volume= 35,048 cf, Atten= 98%, Lag= 277.5 min
Primary = 0.34 cfs @ 16.62 hrs, Volume= 35,048 cf
Routed to nonexistent node 6R

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Peak Elev= 98.98' @ 16.62 hrs Surf.Area= 13,377 sf Storage= 35,396 cf

Plug-Flow detention time= 1,043.9 min calculated for 35,048 cf (76% of inflow)
Center-of-Mass det. time= 961.0 min (1,729.5 - 768.5)

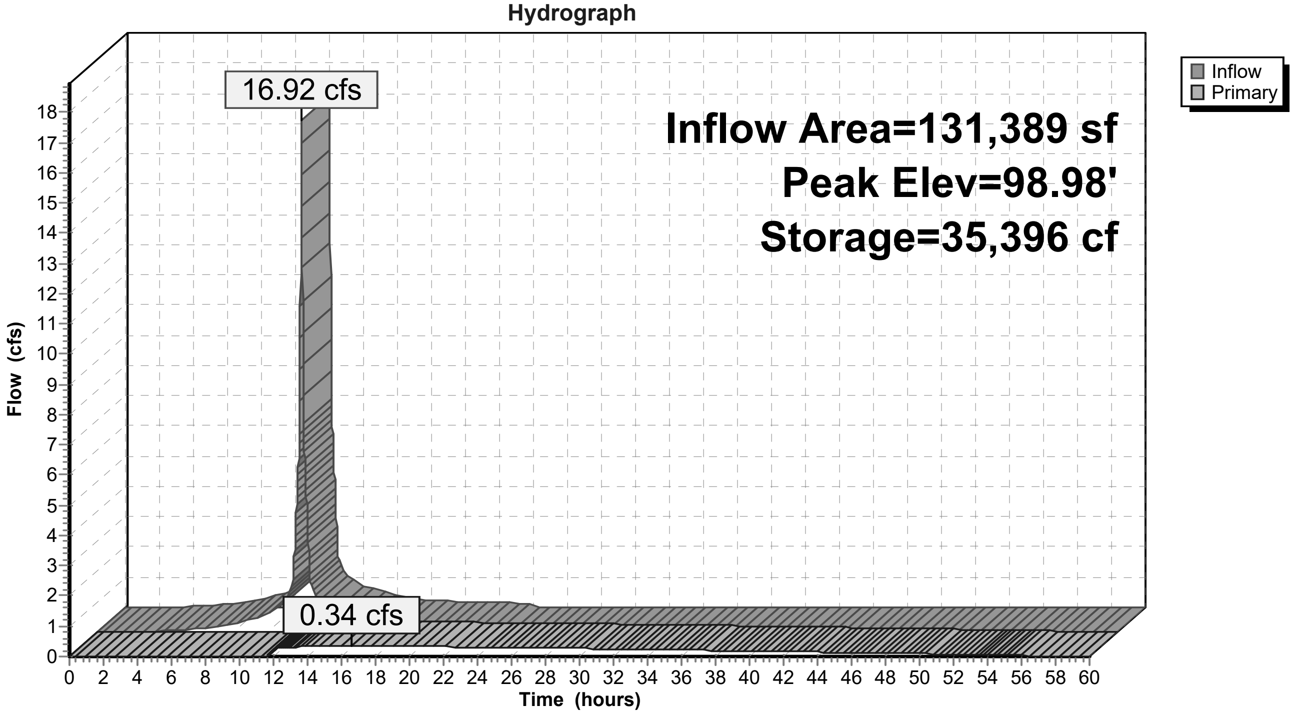
Volume	Invert	Avail.Storage	Storage Description
#1	93.71'	35,609 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
93.71	9,672	0.0	0	0
95.90	9,672	0.0	0	0
95.91	9,672	100.0	97	97
96.00	9,773	100.0	875	972
97.00	10,922	100.0	10,348	11,319
98.00	12,130	100.0	11,526	22,845
99.00	13,397	100.0	12,764	35,609

Device	Routing	Invert	Outlet Devices
#1	Primary	96.91'	**18.0" Round Culvert** L= 37.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 96.91' / 96.72' S= 0.0051 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf
#2	Device 1	96.91'	**1.5" Vert. Orifice/Grate X 4.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.34 cfs @ 16.62 hrs HW=98.98' (Free Discharge)
└─**1=Culvert** (Passes 0.34 cfs of 7.72 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 0.34 cfs @ 6.83 fps)

Pond 8P: Temporary Sedimentation Basin #8



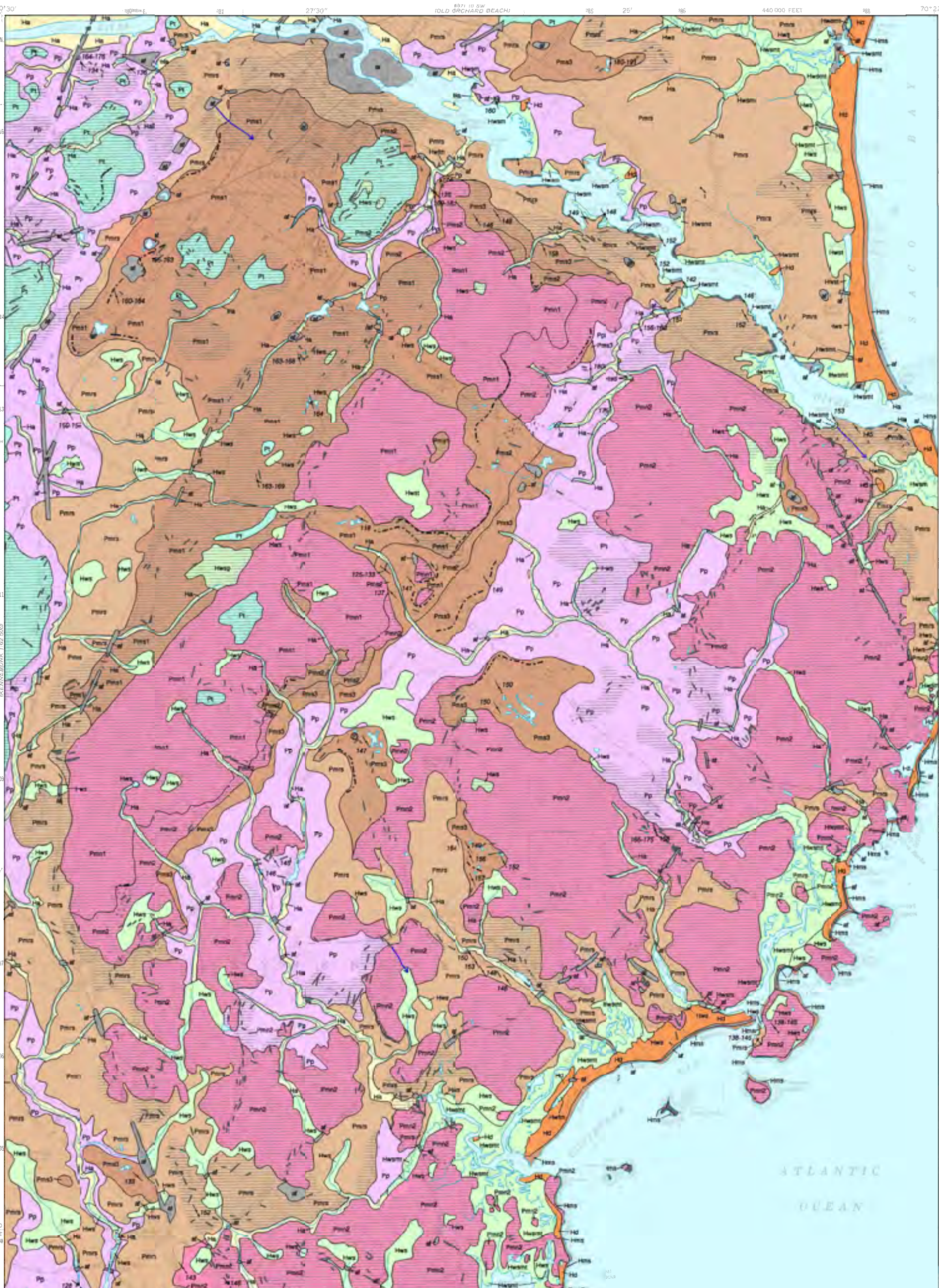
ATTACHMENT 11

SURFICIAL GEOLOGY, SIGNIFICANT SAND AND GRAVEL AQUIFERS, & FEMA MAPS

ATTACHMENT 11

SURFICIAL GEOLOGY MAPS

Surficial Geology



Biddeford Quadrangle, Maine

Surficial geologic mapping by
Carol T. Hildreth

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U.S. Geological Survey Cooperative Geological Mapping (COGEOMAP) Program, Cooperative Agreement No. 14-08-0001-A0381.

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Open-File No. 07-81
2007

For additional information, see Open-File Report 99-109.
This map supersedes Open-File Map 99-78.

SURFICIAL GEOLOGY OF MAINE

Continental glaciers like the ice sheet now covering Antarctica probably extended across Maine several times during the Pleistocene Epoch, between about 1.5 million and 10,000 years ago. The slow-moving ice superficially changed the landscape as it scraped over mountains and valleys (**Figure 1**), eroding and transporting boulders and other rock debris for miles (**Figure 2**). The sediments that cover much of Maine are largely the product of glaciation. Glacial ice deposited some of these materials, while others washed into the sea or accumulated in meltwater streams and lakes as the ice receded. Earlier stream patterns were disrupted, creating hundreds of ponds and lakes across the state. The map at left shows the pattern of glacial sediments in the Biddeford quadrangle.

The most recent "Ice Age" in Maine began about 25,000 years ago, when an ice sheet spread southward over New England (Stone and Borns, 1986). During its peak, the ice was several thousand feet thick and covered the highest mountains in the state. The weight of this huge glacier actually caused the land surface to sink hundreds of feet. Rock debris frozen into the base of the glacier abraded the bedrock surface over which the ice flowed. The grooves and fine scratches (striations) resulting from this scraping process are often seen on freshly exposed bedrock, and they are important indicators of the direction of ice movement (**Figure 3**). Erosion and sediment deposition by the ice sheet combined to give a streamlined shape to many hills, with their long dimension parallel to the direction of ice flow. Some of these hills (drumlins) are composed of dense glacial sediment (till) plastered under great pressure beneath the ice.

A warming climate forced the ice sheet to start receding as early as 21,000 years ago, soon after it reached its southernmost position on Long Island (Sirkin, 1986). The edge of the glacier withdrew from the continental shelf east of Long Island and reached the present position of the Maine coast by 13,800 years ago (Dorion, 1993). Even though the weight of the ice was removed from the land surface, the Earth's crust did not immediately spring back to its normal level. As a result, the sea flooded much of southern Maine as the glacier retreated to the northwest. Ocean waters extended far up the Kennebec and Penobscot valleys, reaching present elevations of up to 420 feet in the central part of the state.

Great quantities of sediment washed out of the melting ice and into the sea, which was in contact with the receding glacier margin. Sand and gravel accumulated as deltas (**Figure 4**) and submarine fans where streams discharged along the ice front, while the finer silt and clay dispersed across the ocean floor. The shells of clams, mussels, and other invertebrates are found in the glacial-marine clay that blankets lowland areas of southern Maine. Age dates on these fossils tell us that ocean waters covered parts of Maine until about 11,000 years ago, when the land surface rebounded as the weight of the ice sheet was removed.

Meltwater streams deposited sand and gravel in tunnels within the ice. These deposits remained as ridges (eskers) when the surrounding ice disappeared (**Figure 5**). Maine's esker systems can be traced for up to 100 miles, and are among the longest in the country.

Other sand and gravel deposits formed as mounds (kames) and terraces adjacent to melting ice, or as outwash in valleys in front of the glacier. Many of these water-laid deposits are well layered, in contrast to the chaotic mixture of boulders and sediment of all sizes (till) that was released from dirty ice without subsequent reworking. Ridges consisting of till or washed sediments (moraines) were constructed along the ice margin in places where the glacier was still actively flowing and conveying rock debris to its terminus. Moraine ridges are abundant in the zone of former marine submergence, where they are useful indicators of the pattern of ice retreat (**Figure 6**).

The last remnants of glacial ice probably were gone from Maine by 10,000 years ago. Large sand dunes accumulated in late-glacial time as winds picked up outwash sand and blew it onto the east sides of river valleys, such as the Androscoggin and Saco valleys (**Figure 7**). The modern stream network became established soon after deglaciation, and organic deposits began to form in peat bogs, marshes, and swamps. Tundra vegetation bordering the ice sheet was replaced by changing forest communities as the climate warmed (Davis and Jacobson, 1985). Geologic processes are by no means dormant today, however, since rivers and wave action modify the land (**Figure 8**), and worldwide sea level is gradually rising against Maine's coast.

References Cited

Davis, R. B., and Jacobson, G. L., Jr., 1985, Late-glacial and early Holocene landscapes in northern New England and adjacent areas of Canada: Quaternary Research, v. 23, p. 341-368.

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Figure 1: "The Bubbles" and Jordan Pond in Acadia National Park. These hills and valleys were sculpted by glacial erosion. The pond was dammed behind a moraine ridge during retreat of the ice sheet.

Figure 2: Daggett's Rock in Phillips. This is the largest known glacially transported boulder in Maine. It is about 100 feet long and estimated to weigh 8,000 tons.

Figure 3: Granite ledge in Westbrook, showing polished and grooved surface resulting from glacial abrasion. The grooves and shape of the ledge indicate ice flow toward the southeast.

Figure 4: Glaciomarine delta in Franklin, formed by sand and gravel washing into the ocean from the glacier margin. The flat delta top marks approximate former sea level. Kettle hole in foreground was left by melting of ice.

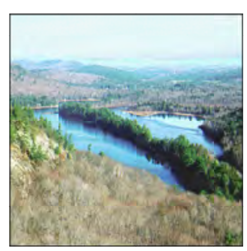

Figure 5: Esker cutting across Kezar Five Ponds, Waterford. The ridge consists of sand and gravel deposited by meltwater flowing in a tunnel beneath glacial ice.

Figure 6: Aerial view of moraine ridges in blueberry field, Sedgwick (note dirt road in upper right for scale). Each boulder ridge marks a position of the retreating glacier margin. The ice receded from right to left.

Figure 7: Sand dune in Wayne. This and other "deserts" in Maine formed as windstorms in late-glacial time blew sand out of valleys, often depositing it as dune fields on hillsides downwind. Some dunes were reactivated in historical time when grazing animals stripped the vegetation cover.

Figure 8: Songo River delta and Songo Beach, Sebago Lake State Park, Naples. These deposits are typical of geological features formed in Maine since the Ice Age.

SOURCES OF INFORMATION

Surficial geologic mapping by Carol T. Hildreth completed during the 1987 field season; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1988. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists. Additional editing in 2007 from review by Woodrow B. Thompson.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Biddeford quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Artificial fill - Artificially emplaced materials of nearly any composition, man-made or natural; areas filled may be either man-made or natural depressions; includes dumps, landfills and areas where the surface has been so altered by construction that the natural landscape has been obliterated -- such as in city centers. Thickness variable.

Stream alluvium - Fine sand, silt, and clay, with some gravel and organic matter in places. Deposited in flood plains of modern streams. Extent of alluvium approximates area of potential flooding. Thickness of deposits variable. In places merges with wetlands deposits.

Landslide - Recently slumped clay-silt deposits of the Presumpscot Formation on the banks of Moors Brook where the bank is a nearly vertical cliff about 15-20 feet high; each landslide is bounded by an arcuate fault scarp about 100 feet long, and extends a maximum of about 30 to 50 feet into the cliff; the toe of each landslide is being swiftly eroded by the brook. Three such landslides were found.

Wetland, swamp* - Peat, silt, clay, and sand. Poorly drained area with variable tree cover, often with standing water. Thickness variable.

Wetland, freshwater marsh - Peat, silt, clay, and sand. Poorly drained freshwater grassland, often with standing water and cattails. Thickness variable.

Wetland, salt marsh* - Peat, silt, clay, and sand. Coastal marsh subject to tidal flooding and containing salt marsh grasses, 0.5 to 2m thick; where 1 m or more thick, bottom part commonly peat rich.

Marine shoreline deposit (beach) - Sand and/or gravel, and minor silt. Developed along the present coast. 0.5 to 5 m thick. May include sand dunes in places.

Sand dunes - Sand with minor silt and gravel in places. Developed primarily along the present shoreline as part of barrier beach complexes, but two small deposits were found inland. 0.5 to 5 m thick.

Marine nearshore deposits - Thin, discontinuous deposits of sand, gravel, silt-clay, and reworked till overlying bedrock and till. Formed in shallow marine waters where glacial sediments were reworked by ocean waves and currents during regressive phase of late-glacial marine submergence. Average thickness probably less than 2 m. Subdivided into units 1 and 2 on the basis of elevation [Pmn_1 is above the 120-foot sea level stand of unit Pms_2 and Pmn_2 is below that level.]

Marine shoreline deposits - Predominantly sand and gravel. Consists of beach deposits formed during stillstands of relative sea level in regressive phase of marine submergence. Thickness variable, less that 3 m to more than 10 m. Pms_1 represents deposits that accumulated at stands of 160+ and 140+ ft, combined. Pms_2, a stand of 120- ft; Pms_3, combined stands of 80+ and 60+ ft; and Pms_4 (mapped only in the Biddeford Pool quad), a sea-level stand of 40- ft.

Pmrs **Marine regressive sand deposits** - Massive to stratified and cross-stratified, well-sorted sand. Generally has gradational basal contact with Pp. Thickness 0.5 to 5 m. Deposited during regressive phase of marine submergence.

Pp **Presumpscot Formation** - Massive to laminated, gray and blue-gray (weathering brown) silt and silty clay. Locally may contain boulders, sand, and gravel. Occurs as blanket deposit over bedrock and older glacial sediments. Variable thickness of 1-20 m. Deposited during period of late-glacial submergence.

Pt **Till** - Gray to gray-brown poorly sorted mixture of silt, sand, pebbles, cobbles, and boulders. Forms a blanket deposit over bedrock, and is inferred to underlie younger sediments where not exposed at surface. Thin over topographic bedrock highs; thickens in topographic low areas; averages 3-5 m in thickness.

Bedrock - Rock units not distinguished. Individual outcrops not shown in areas of poor access. Ruled pattern indicates areas where surficial materials are thin (less than 1-2 m) and bedrock exposures are abundant. Areas of bedrock exposure (gray areas) are mapped in part from direct observation and in part from aerial photos.

Contact

Marine strandline - Defined by beach or base of wave-cut cliff.

Abandoned stream channel - Channel inferred to have been eroded by post-glacial stream during marine offlap. Arrow indicates inferred direction of flow.

135 **Glacial Striation** - Includes striations, grooves, crag-and-tails and related ice-flow indicators on bedrock outcrops. Dot or center of arrow is point of observation. Arrowhead omitted where ice-flow direction is unknown. Flag indicates older trend.

Crossbeds - Arrow indicates average direction and dip of cross-bedding in glaciofluvial deposits. Tip of arrow is at point of observation.

10,150±450 F **Marine fossil locality** - Indicates site where marine fossils were located.

Area of many large boulders

*NOTE: Wetland symbols followed by "t" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

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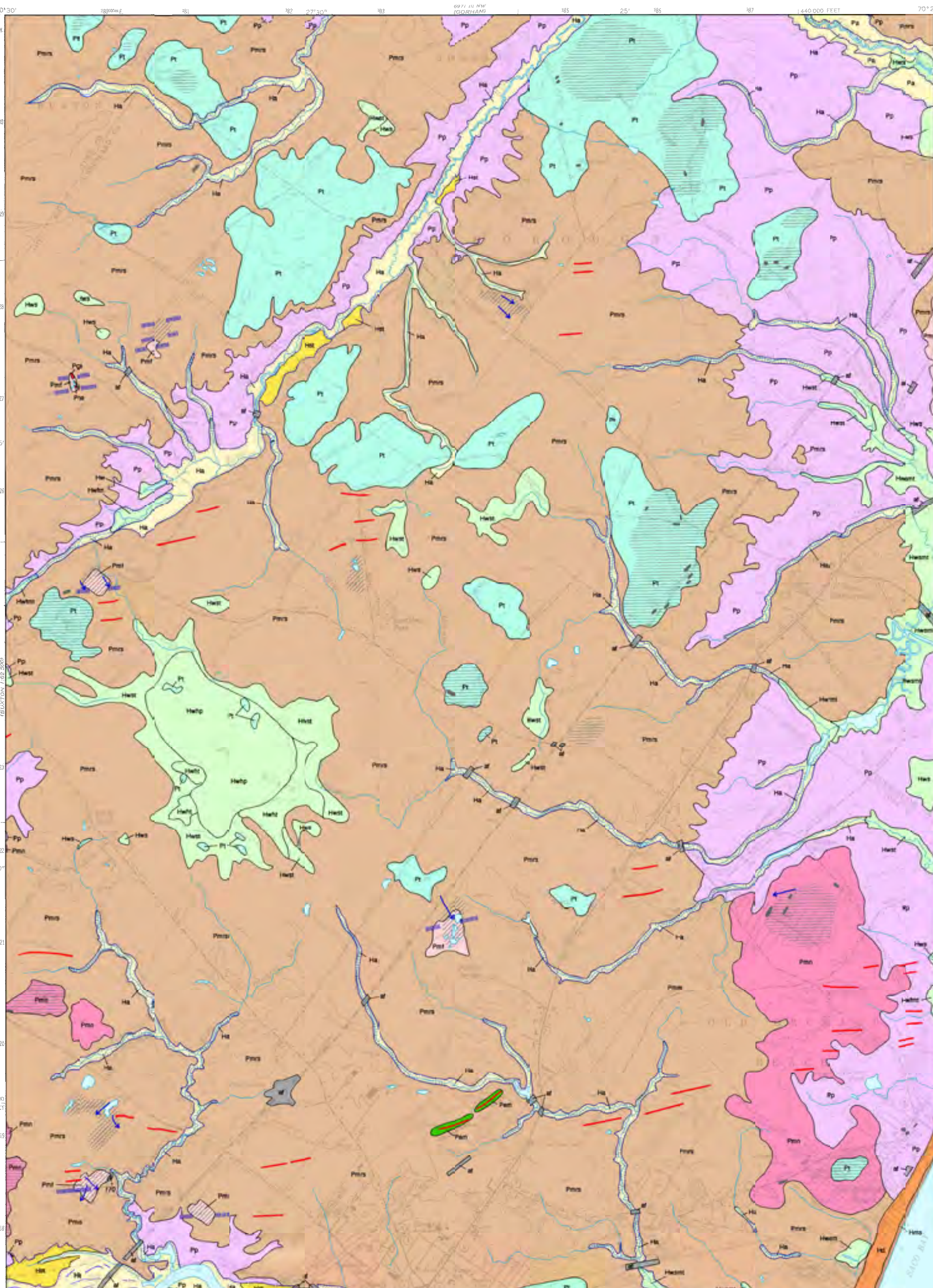
Surficial Geology



SOURCES OF INFORMATION

Surficial geologic mapping by Michael J. Retelle completed during the 1987-1989 field seasons; funding for this work provided by the U. S. Geological Survey COGEOMAP program. Wetlands data provided in part by Cornelia C. Cameron, U.S. Geological Survey, 1988. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

Quadrangle Location

SCALE 1 : 24,000

1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Old Orchard Beach quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

Old Orchard Beach Quadrangle, Maine

Surficial geologic mapping by
Michael J. Retelle

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker

Funding for the preparation of this map was provided in part by the U.S. Geological Survey Cooperative Geological Mapping (COGEOMAP) Program, Cooperative Agreement No. 14-08-0001-A0381.

Maine Geological Survey

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Open-File No. 99-94
1999

For additional information, see Open-File Report 99-125.

SURFICIAL GEOLOGY OF MAINE

Continental glaciers like the ice sheet now covering Antarctica probably extended across Maine several times during the Pleistocene Epoch, between about 1.5 million and 10,000 years ago. The slow-moving ice superficially changed the landscape as it scraped over mountains and valleys (**Figure 1**), eroding and transporting boulders and other rock debris for miles (**Figure 2**). The sediments that cover much of Maine are largely the product of glaciation. Glacial ice deposited some of these materials, while others washed into the sea or accumulated in meltwater streams and lakes as the ice receded. Earlier stream patterns were disrupted, creating hundreds of ponds and lakes across the state. The map at left shows the pattern of glacial sediments in the Old Orchard Beach quadrangle.

The most recent "Ice Age" in Maine began about 25,000 years ago, when an ice sheet spread southward over New England (Stone and Borns, 1986). During its peak, the ice was several thousand feet thick and covered the highest mountains in the state. The weight of this huge glacier actually caused the land surface to sink hundreds of feet. Rock debris frozen into the base of the glacier abraded the bedrock surface over which the ice flowed. The grooves and fine scratches (striations) resulting from this scraping process are often seen on freshly exposed bedrock, and they are important indicators of the direction of ice movement (**Figure 3**). Erosion and sediment deposition by the ice sheet combined to give a streamlined shape to many hills, with their long dimension parallel to the direction of ice flow. Some of these hills (drumlins) are composed of dense glacial sediment (till) plastered under great pressure beneath the ice.

A warming climate forced the ice sheet to start receding as early as 21,000 years ago, soon after it reached its southernmost position on Long Island (Sirkin, 1986). The edge of the glacier withdrew from the continental shelf east of Long Island and reached the present position of the Maine coast by 13,800 years ago (Dorion, 1993). Even though the weight of the ice was removed from the land surface, the Earth's crust did not immediately spring back to its normal level. As a result, the sea flooded much of southern Maine as the glacier retreated to the northwest. Ocean waters extended far up the Kennebec and Penobscot valleys, reaching present elevations of up to 420 feet in the central part of the state.

Great quantities of sediment washed out of the melting ice and into the sea, which was in contact with the receding glacier margin. Sand and gravel accumulated as deltas (**Figure 4**) and submarine fans where streams discharged along the ice front, while the finer silt and clay dispersed across the ocean floor. The shells of clams, mussels, and other invertebrates are found in the glacial-marine clay that blankets lowland areas of southern Maine. Age dates on these fossils tell us that ocean waters covered parts of Maine until about 11,000 years ago, when the land surface rebounded as the weight of the ice sheet was removed.

Meltwater streams deposited sand and gravel in tunnels within the ice. These deposits remained as ridges (eskers) when the surrounding ice disappeared (**Figure 5**). Maine's esker systems can be traced for up to 100 miles, and are among the longest in the country.

Other sand and gravel deposits formed as mounds (kames) and terraces adjacent to melting ice, or as outwash in valleys in front of the glacier. Many of these water-laid deposits are well layered, in contrast to the chaotic mixture of boulders and sediment of all sizes (till) that was released from dirty ice without subsequent reworking. Ridges consisting of till or washed sediments (moraines) were constructed along the ice margin in places where the glacier was still actively flowing and conveying rock debris to its terminus. Moraine ridges are abundant in the zone of former marine submergence, where they are useful indicators of the pattern of ice retreat (**Figure 6**).

The last remnants of glacial ice probably were gone from Maine by 10,000 years ago. Large sand dunes accumulated in late-glacial time as winds picked up outwash sand and blew it onto the east sides of river valleys, such as the Androscoggin and Saco valleys (**Figure 7**). The modern stream network became established soon after deglaciation, and organic deposits began to form in peat bogs, marshes, and swamps. Tundra vegetation bordering the ice sheet was replaced by changing forest communities as the climate warmed (Davis and Jacobson, 1985). Geologic processes are by no means dormant today, however, since rivers and wave action modify the land (**Figure 8**), and worldwide sea level is gradually rising against Maine's coast.

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Dorion, C. C., 1993, A chronology of deglaciation and accompanying marine transgression in Maine: Geological Society of America, Abstracts with Programs, v. 25, no. 2, p. 12.

Sirkin, L., 1986, Pleistocene stratigraphy of Long Island, New York, *in* Caldwell, D. W. (editor), The Wisconsinan stage of the first geological district, eastern New York: New York State Museum, Bull. 455, p. 6-21.

Stone, B. D., and Borns, H. W., Jr., 1986, Pleistocene glacial and interglacial stratigraphy of New England, Long Island, and adjacent Georges Bank and Gulf of Maine, *in* Sibrava, V., Bowen, D. Q., and Richmond, G. M. (editors), Quaternary glaciations in the northern hemisphere: Quaternary Science Reviews, v. 5, p. 39-52.

Figure 1: "The Bubbles" and Jordan Pond in Acadia National Park. These hills and valleys were sculpted by glacial erosion. The pond was dammed behind a moraine ridge during retreat of the ice sheet.

Figure 2: Daggett's Rock in Phillips. This is the largest known glacially transported boulder in Maine. It is about 100 feet long and estimated to weigh 8,000 tons.

Figure 3: Granite ledge in Westbrook, showing polished and grooved surface resulting from glacial abrasion. The grooves and shape of the ledge indicate ice flow toward the southeast.

Figure 4: Glaciomarine delta in Franklin, formed by sand and gravel washing into the ocean from the glacier margin. The flat delta top marks approximate former sea level. Kettle hole in foreground was left by melting of ice.

Figure 5: Esker cutting across Kezar Five Ponds, Waterford. The ridge consists of sand and gravel deposited by meltwater flowing in a tunnel beneath glacial ice.

Figure 6: Aerial view of moraine ridges in blueberry field, Sedgwick (note dirt road in upper right for scale). Each bouldery ridge marks a position of the retreating glacier margin. The ice receded from right to left.

Figure 7: Sand dune in Wayne. This and other "deserts" in Maine formed as windstorms in late-glacial time blew sand out of valleys, often depositing it as dune fields on hillsides downwind. Some dunes were reactivated in historical time when grazing animals stripped the vegetation cover.

Figure 8 : Songo River delta and Songo Beach, Sebago Lake State Park, Naples. These deposits are typical of geological features formed in Maine since the Ice Age.

Ha	**Stream alluvium** - Gravel, sand, and silt deposited on flood plains of modern streams.
Hat	**Stream terraces** - Flat alluvial benches situated above modern flood plains of rivers and streams. Materials forming depositional terrace may include gravel, sand, silt, and clay; step-like morphology is created by downcutting of stream through alluvial plain.
Hws	**Wetland, swamp*** - Peat and fine-grained inorganic sediment. Poorly drained area with standing water common.
Hwfm	**Wetland, freshwater marsh*** - Peat and fine-grained inorganic sediment. Poorly drained grassland with standing water common.
Hwsm	**Wetland, saltmarsh*** - Peat and fine-grained inorganic sediment in coastal areas commonly subject to tidal flooding.
Hwh	**Heath*** - Peat and fine-grained inorganic sediment. Distinguished from other wetlands by the absence of trees and the presence of shrubs.
Hw	**Wetland, undifferentiated** - May include peat, muck, clay, silt, and sand deposited in poorly drained areas.
Hms	**Marine shoreline deposit (beach)** - Sand and gravel deposited by marine processes along the ocean shore.
Hd	**Dune deposits** - Sand dunes adjacent to modern beaches.
Pa	**Alluvium** - Coarse to fine alluvial sand in high terraces and overlying Presumpscot Formation clays, north and south of the Nonesuch River.
Pmn	**Marine nearshore deposits** - Sand and gravel deposits formed as beaches and shallow marine sand bodies during marine submergence and regression.
Pmrs	**Marine regressive sand deposits** - Sand deposited in marine waters during regression of the sea from the coastal zone. Sand is commonly interbedded with fine-grained sediments of the Presumpscot Formation.
Pp	**Presumpscot Formation** - Fine-grained silt and clay with minor marine fossils and dropstones deposited in deeper, quiet water during the marine submergence of the coastal zone.
Pmf	**Marine fan** - Layered gravel and sand deposited in wedge or mound form at the glacier margin during marine submergence.
Pge	**Esker** - Gravel and sand deposited in ice tunnel by subglacial meltwater stream (northwestern part of the quadrangle).
Pem	**End moraine** - Till, sand, gravel, and clay deposited in ridge form by glacier ice.
Pt	**Till** - Poorly sorted mixture of gravel, sand, silt, and clay deposited directly by the action of glacier ice.
	Bedrock - Where bedrock is covered by thin veneer of surface materials, horizontal ruling is shown. Gray dots show areas of "ledge" exposed at the surface.
af	**Artificial fill** - Mixture of till, gravel, sand, silt, and clay transported and dumped to form elevated sections of roadways, etc.
	Contact - Boundary between adjacent map units, dashed where approximated.
135	**Glacial striation or groove** - Arrow shows inferred direction of former ice movement. Number is azimuth (in degrees) of ice flow direction; dot shows location of observation.
	Inferred direction of meltwater flow - Curved arrow shows direction of former glacial meltwater flow measured from current indicators (cross-bedding) in sediments.
	End moraine - Ridge of till, sand, and gravel deposited by glacier ice.
	Stream terrace scarp - Indicates edge of terrace step. Teeth indicate front of terrace riser.
	Ice margin position - Line shows an approximate position of the glacier margin during ice retreat.
	Flood plain scroll - Curved lines indicating former position of meanders on flood plain as observed from aerial photography.
	Modified ground - Pattern shows areas affected by change in topography resulting from development or excavation subsequent to publication of topographic base map.

*NOTE: Wetland symbols followed by "t" indicate areas where peat deposits probably do not constitute a significant commercial resource, either because they are thin (< 1.5 m), or they have an ash content greater than 25 percent. Symbols followed by "p" indicate peat deposits that are thicker (generally > 1.5 m), with ash content less than 25 percent, and thus may be suitable for commercial applications.

USES OF SURFICIAL GEOLOGY MAPS

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the products of postglacial geologic processes, such as river floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the areal distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of glacial lakes or the glacial sea, now long gone from the state. This glacial geologic history of the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial geology maps are often best used in conjunction with related maps such as surficial materials maps or significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to surficial geology. Construction projects such as locating new roads, excavating foundations, or siting new homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

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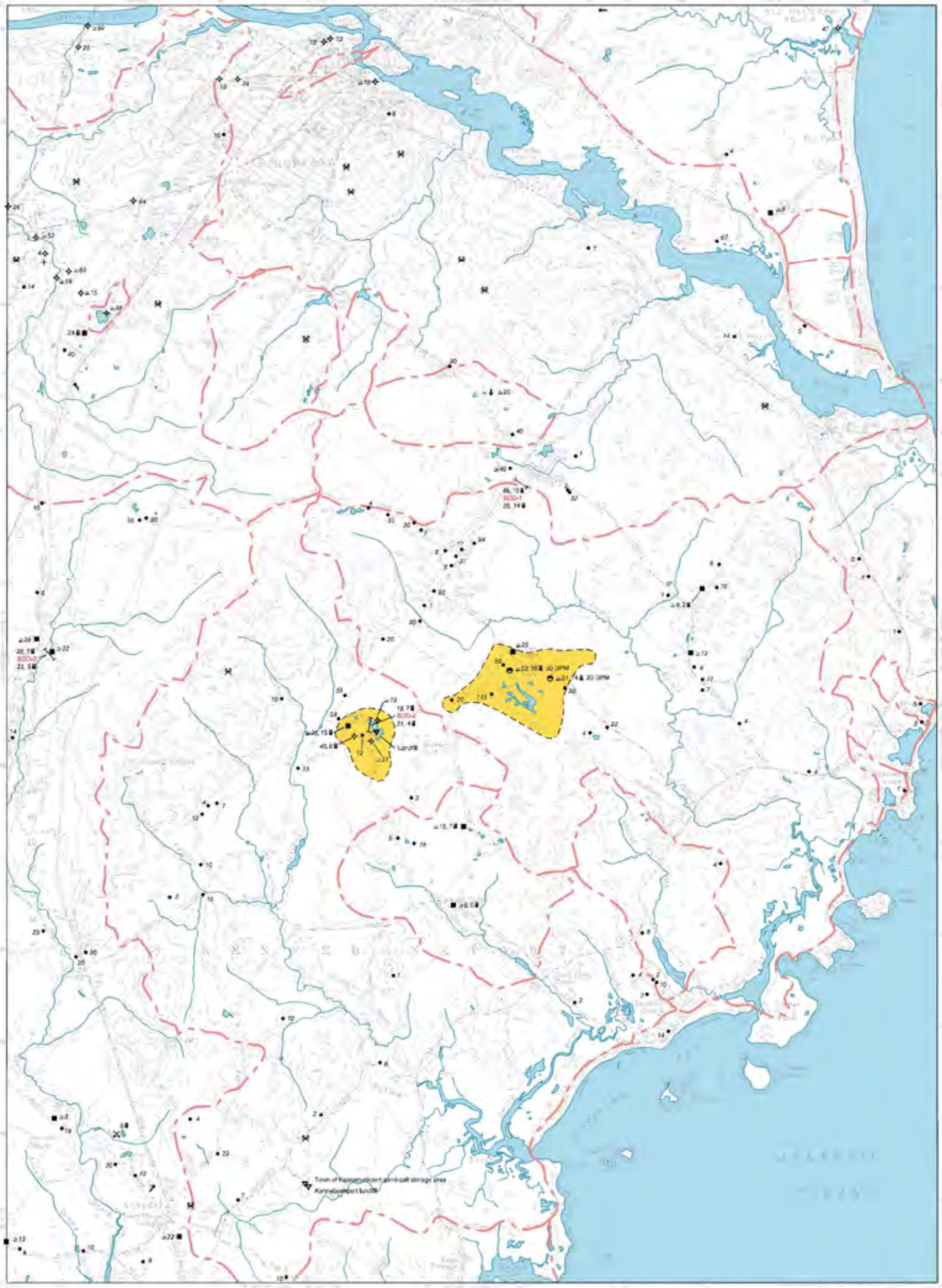
ATTACHMENT 11

SIGNIFICANT SAND AND GRAVEL AQUIFERS MAPS

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Lanctot, E. M., and Tolman, A. L., 1995, Hydrogeologic data for significant sand and gravel aquifers in parts of York and Cumberland Counties, Maine: Map 4: Maine Geological Survey, Open-File Map 85-93, scale 1:50,000.

Well inventory data from U.S. Geological Survey Basic-Data Reports and additional data collected by Maine Geological Survey field assistants during the 1978-1984 and 1995 field seasons.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETER

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Biddeford quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

Biddeford Quadrangle, Maine

Compiled by
Craig D. Neil

Preliminary aquifer boundaries mapped by:
Carol T. Hildreth

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker
Bennett J. Wilson, Jr.

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection.

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Open-File No. 98-149
1998

WHAT IS AN AQUIFER?

Ground water, as the name implies, is water found below the land surface in the pore spaces between sand grains and in fractures in the bedrock (see diagrams below). An *aquifer* is a water-bearing geologic formation capable of yielding a usable amount of ground water to a well. In Maine there are two types of aquifers: loose soil materials (such as sand, gravel, and other sediments) and fractured bedrock. A sand and gravel deposit is considered a *significant aquifer* when a well in that deposit is capable of being continuously pumped at a rate of 10 gallons per minute (gpm) or more. To sustain a yield of 10 gpm or more, a deposit must be permeable enough for water to flow readily into the well as it is pumped (see section on *porosity* and *permeability* below), and there must be a sufficient depth of water in the well so that it will not be pumped dry.

The diagram below shows a schematic cross section of a sand and gravel aquifer in Maine. The symbols above the diagram correspond to the well symbols shown on the map at left. Information typically shown for these wells includes type of well, depth to bedrock, depth to water, and well yield. The blue line in the diagram is the *water table*. The area below the water table is called the *saturated zone*, where all pore spaces between the sediment particles are filled with water. In order to yield water, a well must extend below the water table into the saturated zone. Notice that the water table corresponds to the water level in most wells and in the stream.

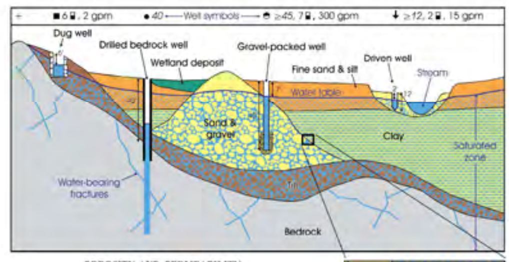
Several types of wells, common in Maine, are shown in the diagram. A *dug well* is a large diameter hole excavated by hand or backhoe. The hole is kept from caving in by installing a lining that may be stone, tile, or cement blocks. The hole must be deep enough to extend below the water table. The shallow dug well in the diagram has a yield of 2 gpm. Although the yield is often low, dug wells generally supply enough ground water for a household because of the large amount of water stored in the well.

A *gravel-packed* well is usually installed into coarse-grained sediment and is drilled with a much larger diameter than the final casing and screen diameter. To increase the yield and pumping efficiency of the well, the space around the well screen is filled with selected gravel that increases the permeability in the immediate vicinity of the well. The gravel-packed well in the diagram has a high yield of 300 gpm. Such high-yielding gravel-packed wells are commonly drilled for municipal or industrial water systems.

A *driven well* or *well point* can be installed into sand and gravel where the water table is within about 20 feet of the ground surface. A 2 to 3 inch diameter pipe, equipped with a well screen at its lower end, is driven into the deposit until the screen is below the water table. This pipe acts as a casing, and water is pumped directly from the aquifer. The driven well in the diagram has a significant yield of 15 gpm. Although the yield is relatively high, driven wells generally only supply a single household because very little water is stored in the well casing.

Wells of any type constructed in the other sediments shown in the diagram (clay or fine sand and silt) would yield some water, but yields would be lower than for wells in coarse-grained sand and gravel deposits.

Another type of well common in Maine is the *drilled bedrock well*. This well is drilled into the underlying rock with steel casing to isolate the well from potential surface-water contamination. In this type of well, water is found when the well hole intersects water-bearing fractures in the bedrock. Notice how the water level in this well is not the same level as the water table. The well casing isolates the bedrock well from the overlying sediments. The water level is controlled by water pressure in the fractures in the bedrock and is not related to the water table in the overlying materials.

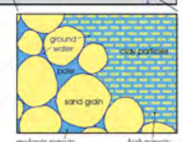


POROSITY AND PERMEABILITY

The diagram at right is an enlarged view of a section of the diagram above. Note that the section shown is below the water table and that ground water completely fills the pore spaces between the sediment grains. In an aquifer, the more pore space there is, the more water the aquifer can hold. This is called the *porosity* of a deposit. *Permeability* refers to the ability of a surficial deposit to transmit water. Permeability depends on the size of the spaces between the sediment grains.

Permeability is related to porosity, but is not the same. Porosity determines the capacity of the material to hold water. Permeability determines its ability to yield water. For example, clay is made of tiny particles with a large amount of pore space between them. However, the pore spaces are so small that they create a resistance to flow which reduces ground water permeability. Sand and gravel may not be as porous as clay, but the pore spaces are larger and better connected and the materials are much more permeable.

Permeability is an important characteristic since it determines whether ground water can actually be drawn into a pumping well.



moderate porosity, high permeability　*high porosity, low permeability*

HOW ARE AQUIFERS MAPPED?

Operating a twelve-channel seismograph, Piscataquis County, Maine

When mapping sand and gravel aquifers, geologists visit gravel pits, stream banks, road cuts, and other surface exposures to describe materials and identify deposits. This surficial geology mapping is supplemented with seismic-refraction studies and the installation of observation wells and test borings. In addition, much information about an aquifer may already be available from water-company exploration, large construction projects, town well inventories, and other sources. This information, along with aerial photography and previously published maps, allows the geologist to define the boundaries of favorable surficial deposits and estimate how well the deposits will yield water to a well.

The boundaries of favorable surficial deposits do not necessarily coincide with the aquifer boundaries. In some areas, a thin cover of favorable coarse-grained material may overlie fine-grained sediments, till, or bedrock. A well in that material would not be able to sustain a yield of 10 gpm, so the area would not be mapped as an aquifer. In other areas, fine-grained sediments or till may overlie favorable coarse-grained sediments and the subsurface deposit may not be recognized as an aquifer.

Single- and 12-channel seismic-refraction studies are conducted to determine the saturated thickness of a deposit by establishing the depth to water table and bedrock surface. The 12-channel seismic survey has the additional advantage of providing the topography of the buried bedrock surface at a site.

Installing monitoring wells and drilling test borings provide direct information about the aquifer characteristics of a deposit. This work provides information on the depth to water table and bedrock surface, water quality, and how easily the sediment transmits water.

GROUND-WATER FLOW AND CONTAMINATION

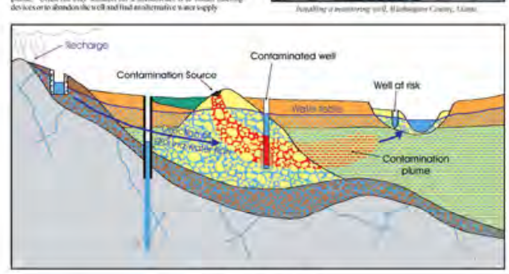
Ground water is replenished or *recharged* by rainwater and melting snow that soak into the soil. This water percolates downward and eventually reaches the water table. When recharge is high during spring snowmelt and fall rains, the amount of ground water increases and the water table rises. When recharge is low during the late summer or when the ground is frozen during the winter, the water table becomes lower.

Notice in the diagram below that ground water is not static; it flows. This concept is very important, especially when ground water becomes contaminated. Once in the ground-water system, contaminants usually travel along the paths followed by ground water and are sometimes able to migrate considerable distances over time.

In the diagram below, a plume of contamination originates at the source in the sand and gravel deposit. This source could be a landfill, a leaking fuel storage tank, or an accidental spill. As the contaminant seeps into the subsurface system and enters the aquifer, it flows with the ground water. In the diagram, the plume contaminated the gravel-packed well as it passed by. The driven well near the stream is not contaminated, but is at risk since the plume is flowing in that direction. The dug well on the hillside, however, is not affected because it is upgradient of the source, hence the contaminated ground water flows away from this well.

Once ground water is contaminated, it is very difficult and expensive to correct. To design a clean-up plan, monitoring wells are installed under the direction of a hydrogeologist or other specialist. These wells define the three-dimensional extent of the affected area. Sometimes it is possible to pump contaminants to the surface using remediation wells within the plume. Often the only solution for a homeowner is to install filtering devices or to abandon the well and find an alternative water supply.

Installing a monitoring well, Washington County, Maine



HOW TO USE THIS MAP

Types of Information Shown on this Map: The yellow and red colored areas on the map indicate significant aquifers, zones where ground-water yield is estimated to be 10 gpm or greater. The boundaries of the aquifers are drawn by a geologist based, in part, on the well data shown on the map. Areas not mapped as aquifer may be thin or unsaturated sand and gravel deposits, surficial deposits other than sand and gravel, or bedrock.

The well data on the map provide information about the type of well, depth to water table, depth to bedrock, and yield of the wells in the area. This information is useful when making decisions about water supply, a drainage plan, or the need for blasting.

Information from seismic refraction studies also is shown on the map. Seismic studies give detailed information about depth to water table and depth to and shape of the bedrock surface. Geologic cross sections generated from seismic information are shown in associated reports listed in the references below the map at left.

Surface-water drainage-basin boundaries are also shown on the map. Horizontal direction of ground-water flow generally is away from drainage divides and toward surface-water bodies.

Uses of this Map: Sand and gravel aquifer maps are useful in two major categories of decision-making: ground-water supply and ground-water protection. For ground-water supply, these maps are useful in locating areas favorable for developing water supplies for municipal, industrial, or residential use. Information on the map, such as depth to bedrock and well yield, indicate the potential for ground-water production.

Ground-water protection is another important function of these maps. Knowledge of the location and extent of sand and gravel aquifers is critical when siting potential contamination sites such as landfills and salt storage facilities. When used in conjunction with other geologic information this map can help planners and municipal officials make much more informed decisions to guide industrial growth or residential development.

If ground-water contamination occurs, the general trend of the plume migration can be deduced from these maps by analyzing the drainage basin boundaries and the local surface-water bodies.

For further assistance in interpreting this map contact a geologist at the Maine Geological Survey.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

- - - - - Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

(red) Surficial deposits with good to excellent potential ground-water yield: yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

(yellow) Surficial deposits with moderate to good potential ground-water yield: yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

(white) Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for selected 12-channel seismic lines are shown on Plate 2 of Open-File Report 83-1 (Tolman and others, 1983). Length of 12-channel and single-channel seismic lines as shown on the map is to scale.

83	Depth to bedrock, in feet below land surface.
≥83	Depth to bedrock exceeds depth shown (based on calculations).
12	Depth to water level, in feet below land surface.
MAP-7 131, 23	Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.
69, 12 MAP-E 72, 12	Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refer to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex. MAP - 7, MAP - 8), the line is a 12-channel line. If the identifier is followed by a letter (ex. MAP - E, MAP - F), the line is a single-channel line. Seismic interpretations by C. D. Neil and D. H. Tepper.

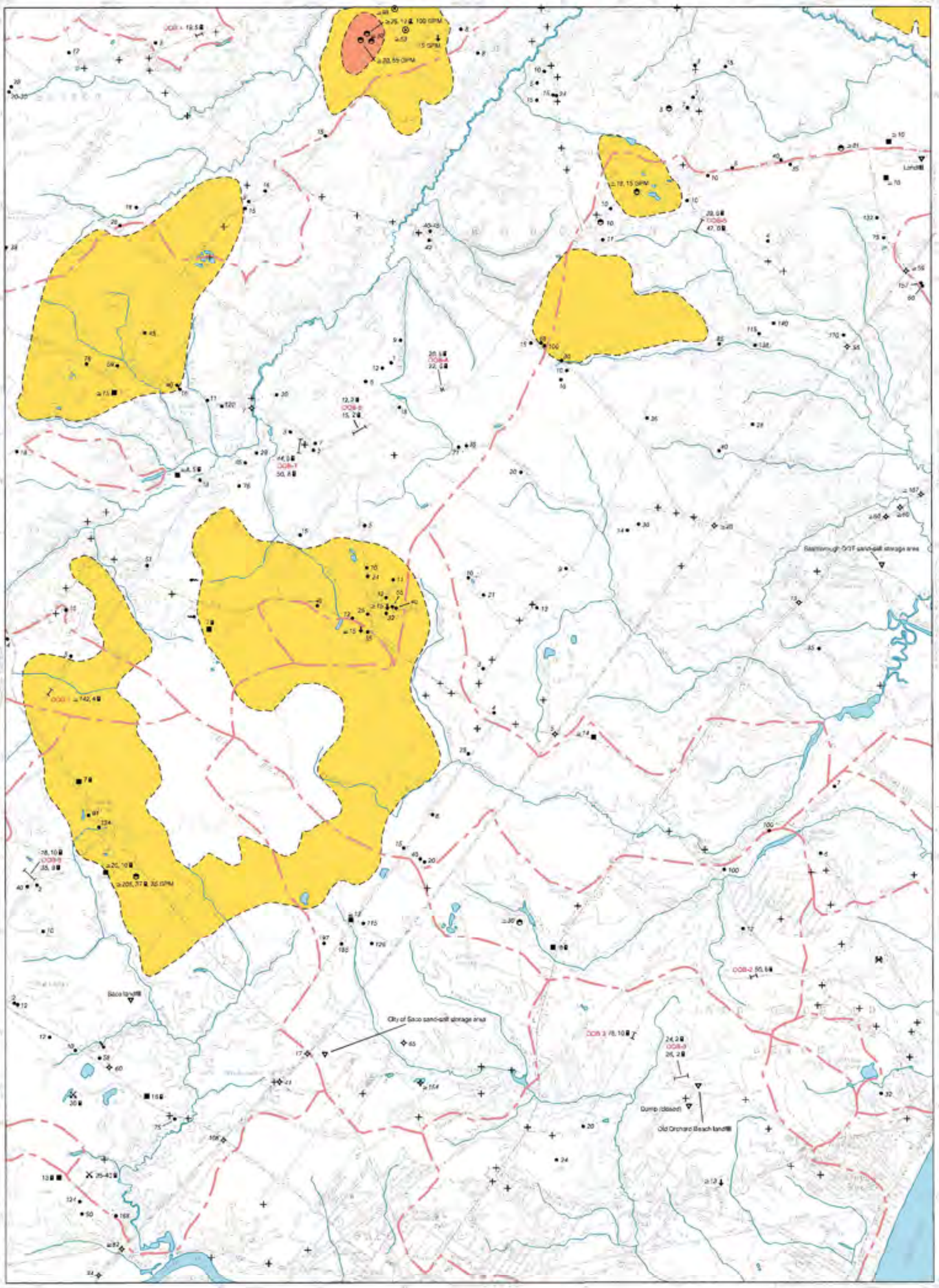
GEOLOGIC AND WELL INFORMATION

50	Depth to bedrock, in feet below land surface.
≥12	Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal.
5	Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line).
✕	Gravel pit (overburden thickness noted in feet, e.g. 5-12').
⚒	Quarry
4 GPM	Yield (flow) of well or spring in gallons per minute (GPM).
↓	Spring, with general direction of flow.
●	Drilled overburden well
■	Dug well
✦	Observation well (project well if labeled; nonproject well if unlabeled)
✧	Test boring (project boring if labeled; nonproject boring if unlabeled)
↓	Driven point
◎	Test pit
•	Drilled bedrock well
▽	Potential point source of ground-water contamination
+	Bedrock outcrop
	Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Tolman, A. L., Tepper, D. H., Prescott, G. C., and Gammon, S. O., 1983, Hydrogeology of significant sand and gravel aquifers, northern York and southern Cumberland Counties, Maine: Maine Geological Survey, Open-File Report 83-1, 4 plates.
2. Hildreth, C. T., 1998, Surficial materials of the Biddeford quadrangle, Maine: Maine Geological Survey, Open-File Map 98-183.
3. Hildreth, C. T., 1996, Surficial geology of the Biddeford 7.5' quadrangle, York County, Maine: Maine Geological Survey, Open-File Report 96-36, 6 p.
4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.
5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Significant Sand and Gravel Aquifers



Aquifer boundaries modified from: Lanctot, E. M., and Tolman, A. L., 1995, Hydrogeologic data for significant sand and gravel aquifers in parts of York and Cumberland Counties, Maine: Map 8: Maine Geological Survey, Open-File Map 95-93, scale 1:50,000.

Well inventory data from U.S. Geological Survey Basic-Data Reports and additional data collected by Maine Geological Survey field assistants during the 1978-1984 and 1995 field seasons.

Drainage basin boundaries compiled by U.S. Geological Survey, Water Resources Division, Augusta, Maine with funding from the Maine Low-Level Radioactive Waste Authority.

Quadrangle Location

SCALE 1 : 24,000

CONTOUR INTERVAL 20 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey Old Orchard Beach quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not impute responsibility for any present or potential effects on the natural resources.

SIGNIFICANT SAND AND GRAVEL AQUIFERS
(yields greater than 10 gallons per minute)

Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.

Surficial deposits with good to excellent potential ground-water yield; yields generally greater than 50 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yield zones are based on subsurface data where available, and may vary from mapped extent in areas where data are unavailable.

Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.

SURFICIAL DEPOSITS WITH LESS FAVORABLE AQUIFER CHARACTERISTICS
(yields less than 10 gallons per minute)

Areas with moderate to low or no potential ground-water yield (includes areas underlain by till, marine deposits, eolian deposits, alluvium, swamps, thin glacial sand and gravel deposits, or bedrock); yields in surficial deposits generally less than 10 gallons per minute to a properly constructed well.

SEISMIC-LINE INFORMATION

Profiles for selected 12-channel seismic lines are shown on Plate 2 of Open-File Report 83-1 (Tolman and others, 1983). Length of 12-channel and single-channel seismic lines as shown on the map is to scale.

83 Depth to bedrock, in feet below land surface.

≥83 Depth to bedrock exceeds depth shown (based on calculations).

12 Depth to water level, in feet below land surface.

MAP-7 131, 23 Twelve-channel seismic line, with depth to bedrock and depth to water shown at the midpoint of the line, in feet below land surface.

69, 12 / MAP-E / 72, 12 Single-channel seismic line, with depth to bedrock and depth to water shown at each end of the line, in feet below land surface. Unless otherwise indicated, data shown above the line-identifier box refer to the northern end of the seismic line.

The 3-letter identifier for a line is an abbreviation for the topographic quadrangle. If the 3-letter identifier for the line is followed by a number (ex: MAP - 7, MAP - 8), the line is a 12-channel line. If the identifier is followed by a letter (ex: MAP - E, MAP - F), the line is a single-channel line. Seismic interpretations by C. D. Neil and D. H. Tepper.

GEOLOGIC AND WELL INFORMATION

60 Depth to bedrock, in feet below land surface.

≥12 Penetration depth of boring; ≥ symbol refers to minimum depth to bedrock based on boring depth or refusal.

6 Depth to water level in feet below land surface (observed in well, spring, test boring, pit, or seismic line).

Gravel pit (overburden thickness noted in feet, e.g. 5-12')

Quarry

4 GPM Yield (flow) of well or spring in gallons per minute (GPM)

Spring, with general direction of flow

Drilled overburden well

Dug well

Observation well (project well if labeled; nonproject well if unlabeled)

Test boring (project boring if labeled; nonproject boring if unlabeled)

Driven point

Test pit

Drilled bedrock well

Potential point source of ground-water contamination

Bedrock outcrop

Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.

OTHER SOURCES OF INFORMATION

1. Tolman, A. L., Tepper, D. H., Prescott, G. C., and Gammon, S. O., 1983, Hydrogeology of significant sand and gravel aquifers, northern York and southern Cumberland Counties, Maine: Maine Geological Survey, Open-File Report 83-1, 4 plates.

2. Retelle, M. J., 1998, Surficial materials of the Old Orchard Beach quadrangle, Maine: Maine Geological Survey, Open-File Map 98-100.

3. Retelle, M. J., 1999, Surficial geology of the Old Orchard Beach quadrangle, Maine: Maine Geological Survey, Open-File Map 99-94.

4. Caswell, W. B., 1987, Ground water handbook for the state of Maine, Second Edition: Maine Geological Survey, Bulletin 39, 135 p.

5. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)

6. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.

Old Orchard Beach Quadrangle, Maine

Compiled by
Craig D. Neil

Preliminary aquifer boundaries mapped by:
Michael J. Retelle

Digital cartography by:
Robert A. Johnston

Robert G. Marvinney
State Geologist

Cartographic design and editing by:
Robert D. Tucker
Bennett J. Wilson, Jr.

Funding for the preparation of this map was provided in part by the Maine Department of Environmental Protection.

Maine Geological Survey

Address: 22 State House Station, Augusta, Maine 04333
Telephone: 207-287-2801 E-mail: mgs@maine.gov
Home page: http://www.maine.gov/doc/nrimc/nrimc.htm

Open-File No. 98-146
1998

WHAT IS AN AQUIFER?

Ground water, as the name implies, is water found below the land surface in the pore spaces between sand grains and in fractures in the bedrock (see diagrams below). An *aquifer* is a water-bearing geologic formation capable of yielding a usable amount of ground water to a well. In Maine there are two types of aquifers: loose soil materials (such as sand, gravel, and other sediments) and fractured bedrock. A sand and gravel deposit is considered a *significant aquifer* when a well in that deposit is capable of being continuously pumped at a rate of 10 gallons per minute (gpm) or more. To sustain a yield of 10 gpm or more, a deposit must be permeable enough for water to flow readily into the well as it is pumped (see section on *porosity* and *permeability* below), and there must be a sufficient depth of water in the well so that it will not be pumped dry.

The diagram below shows a schematic cross section of a sand and gravel aquifer in Maine. The symbols above the diagram correspond to the well symbols shown on the map at left. Information typically shown for these wells includes type of well, depth to bedrock, depth to water, and well yield. The blue line in the diagram is the *water table*. The area below the water table is called the *saturated zone*, where all pore spaces between the sediment particles are filled with water. In order to yield water, a well must extend below the water table into the saturated zone. Notice that the water table corresponds to the water level in most wells and in the stream.

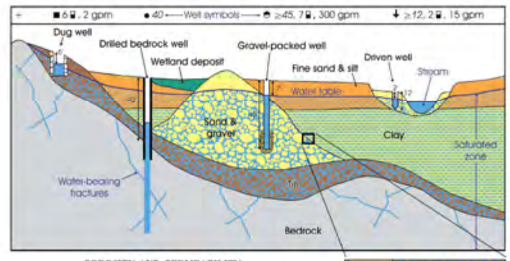
Several types of wells, common in Maine, are shown in the diagram. A *dug well* is a large diameter hole excavated by hand or backhoe. The hole is kept from caving in by installing a lining that may be stone, tile, or cement blocks. The hole must be deep enough to extend below the water table. The shallow dug well in the diagram has a yield of 2 gpm. Although the yield is often low, dug wells generally supply enough ground water for a household because of the large amount of water stored in the well.

A *gravel-packed* well is usually installed into coarse-grained sediment and is drilled with a much larger diameter than the final casing and screen diameter. To increase the yield and pumping efficiency of the well, the space around the well screen is filled with selected gravel that increases the permeability in the immediate vicinity of the well. The gravel-packed well in the diagram has a high yield of 300 gpm. Such high-yielding gravel-packed wells are commonly drilled for municipal or industrial water systems.

A *driven well* or *well point* can be installed into sand and gravel where the water table is within about 20 feet of the ground surface. A 2 to 3 inch diameter pipe, equipped with a well screen at its lower end, is driven into the deposit until the screen is below the water table. This pipe acts as a casing, and water is pumped directly from the aquifer. The driven well in the diagram has a significant yield of 15 gpm. Although the yield is relatively high, driven wells generally only supply a single household because very little water is stored in the well casing.

Wells of any type constructed in the other sediments shown in the diagram (clay or fine sand and silt) would yield some water, but yields would be lower than for wells in coarse-grained sand and gravel deposits.

Another type of well common in Maine is the *drilled bedrock well*. This well is drilled into the underlying rock with steel casing to isolate the well from potential surface-water contamination. In this type of well, water is found when the well hole intersects water-bearing fractures in the bedrock. Notice how the water level in this well is not the same level as the water table. The well casing isolates the bedrock well from the overlying sediments. The water level is controlled by water pressure in the fractures in the bedrock and is not related to the water table in the overlying materials.

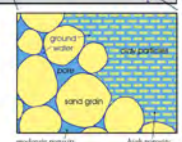


POROSITY AND PERMEABILITY

The diagram at right is an enlarged view of a section of the diagram above. Note that the section shown is below the water table and that ground water completely fills the pore spaces between the sediment grains. In an aquifer, the more pore space there is, the more water the aquifer can hold. This is called the *porosity* of a deposit. *Permeability* refers to the ability of a surficial deposit to transmit water. Permeability depends on the size of the spaces between the sediment grains.

Permeability is related to porosity, but is not the same. Porosity determines the capacity of the material to hold water. Permeability determines its ability to yield water. For example, clay is made of tiny particles with a large amount of pore space between them. However, the pore spaces are so small that they create a resistance to flow which reduces ground water permeability. Sand and gravel may not be as porous as clay, but the pore spaces are larger and better connected and the materials are much more permeable.

Permeability is an important characteristic since it determines whether ground water can actually be drawn into a pumping well.



moderate porosity, high permeability — *high porosity, low permeability*

HOW ARE AQUIFERS MAPPED?

Operating a twelve-channel seismograph, Piscataquis County, Maine

When mapping sand and gravel aquifers, geologists visit gravel pits, stream banks, road cuts, and other surface exposures to describe materials and identify deposits. This surficial geology mapping is supplemented with seismic-refraction studies and the installation of observation wells and test borings. In addition, much information about an aquifer may already be available from water-company exploration, large construction projects, town well inventories, and other sources. This information, along with aerial photography and previously published maps, allows the geologist to define the boundaries of favorable surficial deposits and estimate how well the deposits will yield water to a well.

The boundaries of favorable surficial deposits do not necessarily coincide with the aquifer boundaries. In some areas, a thin cover of favorable coarse-grained material may overlie fine-grained sediments, till, or bedrock. A well in that material would not be able to sustain a yield of 10 gpm, so the area would not be mapped as an aquifer. In other areas, fine-grained sediments or till may overlie favorable coarse-grained sediments and the subsurface deposit may not be recognized as an aquifer.

Single- and 12-channel seismic-refraction studies are conducted to determine the saturated thickness of a deposit by establishing the depth to water table and bedrock surface. The 12-channel seismic survey has the additional advantage of providing the topography of the buried bedrock surface at a site.

Installing monitoring wells and drilling test borings provide direct information about the aquifer characteristics of a deposit. This work provides information on the depth to water table and bedrock surface, water quality, and how easily the sediment transmits water.

GROUND-WATER FLOW AND CONTAMINATION

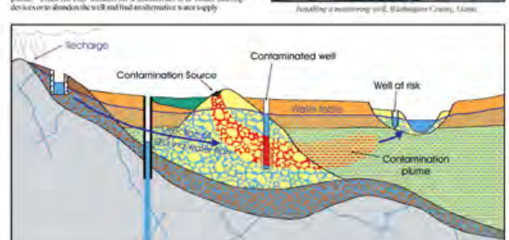
Ground water is replenished or *recharged* by rainwater and melting snow that soak into the soil. This water percolates downward and eventually reaches the water table. When recharge is high during spring snowmelt and fall rains, the amount of ground water increases and the water table rises. When recharge is low during the late summer or when the ground is frozen during the winter, the water table becomes lower.

Notice in the diagram below that ground water is not static; it flows. This concept is very important, especially when ground water becomes contaminated. Once in the ground-water system, contaminants usually travel along the paths followed by ground water and are sometimes able to migrate considerable distances over time.

In the diagram below, a plume of contamination originates at the source in the sand and gravel deposit. This source could be a landfill, a leaking fuel storage tank, or an accidental spill. As the contaminant seeps into the subsurface system and enters the aquifer, it flows with the ground water. In the diagram, the plume contaminated the gravel-packed well as it passed by. The driven well near the stream is not contaminated, but is at risk since the plume is flowing in that direction. The dug well on the hillside, however, is not affected because it is upgradient of the source, hence the contaminated ground water flows away from this well.

Once ground water is contaminated, it is very difficult and expensive to correct. To design a clean-up plan, monitoring wells are installed under the direction of a hydrogeologist or other specialist. These wells define the three-dimensional extent of the affected area. Sometimes it is possible to pump contaminants to the surface using remediation wells within the plume. Often the only solution for a homeowner is to install filtering devices or to abandon the well and find an alternative water supply.

Installing a monitoring well, Washington County, Maine



HOW TO USE THIS MAP

Types of Information Shown on this Map: The yellow and red colored areas on the map indicate significant aquifers, zones where ground-water yield is estimated to be 10 gpm or greater. The boundaries of the aquifers are drawn by a geologist based, in part, on the well data shown on the map. Areas not mapped as aquifer may be thin or unsaturated sand and gravel deposits, surficial deposits other than sand and gravel, or bedrock.

The well data on the map provide information about the type of well, depth to water table, depth to bedrock, and yield of the wells in the area. This information is useful when making decisions about water supply, a drainage plan, or the need for blasting.

Information from seismic refraction studies also is shown on the map. Seismic studies give detailed information about depth to water table and depth to and shape of the bedrock surface. Geologic cross sections generated from seismic information are shown in some listed reports found in the references below the map at left.

Surface-water drainage-basin boundaries are also shown on the map. Horizontal direction of ground-water flow generally is away from drainage divides and toward surface-water bodies.

Uses of this Map: Sand and gravel aquifer maps are useful in two major categories of decision-making: ground-water supply and ground-water protection. For ground-water supply, these maps are useful in locating areas favorable for developing water supplies for municipal, industrial, or residential use. Information on the map, such as depth to bedrock and well yield, indicate the potential for ground-water production.

Ground-water protection is another important function of these maps. Knowledge of the location and extent of sand and gravel aquifers is critical when siting potential contamination sources such as landfills and salt storage facilities. When used in conjunction with other geologic information, this map can help *planners* and municipal officials make much more informed decisions to guide industrial growth or residential development.

If ground-water contamination occurs, the general trend of the plume migration can be deduced from these maps by analyzing the drainage basin boundaries and the local surface-water bodies.

For further assistance in interpreting this map contact a geologist at the Maine Geological Survey.

ATTACHMENT 11

FEMA MAPS

National Flood Hazard Layer FIRMette

FEMA

70°27'59"W 43°30'29"N

70°27'21"W 43°30'3"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) *Zone A, V, A99*
		With BFE or Depth *Zone AE, AO, AH, VE, AR*
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
		Future Conditions 1% Annual Chance Flood Hazard *Zone X*
		Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
		Area with Flood Risk due to Levee *Zone D*
OTHER AREAS	NO SCREEN	Area of Minimal Flood Hazard *Zone X*
		Effective LOMRs
		Area of Undetermined Flood Hazard *Zone D*
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES	B 20.2 / 17.5	Cross Sections with 1% Annual Chance Water Surface Elevation
	8	Coastal Transect
	513	Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 4/9/2021 at 3:15 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 19. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East–West Highway
Silver Spring, Maryland 20910
(301) 713–3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1998 or later.

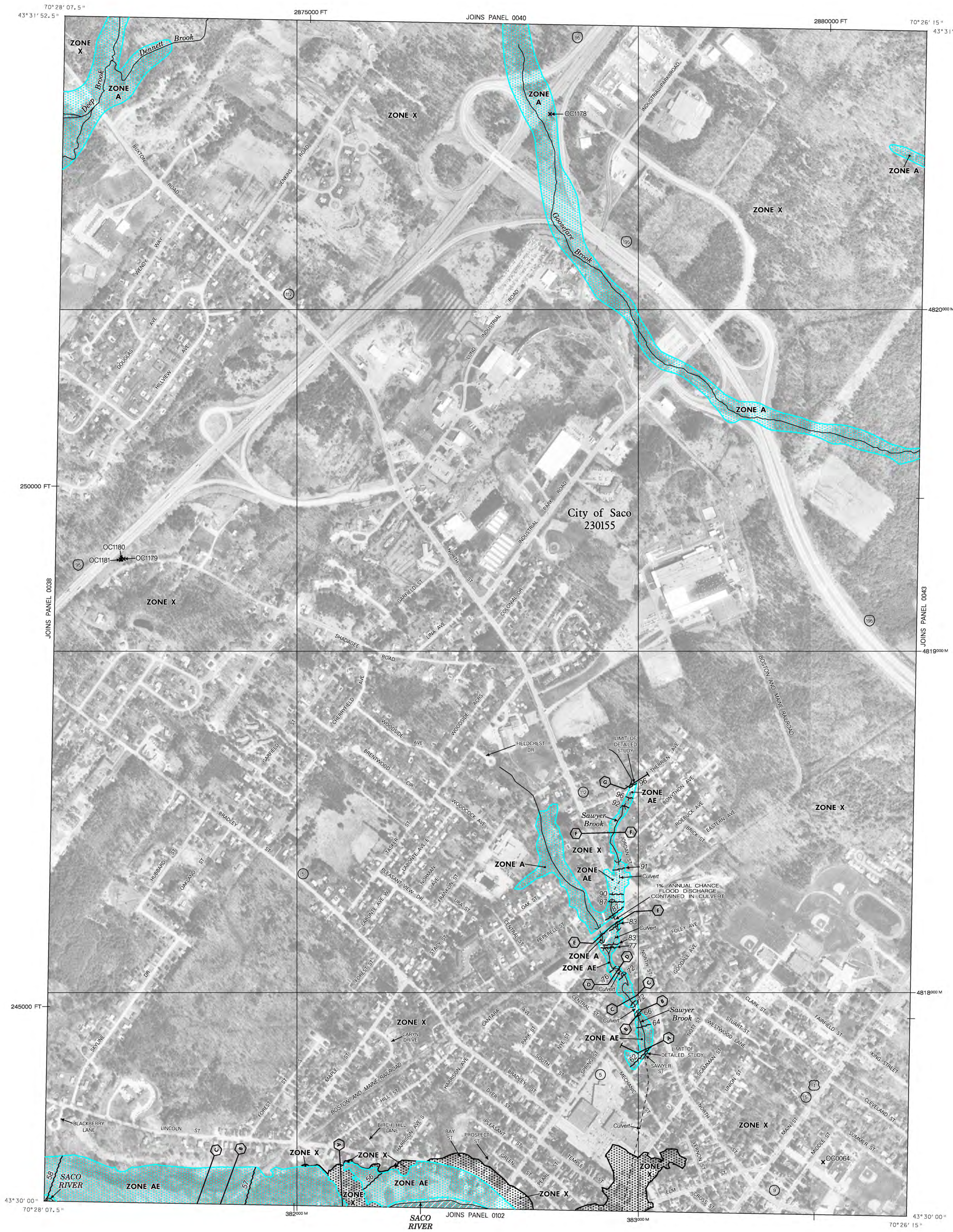
Based on updated topographic information, this map reflects more detailed and up–to–date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for Goosefare Brook, Saco River, and Sawyer Brook in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de–annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map showing the layout of map panels for this jurisdiction.

Contact the **FEMA Map Service Center** at 1–800–358–9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1–800–358–9620 and their website at http://www.msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1–877–336–2627) or visit the FEMA website at www.fema.gov.



LEGEND

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

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

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

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

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary
0.2% annual chance floodplain boundary
Floodway boundary
Zone D boundary
CBRS and OPA boundary
Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A: Cross section line

23 - - - - 23: Transect line

97°07'30", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere

4276000 M — 1000–meter Universal Transverse Mercator grid values, zone 19

600000 FT — 5000–foot grid ticks : Maine State Plane coordinate system, west zone (FIPSZONE 1802), Transverse Mercator projection

DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

• M1.5 — River Mile

MAP REPOSITORY

Saco City Hall, Office of The Building Inspector, 300 Main Street, Saco, Maine 04072 (Maps available for reference only, not for distribution.)

INITIAL IDENTIFICATION
SEPTEMBER 20, 1974
FLOOD HAZARD BOUNDARY MAP REVISIONS
JANUARY 14, 1977
FLOOD INSURANCE RATE MAP EFFECTIVE
JANUARY 5, 1984
FLOOD INSURANCE RATE MAP REVISIONS

March 16, 1998 – to change and add Base Flood Elevations and Special Flood Hazard Areas, to change zone designations, to update map format, to add and update roads and road names, and to reflect updated topographical information.

January 5, 2006 – to update map format, and to change Special Flood Hazard Areas, to add and upadate roads and road names, and to reflect updated topographical information.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1–800–638–6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0039D

FIRM
FLOOD INSURANCE RATE MAP

CITY OF
SACO,
MAINE
YORK COUNTY

PANEL 39 OF 135

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SACO, CITY OF	230155	0039	D

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
2301550039D

MAP REVISED
JANUARY 5, 2006

Federal Emergency Management Agency