

***City of Biddeford***  
**Planning Board**  
**May 04, 2022 6:00 PM Zoom:**  
**May 4, 2022 06:00 PM Eastern Time (US and Canada)**  
**Topic: Planning Board**

Please click the link below to join the webinar:  
<https://biddeford.zoom.us/j/98580042125?pwd=MkdqQmVGU1lSSUwrZVhnTEs2M2JSZz09>  
**Passcode: 694195**  
**Or One tap mobile :**  
**US: +13126266799,,98580042125# or +16465588656,,98580042125#**  
**Or Telephone:**  
**Dial(for higher quality, dial a number based on your current location):**  
**US: +1 312 626 6799 or +1 646 558 8656 or +1 301 715 8592 or +1 346 248 7799 or +1**  
**669 900 9128 or +1 253 215 8782**  
**Webinar ID: 985 8004 2125**  
**International numbers available: <https://biddeford.zoom.us/j/98580042125?pwd=MkdqQmVGU1lSSUwrZVhnTEs2M2JSZz09>**

- 1. DECLARATION OF QUORUM/VOTING MEMBERS**
- 2. ADJUSTMENTS TO THE AGENDA**
- 3. PLANNER'S BUSINESS**
- 4. UNFINISHED BUSINESS**
- 5. NEW BUSINESS**

- 5.A. 2022.15 Shoreland Zoning Permit for Michael Pouliotte to replace a deck in the same footprint at 1 Boat House Lane (Tax Map 51, Lot 3-1) in the SR-1 Zone with Limited Residential overlay.  
Applicant: Michael Pouliotte  
No Agent  
Tax Map/Lot: 51-3-1  
Zone: Suburban Residential-1  
Overlay: Limited Residential  
Defined Land Use: Residential  
Application Type: Shoreland Zoning Permit  
Application Status: Request Final Approval  
Public comments will be accepted for this item.  
[2022.15 1 Boat House Lane draft FOF.pdf](#)  
[2022.15 1 Boat House Lane SR.pdf](#)  
[Application.pdf](#)  
[MPouliotte\\_Elevation 4-18-22.pdf](#)  
[MPouliotte\\_Plan View 4-18-22.pdf](#)
- 5.B. 2022.12 Preliminary Site Plan Application for SteelClad Biddeford, LLC to create a Climate Controlled Self Storage Facility on Enterprise Drive (Tax Map 17, Lot 7-2-1) in

the I-3 Zone (this is a new lot created from 451 Alfred Street).

Applicant: SteelClad Biddeford, LLC

Agent: Acorn Engineering, Inc.

Tax Map/Lots: 17-7-2-1

Zone: Industrial 3

Overlay Zone: N/A

Defined Land Use: Auto Sales (Parking lot area for overflow parking)

Application Type: Preliminary Site Plan Application

Public comments will be accepted for this item.

[Board Report - SteelClad Self-Storage Sketch Plan.pdf](#)

[FULL SUBMISSION PDF.pdf](#)

- 5.C. 2021.08 Request for Preliminary Approval for E & R Development for the West Brook Subdivision located off Winding Creek Lane (Tax Map 8, Lot 3-1 & p/o 3) in the R1-A Zone.

Applicant: E & R Development Corp.

Agent: William Thompson-BH2M

Engineer/Surveyor: Robert Libby-BH2M PLS 2190

Tax Map/Lot: Map 8, Lot 3-1 & p/o 3

Zone: Residential 1A

No overlay

Defined Land Use: Currently wooded parcel with trails

Application Type: Subdivision

Application Status: Requesting Preliminary Approval

Public comments will be accepted for this item

[Board Report - West Brook Subdv Prelim Plan.pdf](#)

[West Brook Packet Letters SW Plans May 4, 2022 Submittal.pdf](#)

[T. Saucier comments 030422.pdf](#)

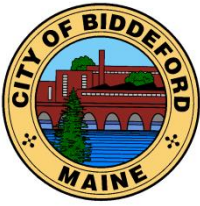
[West Brook Initial Comment Responses.pdf](#)

## **6. OTHER BUSINESS**

## **7. ADJOURN**

**The Board reserves the right to halt official business at 9:30 p.m. Items not heard at tonight's meeting shall be rescheduled to the next meeting of the Board. All materials pertaining to items on the agenda are available for public review at the Biddeford Planning Department, second floor, Biddeford City Hall during normal business hours.**





# CITY OF BIDDEFORD

## Planning and Development Department

205 Main Street  
P.O. Box 586  
Biddeford, ME 04005  
(207) 284-9115

### FINDINGS OF FACT AND CONCLUSIONS OF LAW

#### Shoreland Zoning Permit

Pursuant to the provisions of the City of Biddeford Land Development Regulations Article XIV, Shoreland Zoning, the Biddeford Planning Board has considered the application by **Michael Pouliotte**, including supportive data, public hearing testimony and related materials contained in the record. Based on Public Comment and Staff's review and recommendation, the Planning Board makes the following Findings of Fact and Conclusions of Law:

#### 1. FINDINGS OF FACT

|     | <u>SUBJECT</u>           | <u>INFORMATION</u>                                           |
|-----|--------------------------|--------------------------------------------------------------|
| 1.  | Applicant                | Michael Pouliotte<br>555 Pool Street,<br>Biddeford, ME 04005 |
| 2.  | Property Owner           | Same as Applicant                                            |
| 3.  | Agent                    | None                                                         |
| 4.  | Engineer/Surveyor        | None                                                         |
| 5.  | Project Location         | 1 Boat House Lane                                            |
| 6.  | Map/Lot                  | Map 51, Lot 3-1                                              |
| 7.  | City Approvals Required  | Shoreland Zoning Permit                                      |
| 8.  | Existing Zoning          | Suburban Residential (SR-1)                                  |
| 9.  | Overlay Zoning           | Limited Residential Shoreland Overlay                        |
| 10. | Existing Use             | Residential                                                  |
| 11. | Proposed Use             | Residential                                                  |
| 12. | Uses in the Vicinity     | Residential                                                  |
| 13. | Parcel Size              | 2.9 acres                                                    |
| 14. | Water Supply             | Public                                                       |
| 15. | Sewerage Disposal        | Private septic                                               |
| 16. | Solid Waste Disposal     | Public                                                       |
| 17. | Fire Protection          | City of Biddeford                                            |
| 18. | Parking Spaces Required  | N/A                                                          |
| 19. | Parking Spaces Provided  | N/A                                                          |
| 20. | Ownership of Road        | Private                                                      |
| 21. | Waivers Needed/Requested | None                                                         |

|     |                                     |                                                                                  |
|-----|-------------------------------------|----------------------------------------------------------------------------------|
| 22. | Waivers Granted                     | None                                                                             |
| 23. | Additional Approvals/Permits Needed | Saco River Corridor Commission (4/27/2022)<br>Maine DEP Permit By Rule (granted) |
| 24. | Fees Paid (LDR Attachment A)        | All Fees Paid                                                                    |
| 25. | Planning Board Review History       | SLZ Permit Approval 5/4/2022                                                     |

## 2. CONCLUSIONS OF LAW

Will maintain safe and healthful conditions;

Will not result in water pollution, erosion, or sedimentation to surface waters;

Will adequately provide for the disposal of all wastewater;

Will not have an adverse impact on spawning grounds, fish, aquatic life, bird or other wildlife habitat;

Will conserve shore cover and visual, as well as actual, points of access to inland and coastal waters;

Will protect archaeological and historic resources as designated in the comprehensive plan;

Will not adversely affect existing commercial fishing or maritime activities in a commercial fisheries/maritime activities district;

Will avoid problems associated with floodplain development and use; and

Is in conformance with the provisions of Section 15, Land Use Standards.

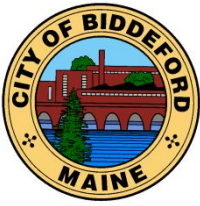
### Approval Granted:

Based on the evidence available and conclusions above, the Biddeford Planning Board approves the Shoreland Zoning Permit for the proposed project summarized above, located at 1 Boat House Lane (Tax Map 51, Lot 3-1) in accordance with the submitted application, supporting data, representations made, and other related materials on file, and with the following Conditions of Approval:

- 1. Standard Conditions of Approval apply.**
- 2. The applicant shall obtain all other pertinent local, state, and federal permits, licenses, and insurance.**

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Planning Board Chairman



# CITY OF BIDDEFORD

## Planning and Development Department

Hannah Bonine  
Assistant City Planner  
205 Main Street  
P.O. Box 586  
Biddeford, ME 04005  
(207) 284-9115  
[Hannah.Bonine@biddefordmaine.org](mailto:Hannah.Bonine@biddefordmaine.org)

### PLANNING BOARD REPORT

TO: Chair Southwick and the Biddeford Planning Board

FROM: Hannah Bonine, Assistant City Planner

DATE: April 27, 2022

A handwritten signature in cursive script that reads "Hannah Bonine".

**RE: 2022.15 Shoreland Zoning Permit for Michael Pouliotte to replace a deck with the same footprint at 1 Boat House Lane (Tax Map 51, Lot 3-1) in the SR-1 Zone and Limited Residential Overlay.**

MEETING DATE: Wednesday, May 4, 2022 at 6:00 pm

#### 1. INTRODUCTION

The applicant is before the Board seeking approval for a Shoreland Zoning Permit. The applicant wishes to reconstruct an existing 15' by 16' deck, deck joists, and railing that is cantilevered over the Saco River. The deck is attached to a small boathouse and was built around 1970. The Saco River Corridor Commission granted permit approval at their meeting on 4/27/2022. A Permit-By-Rule has also been issued by the Maine DEP.

#### 2. PROJECT INFORMATION

|    | <u>SUBJECT</u>          | <u>INFORMATION</u>                                           |
|----|-------------------------|--------------------------------------------------------------|
| 1. | Applicant               | Michael Pouliotte<br>555 Pool Street,<br>Biddeford, ME 04005 |
| 2. | Property Owner          | Same as Applicant                                            |
| 3. | Agent                   | None                                                         |
| 4. | Engineer/Surveyor       | None                                                         |
| 5. | Project Location        | 1 Boat House Lane                                            |
| 6. | Map/Lot                 | Map 51, Lot 3-1                                              |
| 7. | City Approvals Required | Shoreland Zoning Permit                                      |
| 8. | Existing Zoning         | Suburban Residential (SR-1)                                  |
| 9. | Overlay Zoning          | Limited Residential Shoreland Overlay                        |

|     |                                     |                                                                                  |
|-----|-------------------------------------|----------------------------------------------------------------------------------|
| 10. | Existing Use                        | Residential                                                                      |
| 11. | Proposed Use                        | Residential                                                                      |
| 12. | Uses in the Vicinity                | Residential                                                                      |
| 13. | Parcel Size                         | 2.9 acres                                                                        |
| 14. | Water Supply                        | Public                                                                           |
| 15. | Sewerage Disposal                   | Private septic                                                                   |
| 16. | Solid Waste Disposal                | Public                                                                           |
| 17. | Fire Protection                     | City of Biddeford                                                                |
| 18. | Parking Spaces Required             | N/A                                                                              |
| 19. | Parking Spaces Provided             | N/A                                                                              |
| 20. | Ownership of Road                   | Private                                                                          |
| 21. | Waivers Needed/Requested            | None                                                                             |
| 22. | Waivers Granted                     | None                                                                             |
| 23. | Additional Approvals/Permits Needed | Saco River Corridor Commission (4/27/2022)<br>Maine DEP Permit By Rule (granted) |
| 24. | Fees Paid (LDR Attachment A)        | All Fees Paid                                                                    |
| 25. | Planning Board Review History       | SLZ Permit Approval 5/4/2022                                                     |

### 3. COMPLIANCE WITH CITY ORDINANCES

Applications for a Shoreland Zoning Permit must satisfy the following, as stated in Section 16.D of the Biddeford Shoreland Zoning Ordinance:

*Will maintain safe and healthful conditions;*

*Will not result in water pollution, erosion, or sedimentation to surface waters;*

*Will adequately provide for the disposal of all wastewater;*

*Will not have an adverse impact on spawning grounds, fish, aquatic life, bird or other wildlife habitat;*

*Will conserve shore cover and visual, as well as actual, points of access to inland and coastal waters;*

*Will protect archaeological and historic resources as designated in the comprehensive plan;*

*Will not adversely affect existing commercial fishing or maritime activities in a commercial fisheries/maritime activities district;*

*Will avoid problems associated with floodplain development and use; and*

*Is in conformance with the provisions of Section 15, Land Use Standards.*

This project, as it is not located in the waters of the Saco River and is replacing an existing structurally unsound deck, satisfies the provisions for granting a Shoreland Zoning Permit. Staff

believe this replacement is necessary for the safety of the property owners and users of the deck.

WAIVER REQUESTS

None

4. OUTSTANDING ITEMS TO BE ADDRESSED PRIOR TO APPROVAL

None

5. STAFF RECOMMENDATIONS

Staff recommends that the Planning Board approve the Shoreland Zoning Permit.

6. ATTACHMENTS

1. Application
2. Findings of Fact

**CITY OF BIDDEFORD, MAINE**  
**PLANNING BOARD**  
P.O. Box 586, 205 Main Street Biddeford, Maine 04005  
207-284-9115

**APPLICATION FORM**

**Type of Application:**

- |                                                             |                                           |                                      |
|-------------------------------------------------------------|-------------------------------------------|--------------------------------------|
| <input checked="" type="checkbox"/> Shoreland Zoning Permit | <input type="checkbox"/> Site Plan Review | <input type="checkbox"/> Extraction  |
| <input type="checkbox"/> Conditional Use Permit             | <input type="checkbox"/> Subdivision      | <input type="checkbox"/> Private Way |
| <input type="checkbox"/> Other: _____                       |                                           |                                      |

**Applicant Information:**

Applicant's Name: Michael Poullette  
Applicant's Mailing Address: 535 Pool Street Biddeford ME 04005  
Applicant's Telephone: 207-252-0841

What is Applicant's legal interest in the property?

- ☒ Owner    ☐ Potential Buyer with Contract    ☐ Lease/Rental Agreement

Owner's Name: \_\_\_\_\_  
Owner's Address: same as applicant  
Owner's Telephone: \_\_\_\_\_

Agent's Name: \_\_\_\_\_  
Agent's Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

Engineer/Surveyor: \_\_\_\_\_  
Engineer/Surveyor's Address: \_\_\_\_\_  
Telephone: \_\_\_\_\_

**Project Location and Lot Information:**

Street Address: 1 Boat House Lane Biddeford ME 04005  
Tax Map: 51 Lot: 3-1  
Current Zoning: SR-1 Shoreland Zoning: LR

Size of lot: 2.9 ☒ acres ☐ s.f. Lot Frontage: 50' Road 413' +/- shore

Existing Use of Property: Residential  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Property currently serviced by:

|                                                  |                                                   |
|--------------------------------------------------|---------------------------------------------------|
| <input type="checkbox"/> City Road               | <input checked="" type="checkbox"/> Private Road  |
| <input type="checkbox"/> Public Sewer            | <input checked="" type="checkbox"/> Septic System |
| <input checked="" type="checkbox"/> Public Water | <input type="checkbox"/> Private Well             |
| <input checked="" type="checkbox"/> Public Trash | <input type="checkbox"/> Private Hauler           |

Slope Conditions in Area of Construction (if applicable):

☐ Flat (0-3 % slope) ☒ Rolling (3-8% slope) ☐ Hilly (8-15% slope) ☐ Steep (15% + slope)

Are there any wetlands or waterbodies on the site? ☒ Yes ☐ No If yes, attach information

Do you plan to bring fill onto the lot? ☐ Yes ☒ No If yes, attach information

**Description of proposed use of property:**

Project/Proposed Use Description: Residential  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Property to be serviced by:

|                                                  |                                                   |
|--------------------------------------------------|---------------------------------------------------|
| <input type="checkbox"/> City Road               | <input checked="" type="checkbox"/> Private Road  |
| <input type="checkbox"/> Public Sewer            | <input checked="" type="checkbox"/> Septic System |
| <input checked="" type="checkbox"/> Public Water | <input type="checkbox"/> Private Well             |
| <input checked="" type="checkbox"/> Public Trash | <input type="checkbox"/> Private Hauler           |

Is this project part of a larger project? ☐ Yes ☒ No

☐ If in a Shoreland Zone:

Percent of residential lot coverage (Max. 20%):

N/A

Percent of structure expansion (Max. 30%):

N/A

☐ If Subdivision Review, number of lots proposed:

N/A

☐ If a Private Way is proposed, number of lots served:

N/A

☐ If Site Plan Review, you must provide the following information:

Total new square feet footprint of structures:

N/A

Total new square feet paving/parking:

N/A

Waiver Requests (attach details):

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

**Attachments:**

A. Letters of Approval

- ☐ Fire Department - Contact Chief or Deputy Chief - 282-9986
- ☐ Ability to Serve for Water Service – Maine Water - 282-1543
- ☐ Ability to Serve for Sewer Service- Engineering Dept (Sewer) - Tom Milligan 284-9118
- ☐ Police Department - E-911 Road Name Designation - Contact Joanne Fisk - 282-5127

B. Letter to Planning Board describing project, waiver requests, proposed improvements, addressing permit requirements, etc.

C. Photographs of site.

D. Architectural renderings/drawings of proposed buildings, as required.

E. Engineered Plans, as required.



**Fees (due at time of application):**

Refer to "Attachment A Fees and Charges" of the Land Development Regulations for more information. Consult with Planning Staff if you have questions.

**Required Signatures:**

By signing this application, as the foresaid applicant or authorized agent:

- I certify that I have read and completely understand the application;
- I certify that the information contained in this application and it's attachments are true and correct;
- I understand that all information provided on this form and all other documents submitted as part of my proposal is a matter of public record;
- I understand that copies of this information may be supplied upon request to an interested party.
- I understand that additional funds may be required through the course of review for special studies, legal review costs, and/or engineering review.
- I understand that by submitting this application I am not guaranteed a place on any particular agenda. I further understand that the City Planner will place me on an agenda for review when the application is deemed substantially complete.

☐ Project proposed to have 1 acre or more of site disturbance:

**-Project may need to apply for a Maine Construction General Permit and shall comply with the requirements of DEP Chapter 500 Stormwater Regulations, as they apply.**

**Signature of applicant:**



Date:

4/1/2020

**Signature of owner of property:**

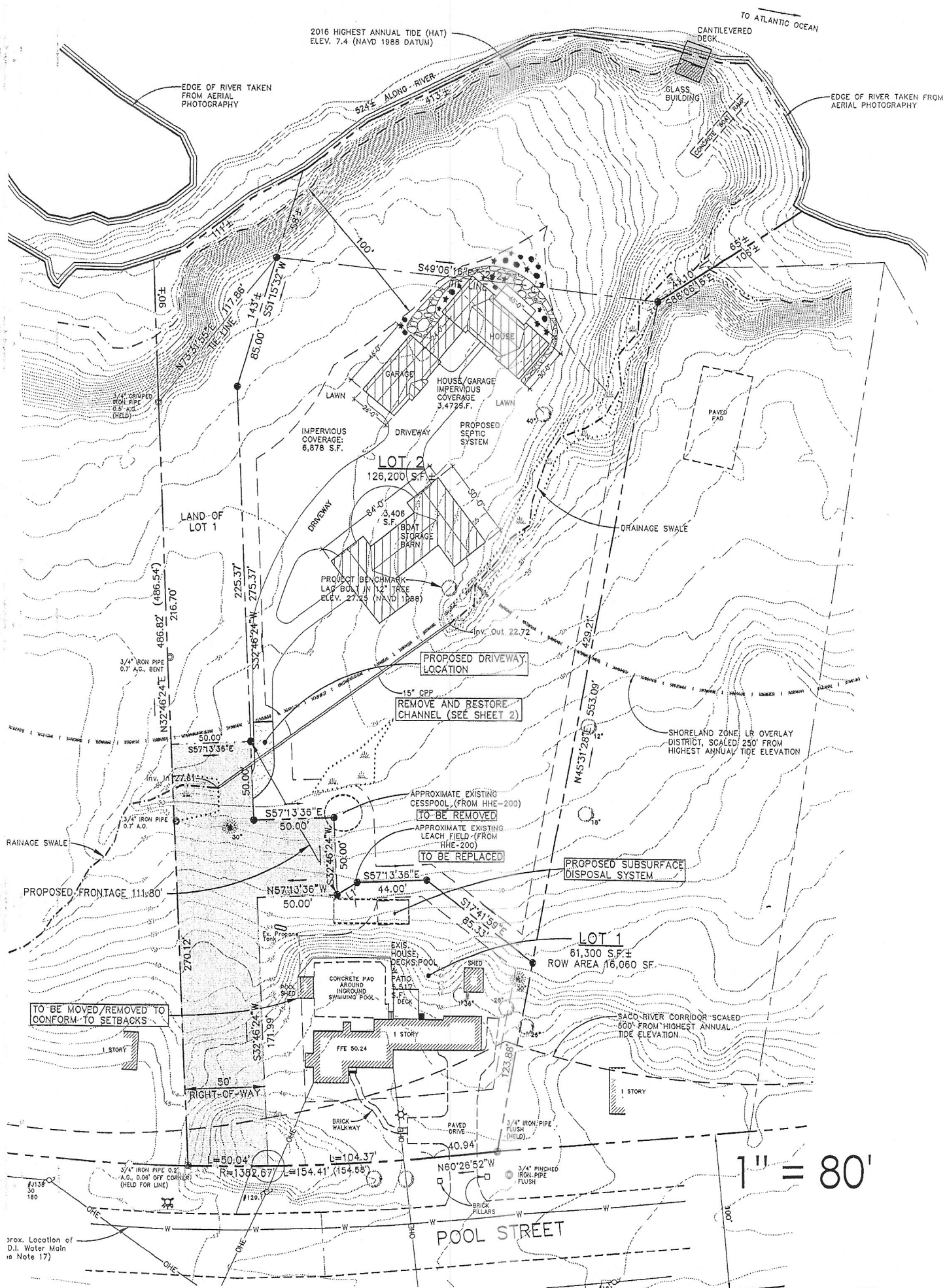


Date:

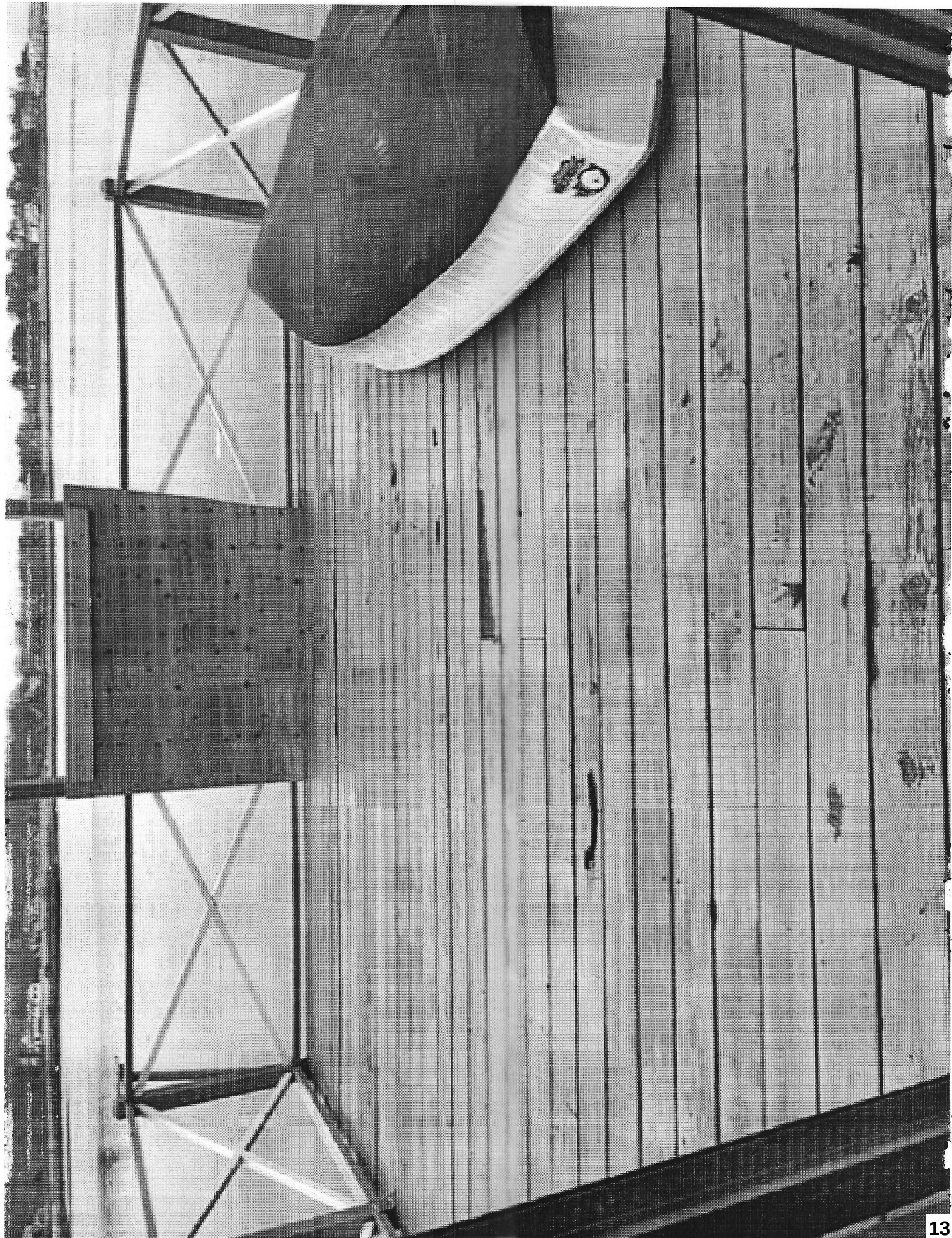
4/1/2020

**IF PLAN APPROVAL IS ANTICIPATED, PROVIDE 2 FULL SIZE MYLARS & 2 FULL SIZE PAPER COPIES FOR BOARD SIGNATURE (AS APPLICABLE).  
CHECK WITH PLANNING STAFF FOR CLARIFICATION.**

SACO RIVER

















EXISTING  
BOAT HOUSE

36" RAIL HEIGHT

4"x4" POSTS

2"x6" RAIL CAP

CABLE  
RAILS  
4" ON CENTER

GANGWAY  
TO DOCK

16" ON CENTER 2"x6" PT JOISTS

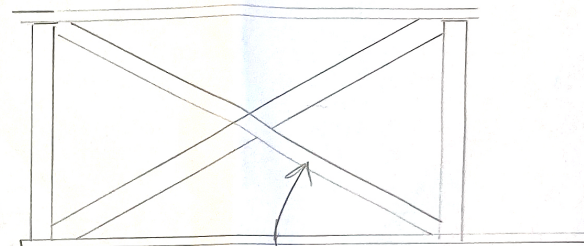
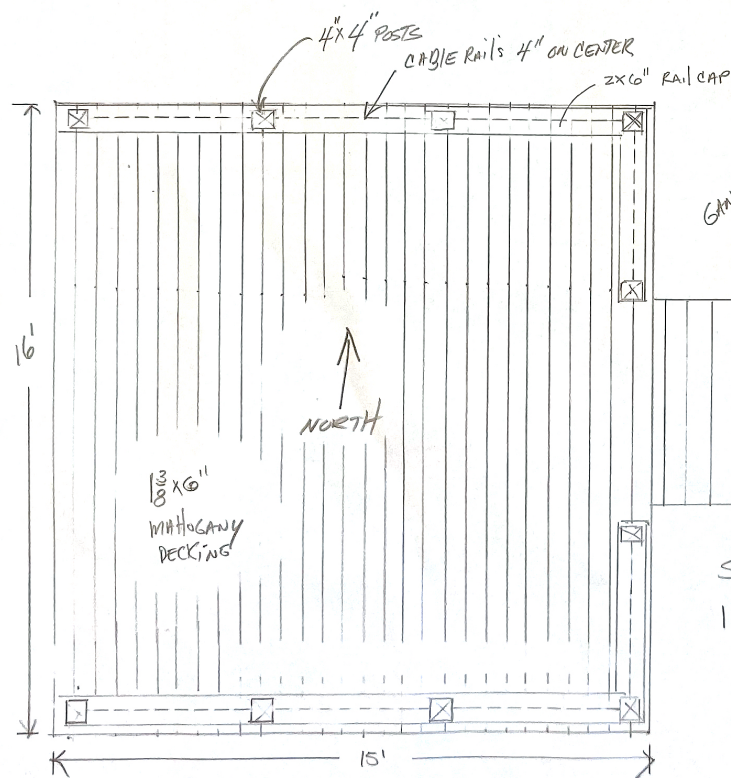
③ GALV. STRUT POST LOCATED ON EACH END AND MIDDLE  
PINED TO LEDGE AND I BEAM JOISTS  
TO REPLACE SINGLE EXISTING RUSTED POST.

LEDGE

MICHAEL POULIOTTE / TRANSITIONAL WORKS INC  
1 BOAT HOUSE LANE / 4/7/2022

SCALE  $\frac{1}{2}" = 1'$

REPLACE: DECKING, JOISTS, AND RAILINGS  
REPLACE AND ADD TWO STRUT POSTS



EXISTING RAIL STYLE  
TO BE REPLACED WITH  
CABLE RAILS AS PER  
DRAWINGS

GANGWAY  
TO DOCK

SCALE  $\frac{1}{2}" = 1'$

1 BOAT HOUSE LANE / 4/7/2022  
REPLACE: DECKING, JOIST, AND RAILINGS  
REPLACE AND ADD TWO STEEL POSTS

PLANNING BOARD  
REPORT

April 27, 2022

Biddeford Planning Board  
Hannah Bonine, Assistant City Planner  
City of Biddeford  
205 Main Street  
Biddeford, Maine 04005

Application: Self Storage Development– Steelclad Biddeford, LLC  
451 Alfred Street (Tax Map 17 Lot 7-2)

**Sketch Plan Review**

Review Status: New plan application.

Board members and Ms. Bonine,

The following application information has been provided for review:

1. Application form dated 3/23/2022.
2. Cover letter dated 10/12/2021 and project narrative; *Re: 5 Points – Proposed Biddeford Regional College of Technology* prepared by Trillium Engineering Group.
3. Plan set entitled: *Conditioned Self-Storage, Biddeford, Maine*. Acorn Engineering, Inc. Dated 3/23/2022.
4. Architectural Plan set entitled: *Biddeford Self Storage, Enterprise Drive. Schematic Design*. Prepared by SAA Architects. Dated 3/15/2022.
5. Stormwater Report: *DEP Stormwater management law Permit Application, Conditioned Self-Storage*. Prepared by Acorn Engineering, LLC, dated 4/1/2022.

With review of the above information and the Land Development Regulations, I offer the following comments on compliance with the City's ordinances.

**PROJECT DESCRIPTION**

The project site, located in the Industrial-3 Zone, is a recent 3.2 acre lot split from existing Five Star Auto Sales property. The proposal is to establish a 20,000 SF conditioned self-storage (3-story)



facility on 2.7 acres with access from West Cole Road, adjacent to the YMCA daycare facility. The site is encumbered by a CMP easement and other utility and access easements. Self-storage is permitted as a conditional use in the Industrial -3 district.

### **REVIEW PROCESS**

The proposed development is before the Planning Board as required by Article XI Site Plan Review of the City's Land Development Regulations. Per Section 4.B.II.D any changes of use affecting 10,000 SF or more of floor area is subject to Major Site Plan Review.

As outlined in Part II Procedure for Site Development, Sec. 3 requires major project review to be conducted in two steps; sketch plan and final plan.

### **COMPLIANCE WITH THE CITY'S ORDINANCES**

The applicant should review the applicable site plan standards (Article XI, Sec. 5) and determine compliance or request a waiver rationale to the Board (Article XI, Sec. 9). The written response to the Conditional Use standards submitted should include slightly more elaboration on how the standards are met.

1. Gateway Zone. Article V, Section 2.e. identifies the Industrial -3 base zone as a Gateway and major entrance to the City, whereby requiring more consideration by the Planning Board as to the development's design and landscaping and building facades.
  - a. The proposed building façade renovation does not appear to use masonry materials as required in the Industrial-3 zone, Section 5.B.4.a.2 of the Article XI Site Plan Review (Part II). Building elevation, renderings and siding information has been submitted. Per the provision, alternative finishes may be permitted if demonstrated to the Planning Board that such façade materials will advance the City's intent for a more attractive gateway.
2. Site Design.
  - a. Pavement, per Article XI, Section 5.B.4.f is not permitted in the side and rear property setbacks. If the design cannot conform to this standard the applicant will need to submit a waiver rationale for the Board's consideration.
  - b. Proposed parking is noted on the plan (C-10) under the *Space and Bulk* table as being 28 spaces, but it appears only 25 are provided (which is noted on the parking summary table). Please clarify.
  - c. Lot coverage and the associated calculations should be provided on the site plan demonstrating the conformance to the ordinance.
3. Landscape Design. To contribute to advancing the property's conformance to City's landscaping standards (Art. XI, Sec. 5.B.4.d) as well as to the Gateway Zone (Article V, Sec.

2.e) a Landscape Plan should be prepared for review that includes screening views from Alfred Road (Rt. 111).

4. City Engineering: Initial comments include the following:

- a) Where is the drainage from the parcel to the south going? The topo lines are really very light?
- b) We will certainly need an analysis on the downstream receiving system capacity for the proposed increase of flow for the 25-year storm. We also would like to see 50- and 100-year storm analysis and what impact that would have on that cross culvert going under Route 111 and downstream piping.
- c) We recommend that the sewer connection have a back flow preventer installed.
- d) New MS4 permit requires that sites have low impact development (LID) techniques installed, not sure that the underground storage/sand filter system would meet that requirement? We will run it by our stormwater consultant.
- e) At this time what they have provided is probably OK for a conceptual plan to get the ball rolling and for conditional use discussions but certainly a lot more work appears to be needed to get the plans up to preliminary and final stages. Should let Tom Saucier, peer-review engineer, review application for more detail.

5. Other comments:

- f) There are references to this parcel as including an *Enterprise Drive*. The Boundary Survey does not appear to depict a private street/road. If there is a formal Right-Of-Way associated with Enterprise Drive, it needs to be depicted on the plan with setbacks. Can the applicant clarify?
- g) Eastern Trail plans for connecting existing trails between Biddeford and Saco have indicated an alternative route through this site. Has there been any discussion with the Eastern Trail and its consultant vhb?

## **WAIVER REQUESTS**

None requested. The applicant should review compliance with standards and provide a list of those standards they seek a waiver from along with a rationale for the Board to grant it.

## **CONCLUSION**

The submitted application provides sufficient amount of information for the Planning Board to comment on and ask questions as to familiarize itself with the project. The Board should share its expectations for addressing comments by staff, board members or the public in the subsequent submissions, as well as determining if there is specific information in addition to the required application submittals that it will need to make a final determination.

Per Article XI, Sec. 3.C.3 (Review Procedures/Procedure for major project development review), after completing its review of the sketch plan application the *Planning Board shall vote to deny, approve, or approve with conditions*. The Board should determine if it needs any further information to determine action on the sketch plan.

Feel free to contact me with questions.

Best regards,



Christopher Di Matteo  
City of Biddeford Contract Planner.  
cdimatteo@longmeadowpla.com  
207.604.4245



# SITE PLAN SUBMISSION

## CONDITIONED SELF-STORAGE

### CITY OF BIDDEFORD



Prepared By:

**ACORN ENGINEERING, INC.**

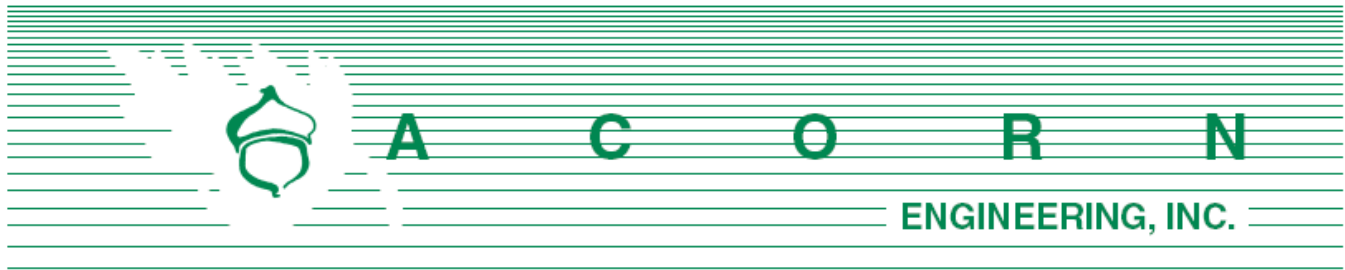
For:

**STEELCLAD BIDDEFORD, LLC**

March 23rd, 2022







Planning Board & Planning Department  
City of Biddeford, Maine  
205 Main Street  
Biddeford, ME 04005

March 23<sup>rd</sup> 2022

Subject: Site Plan Application: Climate Controlled Self-Storage

Members of the Board:

On behalf of SteelClad Biddeford, LLC we are pleased to submit the accompanying package of submission materials related to the proposed redevelopment located between West Cole Road and Alfred Street (Map: 17 Lot: 7-2-1) in the I-3 Industrial Zone. The project proposes to repurpose the existing 0.5-acre gravel parking lot and 2.7 acre vacant parcel into a three-story 20,000 SF footprint conditioned self-storage facility. Storage facilities are characterized as a Conditional use within the I-3 industrial zoning district of Biddeford and are consistent with the intent of the I-3 zone.

The site will be accessed through Enterprise Drive, an existing gravel private road off West Cole Road. The development intends to upgrade the existing road to provide a two-way paved road to access the facility which will be gated for existing tenants while providing a parking area for guests outside of the gate. The site design allows tenants to directly access first floor units in addition to providing 22 tenant parking spaces for internal or upper level units accessed by an elevator or stairs.

The project is located within the Thatcher Brook watershed which is classified as an urban impaired stream by the Maine DEP. Given the project will create over 20,000 square-feet of impervious area, the project will meet the basic and general standards under chapter 500 stormwater management rules. The project will collect and treat 95% of proposed impervious area through underdrained subsurface sand filters which represents a significant upgrade to the existing condition which presently treats 0% of the impervious area. A Stormwater Law application is being submitted to the Maine DEP and will be reviewed concurrently with the Site Plan application.

We are excited to submit this urban infill project which will provide a necessary service to local residents as living spaces become more condensed and valuable. We would request to be placed on the next available Planning Board agenda. If you have any questions regarding this project, or the completeness of the application, please do not hesitate to contact me.

Sincerely,

Samuel J. Lebel, P.E.  
Project Manager  
Acorn Engineering, Inc.

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City of Biddeford Planning and Development  
205 Main Street  
Biddeford, Maine 04005

**March 21, 2022**

**Re: New Self Storage Facility**

To Whom it May Concern,

SAA Architects, Inc.  
600 North Hartley Street  
Suite 150  
York PA 17404  
T 717.843.3200  
F 717.699.0205  
[www.SAAarchitects.com](http://www.SAAarchitects.com)

Mark D. Shermeyer  
AIA, NCARB, LEED® GA

Danika R.S. Dallam  
RA, NCARB, LEED® GA

We are designing a new self-storage facility that will be located adjacent to Alfred Street, parallel to the railroad track and accessed off West Cole Road. Due to the orientation of the property, the North-East elevation of the building will be viewed from Alfred Street when traveling West and the North-West elevation of the building will be viewed beyond the existing Five Star Auto Sales building when traveling East on Alfred Street.

The exterior forms and finishes are strongly influenced by the Life Storage brand design standards. The primary material facing Alfred Street is White Alpolic metal panel, which covers the entire North-East elevation and roughly 50% of the North-West elevation. The remainder of the North-East elevation is to be EIFS with some Metal Accent panel and glazing on the South-West corner that will be viewed as you approach the building from the access drive. The South-East elevation is split between metal panel and glazing and White Alpolic metal panel. The Long South-East side that faces the railroad track is largely vertical metal siding. The color palette will be White, Black and Grey with brand accents of Yellow and Blue.

We have designed the most visible elevations to have the more sophisticated forms and finishes, while the entire building has a clean, uncomplicated look that is representative of the buildings function. The base of the building has a concrete look panel, for the purpose of grounding and protecting the building perimeter.

We believe that the materials are attractive and appropriate for the function and location of the building, particularly considering the existing adjacent buildings. Integrating stone or brick in any significant way does not meet the brand design standard and will be hidden once the Phase 2 building is constructed.

Sincerely,



Danika R S Dallam, AIA  
Vice President

Steelclad Biddeford LLC  
547 Riverside Street  
Portland, ME 04103

February 14, 2022

RE: 451 Alfred Street Land in Biddeford, ME for Self Storage Development

To whom it may concern,

Steelclad Biddeford LLC hereby grants Acorn Engineering the authority to act on our behalf in matters concerning permitting when engaging with Local and State of Maine Authorities. If you have questions regarding this authorization, you can reach me at (207) 776-0913 or via email at [robertleblanc1@me.com](mailto:robertleblanc1@me.com).

Sincerely,

A handwritten signature in black ink, appearing to read 'Robert LeBlanc', with a long horizontal flourish extending to the right.

Robert LeBlanc owner

Steelclad Biddeford LLC



---

# SECTION 1

**RIGHT, TITLE, OR INTEREST**



## **Section 1: Title, Right, or Interest**

Please see attached for a copy of the deed recorded at the York County Registry of Deeds.



DLN 1002240180673

**QUITCLAIM DEED WITH COVENANT**  
Maine Statutory Short Form

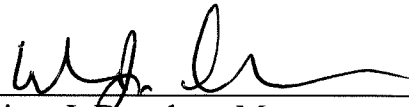
KNOW ALL BY THESE PRESENTS THAT **FIVE STAR HOLDINGS, LLC**, a Maine limited liability company with a place of business in the City of Biddeford, County of York, State of Maine, for consideration paid, grants to **STEELCLAD BIDDEFORD, LLC**, a Maine limited liability company with a place of business in the City of Portland, County of Cumberland, State of Maine, with a mailing address 25 Penrith Road, Portland, Maine 04102 with **QUITCLAIM COVENANT**, the land, together with any improvements thereon, situated in the City of Biddeford, County of York, and State of Maine more particularly described in **Exhibit A** attached hereto and made a part hereof.

IN WITNESS WHEREOF, the said FIVE STAR HOLDINGS, LLC has caused this instrument to be signed and sealed this 20<sup>th</sup> day of January, 2022.

WITNESS:

FIVE STAR HOLDINGS, LLC

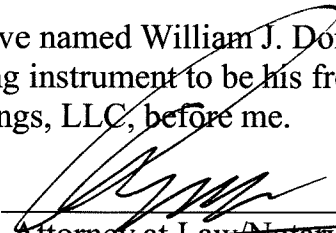
By

  
William J. Donahue, Manager

STATE OF MAINE  
COUNTY OF CUMBERLAND

January 20, 2022

Then personally appeared the above named William J. Donahue, in his said capacity, and acknowledged the foregoing instrument to be his free act and deed, and the free act and deed of said Five Star Holdings, LLC, before me.

  
Attorney at Law/Notary Public

Dr. A. Anderson  
Printed Name

Maine R.E. Transfer Tax Paid

## EXHIBIT A

A certain lot or parcel of land shown as “Area to be Conveyed to SteelClad Biddeford, LLC” on a plan entitled “Proposed Lease Areas” prepared for Five Star Holdings, LLC by Northern Survey Engineering, LLC, Project No. 21074, Dated September 1, 2021 and recorded in the York County Registry of Deeds in Plan Book 421, Page 18 (hereafter referred to as the “*NORSE Plan*”), being situated on the northerly sideline of West Cole Road, so called, and the southeasterly sideline of Alfred Street (Route 111), so called, in the City of Biddeford, County of York, State of Maine, and being more particularly described as follows:

**Beginning** at a capped iron rod set on the northerly sideline of said West Cole Road at the land of Five Star Holdings, LLC now or formerly being leased to the Northern York County Family YMCA, (recorded in the York County Registry of Deeds in Book 14580, Page 55, hereafter referred to as the YMCA parcel), and being further located N 87° 45’ 38” W, a distance of 113.59 feet from a capped #5 rebar found at the southwesterly corner of the said YMCA Parcel;

Thence N 58° 41’ 54” W, a distance of 66.29 feet along the northerly sideline of said West Cole Road to an angle iron found at the southwesterly corner of the other land of Five Star Holdings, LLC (recorded in said Registry of Deeds in Book 17072, Page 179, hereafter referred to as the “Beacon Press Parcel”);

Thence N 36° 41’ 56” E, a distance of 392.30 feet along the said Beacon Press Parcel and land to be retained by Five Star Holdings, LLC to a capped iron rod set on the westerly sideline of a proposed utility easement shown on the *NORSE Plan*;

Thence S 15° 28’ 15” E, a distance of 9.08 feet through the land of said Five Star Holdings, LLC to a capped iron rod set;

Thence N 36° 41’ 56” E, a distance of 388.35 feet through the land of said Five Star Holdings, LLC to a capped iron rod set;

Thence N 28° 24’ 56” W, a distance of 71.81 feet through the land of said Five Star Holdings, LLC to a point;

Thence N 16° 32’ 20” W, a distance of 4.24 feet through the land of said of Five Star Holdings, LLC to a capped iron rod set on the southeasterly sideline of said Alfred Street;

The following 7 calls run along the southerly sideline of said Alfred Street:

1. Thence in an easterly direction along a non-tangential curve to the left having a radius of 9887.68 feet and an arc length of 99.95 feet to a capped #5 rebar found (“PLS 2114”), having a cord bearing of N 74° 34’ 28” E with a chord distance of 99.95 feet from the last described point;

2. Thence along a tangential curve to the left having a radius of 9887.68 feet and an arc length of 61.41 feet to a capped #5 rebar found ("PLS 2114"), having a cord bearing of N 74° 06' 25" E with a chord distance of 61.41 feet from the last described point;
3. Thence N 73° 55' 45" E, a distance of 47.42 feet to a capped #5 rebar found ("PLS 2114");
4. Thence N 36° 41' 56" E, a distance of 5.42 feet to a capped #5 rebar found ("PLS 2114");
5. Thence N 80° 14' 02" E, a distance of 50.68 feet to a capped #5 rebar found ("PLS 2114");
6. Thence N 74° 34' 29" E, a distance of 100.06 feet to a capped #5 rebar found ("PLS 2114");
7. Thence N 74° 33' 32" E, having a distance of 35.24 feet to a capped #5 rebar ("PLS 2114") found at the land now or formerly of the Boston & Maine Corporation;

The following 4 calls run along the northwesterly sideline of the land of the said Boston & Maine Corporation:

1. Thence along a non-tangential curve to the right with a radius of 9128.16 feet, having an arc length of 422.25 feet to a capped #5 rebar ("PLS 2114") set on the southwesterly sideline of Alfred Street, so called, having a chord bearing of S 37° 12' 12" W, and chord length of 422.21 feet from the last point;
2. Thence S 38° 31' 43" W a distance of 106.86 feet to a capped #5 rebar found ("PLS 2114");
3. Thence S 76° 51' 31" W a distance of 0.93 feet to a point;
4. Thence S 38° 31' 07" W, a distance of 315.80 feet to a capped iron rod set at the southeasterly corner of the parcel shown as "Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres" on the said *NORSE Plan*;

Thence N 53° 26' 45" W a distance of 130.21 feet along the said "Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres" to a capped iron rod set;

Thence S 36° 41' 56" W a distance of 30.18 feet along the said "Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres" at the northwesterly corner of the said YMCA Parcel;

Thence S 36° 41' 56" W a distance of 131.04 feet along the land of said YMCA Parcel to a capped iron rod set";

Thence N 53° 18' 04" W a distance of 13.91 feet along the land of said YMCA Parcel to a capped iron rod set;

Thence S 36° 41' 56" W a distance of 55.35 feet along the land of said YMCA Parcel to a capped iron rod set at the northwesterly corner the parcel shown as "Area to be Transfer from Map 174, Lot 7-3 to Map 17, Lot 7-2-1, 0.03 Acres";



Thence S 2° 33' 12" E, a distance of 69.40 feet along the said "Area to be Transfer from Map 174, Lot 7-3 to Map 17, Lot 7-2-1, 0.03 Acres" to the **Point of Beginning**.

Being a portion of the land conveyed to Five Star Holdings, LLC recorded in said Registry of Deeds in Book 14649, Page 390, Book 14233, Page 943 and Book 14580, Page 55.

The Grantor hereby excepts and reserves for itself, its successors and assigns an appurtenant perpetual access easement as shown on the Norse Plan and more particularly described on Exhibit B attached to and made a part of this deed (the "Access Easement"), and an appurtenant perpetual utility easement as shown on the Norse Plan and more particularly described on Exhibit C attached to and made a part of this deed (the "Utility Easement", and together with the Access Easement, the "Easements", or the "Easement Areas"). The Easements shall be for the following purposes and subject to the following terms and conditions:

The Access Easement shall be for ingress and egress by foot and vehicles over the Access Easement area for all purposes now or hereafter customary of an access way, for the benefit of Grantor's retained land, including the rights of installation, maintenance, repair and replacement of any improvements reasonably necessary to accomplish the foregoing, and utilities. The Utility Easement shall be for installation, use, maintenance, repair, improvement, replacement and reconstruction of utility lines, services, conduits, and similar customary appurtenances within the Utility Easement area for providing any and all types of utility services (including without limitation electrical, telecommunications, sewer, water, and gas) for the benefit of Grantor's retained land. Grantor shall have the right to enter upon Easement Areas with persons, machinery and equipment to construct, install, improve, maintain, repair and replace any improvements, structures, or components within the Easement Areas, provided that in exercise of the easement rights, Grantor its successors and assigns, shall (a) ensure all work is done properly and promptly in accordance with all applicable laws, codes and regulations; (b) ensure that no vehicles or construction equipment whatsoever are left overnight or otherwise stored within Easement Areas except when easement work is underway; (c) exercise best efforts to limit any inconvenience to the Grantee, its successors and assigns, (d) promptly and reasonably restore the Easement Areas to their former condition before the exercise of the easement rights; and (e) defend and indemnify Grantee, its successors and/or assigns, of and from all losses, damages and expenses arising from the exercise of the easement rights, including all losses, damages and expenses (including death) arising from the exercise of the easement rights for which any third parties seek to hold the Grantee, its successors and assigns, liable.

Grantor, its successors and assigns, shall not erect or construct any building of any kind within Easement Areas, and shall not otherwise unreasonably interfere with the Grantee's use of Easement Areas without Grantee's written consent. Grantor's use of the easement rights set forth herein shall be confined to such activities as are consistent with the purpose of this Easement. Grantor shall not allow any mechanics' liens to be filed against Grantee's property, and if any such lien is filed, Grantor shall immediately cause the same to be bonded off and discharged at Grantor's sole cost and expense.

Grantor shall maintain liability insurance and all other appropriate forms of insurance in connection its exercise of its easement rights set forth herein. All such insurance shall without limitation insure against acts or omissions by Grantor, its invitees, agents or subcontractors, and shall name Grantee as additional insured.

Grantor and Grantee shall have the right to enforce the easements, covenants and agreements contained herein by proceedings at law or in equity. Grantor and Grantee agree that if either party brings an action against the other party to enforce the terms hereof or to declare rights hereunder the prevailing party shall be entitled to recover from the other party reasonable attorney's fees and costs incurred therein.

The easement rights reserved and granted herein, including all obligations and rights of the parties hereto, are intended to run with Grantor's remaining land and the property conveyed hereby (the "Affected Properties"). The acceptance of a deed or mortgage to any portion of the Affected Properties, or entering into a lease or other occupancy of any such portion shall constitute an agreement that the covenants and restrictions set forth herein are accepted and ratified by such grantee, mortgagee, tenant or occupant. All of the foregoing provisions shall be covenants running with the land and shall bind any persons having at any time any interest or estate in the Affected Properties or any portion thereof.

In addition, the property is conveyed subject to the following easements:

1. 66-foot-wide easement granted to Central Maine Power by the State of Maine, in Book 1228, Page 407, dated January 22, 1953
2. 15-foot-wide gas line easement granted to Portland Gas & Light Co, in Book 1687, Page 55, dated October 15, 1965.

This property is conveyed subject to and together with any other easements or restrictions of record.

All bearings are in reference to Grid North, Maine State Plane Coordinate System, West Zone (FIPS 1802), NAD83.

All "*capped iron rods set*" refer to #5 rebar set with surveyor's I.D. cap stamped "MULLEN PLS 2575".

Meaning and intending to convey a portion of the land conveyed to Five Star Holdings, LLC in Book 14649, Page 390, Book 14233, Page 943 and Book 14580, Page 55.

**EXHIBIT B**  
**ACCESS EASEMENT AREA**

**Beginning** at a capped iron rod set on the westerly sideline of said West Cole Road at the land of Five Star Holdings, LLC now or formerly being leased to the Northern York County Family YMCA, (Book 14580, Page 55 – hereafter referred to as the “YMCA Parcel”), being further located N 87° 45’ 38” W, a distance of 113.59 feet from a capped #5 rebar found at the southwesterly corner of the said YMCA Parcel;

Thence N 58° 41’ 54” W, a distance of 66.29 feet along the northwesterly sideline of said West Cole Road to an angle Iron found 36” above grade at the southwesterly corner of the other land of Five Star Holdings, LLC (Book 17072, Page 179 – hereafter referred to as the “Beacon Press Parcel”);

Thence N 36° 41’ 56” E, a distance of 392.30 feet along the said Beacon Press Parcel and land to be retained by Five Star Holdings, LLC to a capped iron rod set;

Thence S 15° 28’ 15” E, a distance of 9.08 feet along the said retained land of Five Star Holdings, LLC to a capped iron rod set;

Thence continuing S 15° 28’ 15” E, a distance of 36.49 feet through the land shown on the *NORSE Plan* as “Proposed Lot 7-2-1” to a point;

Thence S 36° 41’ 56” W, a distance of 87.80 feet the said “Proposed Lot 7-2-1” to a capped iron rod set at the northwesterly corner of the parcel shown on the said Norse Plan as “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres”;

Thence continuing S 36° 41’ 56” W, a distance of 30.18 feet along the said “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres” to the the northwesterly corner of the said YMCA Parcel;

Thence continuing S 36° 41’ 56” W, a distance of 131.04 feet along the land of said YMCA Parcel to a capped iron rod set;

Thence N 53° 18’ 04” W, a distance of 13.91 feet along the land of said YMCA Parcel to a capped iron rod set;

Thence S 36° 41’ 56” W, a distance of 55.35 feet along the land of said YMCA Parcel to a capped iron rod set at the northwesterly corner the parcel shown as “Area to be Transfer from Map 174, Lot 7-3 to Map 17, Lot 7-2-1, 0.03 Acres” as shown on said Norse Plan;

Thence S 2° 33’ 12” E, a distance of 69.40 feet along the said “Area to be Transfer from Map 174, Lot 7-3 to Map 17, Lot 7-2-1, 0.03 Acres” to the **Point of Beginning**.

**EXHIBIT C**  
**UTILITY EASEMENT AREA**

**Beginning** at a point on the on the northeasterly sideline of the parcel shown as “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres” on said Norse Plan, further described as being S 53° 26’ 45” E, a distance of 53.82 feet from a capped rebar set at the northwesterly corner of the said “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres”

Thence N 22° 06’ 12” W, a distance of 105.00 feet through the land shown as “Area to be conveyed to Steelclad Holdings, LLC” (hereafter referred to as the Steelclad Holdings, LLC parcel) on the above mentioned *NORSE Plan* to a point on the southeasterly line of the retained land of Five Star Holdings, LLC;

Thence N 53° 18’ 03” W, a distance of 15.00 feet through the said retained land of Five Star Holdings, LLC to a point;

Thence N 36° 41’ 57” E, a distance of 20.00 feet through the said retained land of Five Star Holdings, LLC to a point;

Thence S 53° 18’ 03” E, a distance of 15.00 feet through the said retained land of Five Star Holdings, LLC to a point on the southeasterly line of the said Lot ;

Thence N 36° 41’ 56” E, a distance of 41.22 feet along the said retained land of Five Star Holdings, LLC to a capped rebar set;

Thence N 15° 28’ 15” W, a distance of 118.15 feet through the said retained land of Five Star Holdings, LLC to the southeasterly corner of the land now or formerly of AutoZone, Inc. #3025 (Deed Book 9982, Page 113);

Thence N 74° 31’ 25” E, a distance of 30.00 feet through the said retained land of Five Star Holdings, LLC to a point;

Thence S 15° 28’ 18” E a distance of 239.53 feet through the said retained land of Five Star Holdings, LLC and through the said Steelclad Holdings, LLC parcel to a point;

Thence S 36° 41’ 56” W a distance of 64.80 feet through said Steelclad Holdings, LLC parcel to a point on the said northeasterly line of said “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres”;

Thence N 53° 26’ 45” W a distance of 24.45 feet along the said “Area to be Transferred from Map 17, Lot 7-2-1 to Map 17, Lot 7-3, 0.09 Acres” to the **Point of Beginning**.

---

# SECTION 2

## DECLARATION OF EASEMENTS, CONVENANTS, AND RESTRICTIONS





## **Section 2: Declaration of Easements, Covenants, and Restrictions**

### **Existing Easements:**

The project currently conveys 3 existing easements as outlined below. Please refer to the attached plans for the existing easements across the property.

- 66' wide easement to Central Maine Power (Book: 1228, Page: 407)
- 15' wide easement to Unitil (Book: 1687, Page: 55)
- 20' wide Sewer easement to the City of Biddeford; "The City may enter upon the easement for the purpose of installing, operating, cleaning, repair, and maintenance of the sewers and associated structures...." (Book:14351, Pg: 885)

### **Proposed Easements:**

In lieu with the proposed development, and in addition to the existing easements to remain, the proposed easements are as followed.

A proposed 25' utility water easement is to lie over the existing 30' Utility easement that runs from the existing Day Care facility on lot 17-7-3, through lot 17-7-2-1, and up along lot 17-7-2. This easement will allow the development to receive and connect to City Water.

A drainage easement is proposed on the North edge of the site to connect to an existing culvert on the Five Star property Lot 17-7-2. Please refer to sheet C-20 Utility Plan for Proposed locations.

In tandem with the proposed drainage easements that will be drafted in coordination with the abutting landowner, temporary construction easements will be in place to facilitate earthwork activities.

Please refer to the plans for proposed and existing easement locations. Drafts of the language along with exhibits will be developed as the project progresses. It should be noted that the adjacent landowner owns both Five Star Auto and the Daycare facility and recently sold the subject parcel to the Applicant, and has considered and verbally agreed to these easements which will be formally drafted as the project progresses.



---

# SECTION 3

## FINANCIAL AND TECHNICAL CAPACITY



### **3. Financial Capacity / Certificate of Good Standing**

Please see the attached letter from Machias Savings Bank stating financial capacity for the project and a Certificate of Good Standing from the Department of the Secretary of State for SteelClad Biddeford, LLC.





February 15, 2022

RE: SteelClad Biddeford LLC

To Whom it May Concern:

SteelClad Biddeford LLC is a business client and has an established commercial banking relationship with Machias Savings Bank. We have been involved as a financing partner on Robert LeBlanc's project located at 451 Alfred St, Biddeford, ME. Pending full underwriting for the project, but based upon his known financial capacity, we look forward to the opportunity to work with the developer and help finance this project.

If I can be of further assistance regarding the financial capacity of the applicant, please do not hesitate to contact me at (207)-561-3936.

Regards,

A handwritten signature in blue ink that reads "Shawn Leger/mtr".

Shawn Leger  
VP, Commercial Lender



**Corporate Name Search**

## Information Summary

[Subscriber activity report](#)

**This record contains information from the CEC database and is accurate as of: Tue Oct 05 2021 10:44:24. Please print or save for your records.**

| Legal Name                  | Charter Number | Filing Type                             | Status           |
|-----------------------------|----------------|-----------------------------------------|------------------|
| STEELCLAD<br>BIDDEFORD, LLC | 20221712DC     | LIMITED LIABILITY<br>COMPANY (DOMESTIC) | GOOD<br>STANDING |

| Filing Date | Expiration Date | Jurisdiction |
|-------------|-----------------|--------------|
| 06/14/2021  | N/A             | MAINE        |

**Other Names** (A=Assumed ; F=Former)

NONE

### Clerk/Registered Agent

THOMAS F JEWELL  
511 CONGRESS STREET  
SUITE 502  
PORTLAND, ME 04101

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[Long Form with  
amendments](#)  
(\$30.00)

You will need Adobe Acrobat version 3.0 or higher in order to view PDF files.  
If you encounter problems, visit the [troubleshooting page](#).



If you encounter technical difficulties while using these services, please contact the [Webmaster](#). If you are unable to find the information you need through the resources provided on this web site, please contact the Bureau's Reporting and Information Section at 207-624-7752 or [e-mail](#) or visit our [Feedback](#) page.

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# SECTION 4

## STORMWATER MANAGMENT REPORT





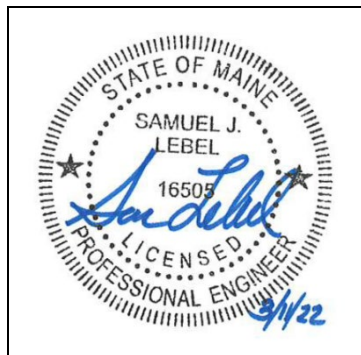
# **STORMWATER MANAGEMENT** **REPORT**

**Prepared For:**

**SteelClad Biddeford, LLC  
25 Penrith Road,  
Portland, ME 04101**

**Prepared By:**

**Acorn Engineering, Inc.  
65 Hanover Street  
Portland, Maine 04101**



**March 2022**

## **INTRODUCTION**

Acorn Engineering, Inc. has been retained by SteelClad Biddeford LLC., to provide civil engineering services for the proposed redevelopment of 451 Alfred Street in Biddeford. The proposed project includes the redevelopment of a vacant lot which currently consists of vacant grassed and wooded land with an existing half-acre gravel road and paved parking lot. The proposed redevelopment intends to provide 465 units within the three story self-storage facility with a combined paved parking lot.

The proposed project will include the development of over 20,000 square feet of impervious area within the Thacher Brook watershed, which is an urban impaired stream. Therefore, the project is required to include stormwater management features for stormwater quality and. The stormwater analysis is documented with supporting calculations and reports attached to this narrative.

The current course of action is to provide primary water quality and quantity control through a Best Management Practice (BMP) approved by the Maine Department of Environmental Protection (MDEP). The majority of the pavement on site as well as the entirety of the roof will drain to two underdrained subsurface sand filters. The implemented BMP will provide water quality treatment for no less than 95% of the new impervious area and no less than 80% of the developed area.

## **EXISTING CONDITIONS**

The proposed project site is located on Enterprise Drive between West Cole Road and Alfred Street (RTE. 111) in Biddeford, Maine. A Boundary Survey has been prepared by NORSE Northern Survey Engineering of Brunswick Maine dated August 17<sup>th</sup>, 2021.

The subject parcel contains 3.19 acres consisting of .5 acres of impervious surface consisting of a gravel easement drive aisle as well as a paved parking lot. The remainder of the lot consists of a vacant vegetated area with slopes ranging from generally flat to up to a 2:1 slope along Alfred St/State Route 111. The site is within the Thacher Brook Watershed, which is classified as an urban impaired stream by Maine DEP.

The project team is not aware of the presence of any existing significant natural features located on the site.

## **PROPOSED DEVELOPMENT**

The project intends to construct a 3-story conditioned self-storage facility. The facility will be gated in with the office space accessible for guests and tenants. The site will be accessed from West Cole Road and proposes a paved two-way road within the facility gate and associated parking spaces for tenants as they access their units.

Given that the site is located within the Thacher brook watershed and subject to Stormwater Law permit, the project was designed to treat 95% of impervious area on site as well as over 80% of the developed area through the use of Stormtech Chambers or an underdrained subsurface sand filter (USSF). These chambers are designed to store, cool, filter, and slowly discharge stormwater at a controlled rate. Runoff on site is directed towards catch basins to capture and direct flow throughout the site to the stormtech chamber system. The facility proposes a gutter and downspouts on the building which are proposed to tie in directly to the catch basin system/ storm network on site.

### **GENERAL STANDARDS – WATER QUALITY**

The proposal is to provide primary water quality and quantity control through two separate Underdrained Subsurface Sand Filters (USSF) which have been designed in accordance with the Maine DEP BMP guidelines and are proposed to treat no less than 95% of the new impervious area and no less than 80% of the new developed area.

The underdrained subsurface sand filters were sized to meet or exceed the requirements set forth within the MDEP Volume III BMPs Technical Design Manual, Chapter 7.3. Filter BMP systems have shown to be effective at filtering out and removing a wide range of pollutants from stormwater runoff.

#### *Impervious Treatment Area*

The stormwater runoff shall first flow into the Stormtech Isolator Row which will provide initial treatment of the larger sized pollutants. The stormwater will then flow vertically through the sand filter layer. The treated stormwater will then be collected within perforated pipes and released slowly into the downstream system by an orifice on the end of the 4” underdrain outlet at an attenuated rate before it enters further engineered discharge in an outlet control structure.

The treatment of the impervious and developed surfaces by the BMPs are as follows:

| <b>Table 1 - Impervious Treatment Area Table</b> |                                               |                                        |
|--------------------------------------------------|-----------------------------------------------|----------------------------------------|
| <b>Proposed Total Imp. Area (SF)</b>             | <b>Proposed Imp. Area with Treatment (SF)</b> | <b>% Overall New Imp. Area Treated</b> |
| 55,075                                           | 53,050                                        | 96%                                    |



| <b>Table 2 – Developed Area Treatment Area Table</b> |                                        |                                 |
|------------------------------------------------------|----------------------------------------|---------------------------------|
| Proposed Total Dev. Area (SF)                        | Proposed Dev. Area with Treatment (SF) | % Overall New Dev. Area Treated |
| 69,525                                               | 57,713                                 | 83%                             |

As shown above, the project anticipates meeting the required treatment for total impervious and developed surfaces with the filter BMPs. When compared to the net change in impervious and developed areas, the treatment levels are even higher.

#### *Filter Area Sizing*

A calculation for sand filter area is necessary to meet the requirements below the surface of the USSF. As defined in the Volume III: BMPs Technical Design Manual, Chapter 7, the surface area of the filter shall be no less than the sum of 5% of the tributary impervious area and 2% of the tributary vegetated area. The filter area is calculated by the following formula:

$$[(\text{Imp. SF} \times 0.05) + (\text{Veg. SF} \times 0.02)] = \text{Filter Area (SF)}$$

Please refer to Table 2 below.

Table 3 – Total Filter Surface Area, displays the proposed USSF sizing requirements, actual size and the percentage of required area.

| <b>Table 3 – Total Filter Surface Area</b> |                           |                         |
|--------------------------------------------|---------------------------|-------------------------|
|                                            | Required Filter Area (SF) | Actual Filter Area (SF) |
| USSF 1                                     | 1,189                     | 2,125                   |
| USSF 2                                     | 1,557                     | 2,982                   |

As shown, the size of the soil filter area will greatly exceed the surface area requirements.

#### *Isolator Row Sizing*

The isolator row was sized based upon a letter from Mark Bergeron, Director of the MDEP Bureau of Land Resources, to StormTech dated July 29, 2016. The calculation that Mr. Bergeron references to determine the minimum number of stormwater chambers needed for the isolator row is defined as the one-year peak flow rate divided by the specific flow rate of the chamber. This rate was implemented into the HydroCAD model and divided by the flow rate of the SC-740 chamber (0.2 cfs).



| <b>Table 4 – Isolator Row Sizing</b> |                              |                      |                      |
|--------------------------------------|------------------------------|----------------------|----------------------|
|                                      | 1-Year<br>Peak Flow<br>(cfs) | Required<br>Chambers | Provided<br>Chambers |
| USSF 1                               | 1.32                         | 7                    | 15                   |
| USSF 2                               | 1.56                         | 8                    | 20                   |

As shown, the isolator row will far exceed the requirement.

#### *Water Quality Volume*

In accordance with the Volume III: BMPs Technical Design Manual, a water quality volume of 1.0 inches times the tributary impervious area plus 0.4 inches times the tributary vegetated area is required to be treated by the USSF. The water quality volume is calculated by the following formula:

$$\left( \frac{\text{Imp. SF} \times 1.0''}{12''/1'} \right) + \left( \frac{\text{Veg. SF} \times 0.4''}{12''/1'} \right) = \text{Treatment Volume (CF)}$$

Values from the HydroCAD calculations are attached to this report to demonstrate compliance with this standard.

The treatment volume was confirmed by using the HydroCAD model and the rainfall that produces 18" of ponding within the chambers. The storage volume within the crushed stone and chambers – the two layers above the filter sand – is then added together to calculate the water quality volume.

A vertical orifice is modeled in HydroCAD at the outlet control structure to detain the stormwater for an approximate 24 hour time frame. The orifice for the water quantity volume is then set above the peak elevation determined for the water quality volume. Given that the outlet control structure is located downstream of the four USSFs, it is difficult to provide appropriate attenuation using the outlet control structure alone. To compensate, an orifice is modeled on each of the underdrain outlets from the USSFs. This will provide for further control on the discharge rates from the USSFs. The orifice is intended to be a PVC cap placed on the outfall pipe with the orifice drilled into the cap eccentrically. The PVC cap can be easily inspected, removed or replaced if necessary as accessed from a manhole. The orifice shall be placed at the end of the via an orifice on the end of each underdrain outlet from the USSFs, as well as a water quality and quantity orifice within the outlet control structure downstream of the proposed BMPs.

As demonstrated in the filter area calculations as well as the hydrocad model, the project anticipates meeting and exceeding the required water quality volume.



## **FLOODING STANDARD – WATER QUANTITY**

The proposed project was modeled using HydroCAD to verify that the post-development conditions do not exceed the pre-development conditions. A 24-hour SCS Type III storm distribution for the 2, 10, and 25-year storm events were used. The corresponding rainfall amounts for these storms are 3.24", 5.11", and 6.28" respectively. Due to the numerous variables, and inherent inaccuracies with the modeling program used to calculate stormwater runoff it is custom at Acorn Engineering, Inc. to round to the nearest whole number.

### *Time of Concentration (Tc)*

The times of concentration for subcatchments in both the pre and post conditions were calculated by entering the flow path with the associated ground cover and slopes. HydroCAD then calculated the Tc's and incorporated the total Tc for each subcatchment into the model. When the calculated Tc was less than six minutes (0.1 hours), a direct entry of six minutes was used as advised by the TR-55 model. Consistent with previous submissions and best practices, the sheet flow length for any Tc path was limited to 100 feet before transitioning to shallow concentrated flow.

### *Curve Number (CN)*

Within the pre-development model, the vegetated areas were considered grass/wood land cover in poor condition. This determination was made after multiple site visits that observed exposed soils with little to no organic duff layer. As such, although the land is wooded, the vegetative cover and surface condition would generally be considered in fair condition due to animal burrowing, disposal of debris, utilization of the site as an encampment and walking paths, general urban conditions, and little to no understory growth.

The post development landscaped areas were given a good rating for new landscaped or loam/seed areas.

### *Pre-development Calculations*

The site consists of a gravel driveway, paved parking, wooded area and open grass areas. For the purpose of this analysis the land has been divided into 3 separate sub catchments with their own sub-subcatchments as shown on the pre-development map.





Peak flow rates for the pre-development storm events are as follows:

| <b>Table 5 – Pre-Development Peak Stormwater Flows</b> |                          |                           |                           |
|--------------------------------------------------------|--------------------------|---------------------------|---------------------------|
| Drainage Area                                          | 2-Year Storm Event (cfs) | 10-Year Storm Event (cfs) | 25-Year Storm Event (cfs) |
| POI #1                                                 | 1                        | 2                         | 2                         |
| POI #2                                                 | 4                        | 8                         | 11                        |
| POI #3                                                 | 1                        | 3                         | 4                         |

### *Post-development Calculations*

The drainage patterns from the pre and post conditions remain relatively the same, but with the post condition featuring subcatchments that are dedicated for the treatment of runoff generated primarily by roof and pavement via the two USSF systems.

The post-development calculations include changes to the land use, and the compensation provided by the USSF's, and associated engineered orifices. The following table represents comparison of pre- development and post-development condition peak runoff rates for the proposed development and tributary areas.

| <b>Table 6 – Post-Development Peak Stormwater Flows</b> |                          |                           |                           |
|---------------------------------------------------------|--------------------------|---------------------------|---------------------------|
| Drainage Area                                           | 2-Year Storm Event (cfs) | 10-Year Storm Event (cfs) | 25-Year Storm Event (cfs) |
| POI #1                                                  | 1                        | 2                         | 2                         |
| POI #2                                                  | 4                        | 8                         | 11                        |
| POI #3                                                  | 1                        | 2                         | 3                         |

| <b>Table 7 – Comparison of Peak Flows</b> |                          |      |                           |      |                           |      |
|-------------------------------------------|--------------------------|------|---------------------------|------|---------------------------|------|
| Drainage Area                             | 2-Year Storm Event (cfs) |      | 10-Year Storm Event (cfs) |      | 25-Year Storm Event (cfs) |      |
|                                           | Pre                      | Post | Pre                       | Post | Pre                       | Post |
| POI #1                                    | 1                        | 1    | 2                         | 2    | 2                         | 2    |
| POI #2                                    | 4                        | 4    | 8                         | 8    | 11                        | 11   |
| POI #3                                    | 1                        | 1    | 3                         | 2    | 3                         | 4    |

As shown in Table 6 and 7, the net impact of the post development peak flows will remain at or below the predevelopment levels. A post-development watershed map developed for this project can be viewed in Attachment B, and a copy of the HydroCAD calculations is included within Attachment C of this report.



## **SOILS**

Onsite soil information includes the following:

- Soil Conservation Service Medium Intensity Soil Survey for York County

The site is essentially split into two hydrological groups, A and D which were inputted into HydroCAD accordingly. Please refer to the pre and post development maps as well as the attached soils report for more information.

## **CONCLUSION**

The proposed development was designed to meet and exceed the requirements implemented by the MDEP under the Stormwater Management Statute (38 M.R.S.A. § 420-D) as well as the City of Biddeford. The proposed project as designed is anticipated to improve upon the existing stormwater management by providing significant storage through the use of the StormTech Chambers while also treating over 100% of the new impervious area, creating a significant improvement for this tributary that flows to an urban impaired stream, Thacher Brook.

## **ATTACHMENTS**

Attachment A: Pre – Development Watershed Map

Attachment B: Post – Development Watershed Map

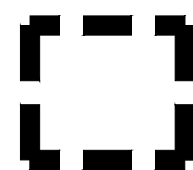
Attachment C: Soils Report

Attachment D: HydroCAD Calculations



1

SUBCATCHMENT NUMBER



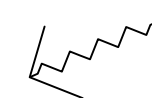
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POI #1

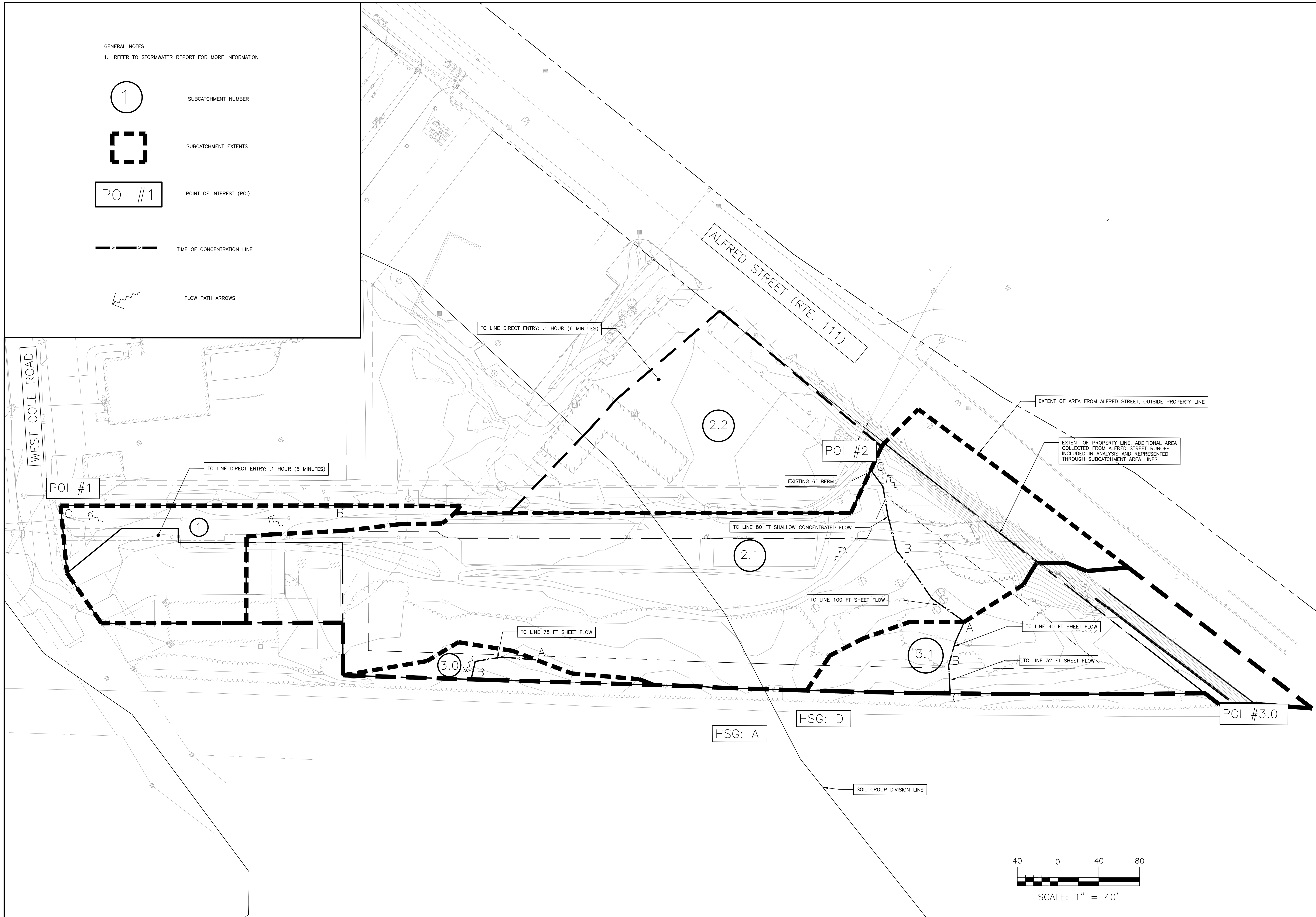
POINT OF INTEREST (POI)



TIME OF CONCENTRATION LINE



FLOW PATH ARROWS

[illegible]

## PRE- DEVELOPMENT PLAN

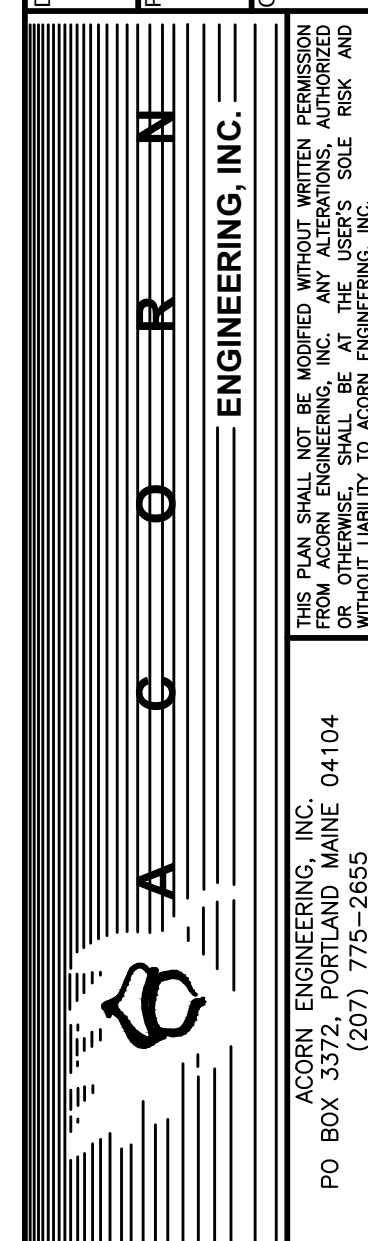
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STEELCLAD BIDDEFORD, LLC  
WEST COLE ROAD & ALFRED STREET (ME RTE. 111)

DRAWING NAME:

PROJECT NAME:

**CLIENT:**



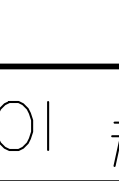
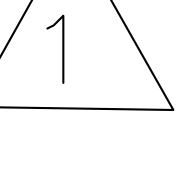
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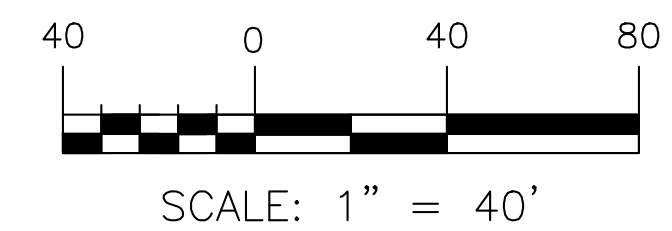


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PRE



|                                                                                   |                            |
|-----------------------------------------------------------------------------------|----------------------------|
|  | SUBCATCHMENT NUMBER        |
|  | SUBCATCHMENT EXTENTS       |
|  | POINT OF INTEREST (POI)    |
|  | POND                       |
|  | TIME OF CONCENTRATION LINE |
|  | FLOW PATH ARROWS           |



PERMIT LEVEL  
NOT ISSUED FOR  
CONSTRUCTION

[illegible]

## POST DEVELOPMENT PLAN

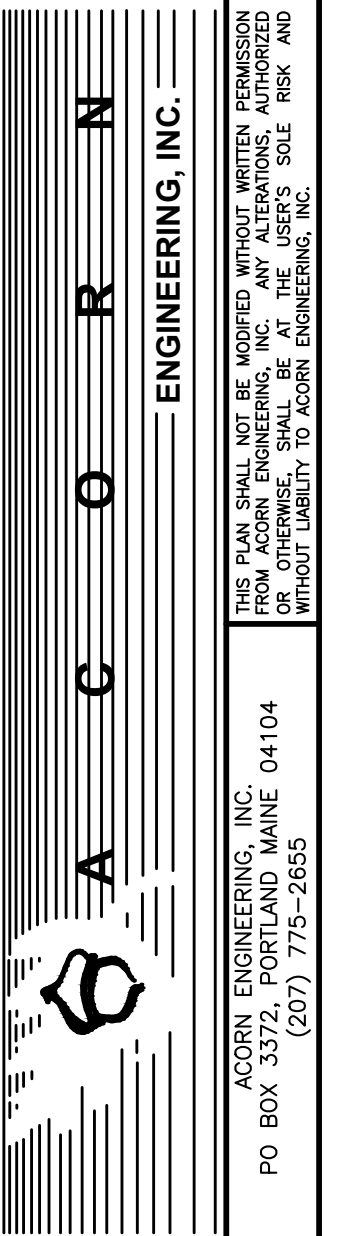
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WEST COLE ROAD & ALFRED STREET (ME RTE. 111)

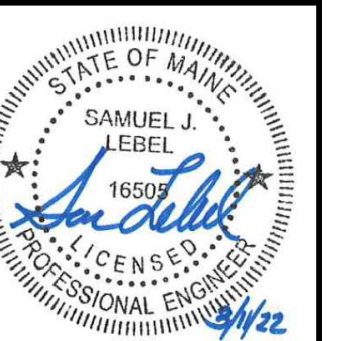
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| SCALE:       | AS NOTED   |
| DESIGNED BY: | SJL        |
| DRAWN BY:    | DNM        |
| CHECKED BY:  | SJL/WHs    |



RAWING NO.

# POST





United States  
Department of  
Agriculture

**NRCS**

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for York County, Maine



# Preface

---

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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# How Soil Surveys Are Made

---

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

## Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

---

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



# Custom Soil Resource Report Soil Map



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

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

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

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

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

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

Soil Survey Area: York County, Maine  
Survey Area Data: Version 19, May 29, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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

## Map Unit Legend

| Map Unit Symbol                    | Map Unit Name                                          | Acres in AOI | Percent of AOI |
|------------------------------------|--------------------------------------------------------|--------------|----------------|
| AgB                                | Adams-Urban land complex, 0 to 8 percent slopes        | 0.3          | 0.2%           |
| BuB                                | Buxton silt loam, 3 to 8 percent slopes                | 2.8          | 1.9%           |
| BuC                                | Buxton silt loam, 8 to 15 percent slopes               | 11.7         | 7.9%           |
| Ch                                 | Chocorua peat                                          | 1.2          | 0.8%           |
| CoB                                | Colton gravelly sandy loam, 0 to 8 percent slopes      | 23.9         | 16.2%          |
| CrB                                | Croghan loamy fine sand, 0 to 8 percent slopes, wooded | 12.3         | 8.3%           |
| LyB                                | Lyman-Rock outcrop complex, 3 to 8 percent slopes      | 0.1          | 0.0%           |
| LyC                                | Lyman-Rock outcrop complex, 8 to 15 percent slopes     | 7.8          | 5.3%           |
| Pg                                 | Pits, gravel                                           | 10.6         | 7.2%           |
| Ra                                 | Raynham silt loam                                      | 13.3         | 9.0%           |
| Sc                                 | Scantic silt loam, 0 to 3 percent slopes               | 58.8         | 39.8%          |
| SeB                                | Scio silt loam, 3 to 8 percent slopes                  | 0.3          | 0.2%           |
| Ur                                 | Urban land                                             | 3.7          | 2.5%           |
| W                                  | Water bodies                                           | 1.0          | 0.7%           |
| <b>Totals for Area of Interest</b> |                                                        | <b>147.8</b> | <b>100.0%</b>  |

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion

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of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.



## York County, Maine

### AgB—Adams-Urban land complex, 0 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2wqnv  
*Elevation:* 490 to 1,310 feet  
*Mean annual precipitation:* 36 to 65 inches  
*Mean annual air temperature:* 28 to 52 degrees F  
*Frost-free period:* 110 to 160 days  
*Farmland classification:* Not prime farmland

#### Map Unit Composition

*Adams and similar soils:* 45 percent  
*Urban land:* 40 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Adams

##### Setting

*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Summit, backslope  
*Landform position (three-dimensional):* Crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Parent material:* Sandy glaciofluvial deposits

##### Typical profile

*Ap - 0 to 7 inches:* loamy sand  
*Bs - 7 to 21 inches:* sand  
*BC - 21 to 27 inches:* sand  
*C - 27 to 65 inches:* sand

##### Properties and qualities

*Slope:* 0 to 8 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(1.42 to 14.17 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)  
*Available water supply, 0 to 60 inches:* Low (about 3.6 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 3s  
*Hydrologic Soil Group:* A  
*Hydric soil rating:* No

#### Description of Urban Land

##### Setting

*Landform:* Outwash deltas



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*Landform position (two-dimensional):* Backslope, summit  
*Landform position (three-dimensional):* Crest, side slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

### Minor Components

#### Croghan

*Percent of map unit:* 5 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

#### Colton

*Percent of map unit:* 5 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

#### Adams, slopes > 15%

*Percent of map unit:* 3 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Backslope  
*Landform position (three-dimensional):* Side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### Naumburg

*Percent of map unit:* 2 percent  
*Landform:* Outwash deltas  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

## **BuB—Buxton silt loam, 3 to 8 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 9k54

*Elevation:* 10 to 900 feet

*Mean annual precipitation:* 34 to 48 inches

*Mean annual air temperature:* 43 to 46 degrees F

*Frost-free period:* 90 to 160 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Buxton and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Buxton**

#### **Setting**

*Landform:* Coastal plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Glaciolacustrine deposits derived from siltstone and/or fine-silty marine deposits

#### **Typical profile**

*H1 - 0 to 7 inches:* silt loam

*H2 - 7 to 19 inches:* silt loam

*H3 - 19 to 37 inches:* silty clay

*H4 - 37 to 65 inches:* silty clay

#### **Properties and qualities**

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)

*Depth to water table:* About 7 to 18 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 9.8 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3w

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

## Minor Components

### Scantic

*Percent of map unit:* 5 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

### Buxton mod well drained

*Percent of map unit:* 5 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### Biddeford

*Percent of map unit:* 2 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

### Scio

*Percent of map unit:* 1 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### Buxton, slopes >8%

*Percent of map unit:* 1 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### Buxton, 0.1 to 3% stone cover

*Percent of map unit:* 1 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

## **BuC—Buxton silt loam, 8 to 15 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 9k55

*Elevation:* 10 to 2,500 feet

*Mean annual precipitation:* 34 to 50 inches

*Mean annual air temperature:* 37 to 46 degrees F

*Frost-free period:* 60 to 160 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Buxton and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Buxton**

#### **Setting**

*Landform:* Coastal plains

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Glaciolacustrine deposits derived from siltstone and/or fine-silty marine deposits

#### **Typical profile**

*H1 - 0 to 7 inches:* silt loam

*H2 - 7 to 19 inches:* silt loam

*H3 - 19 to 37 inches:* silty clay

*H4 - 37 to 65 inches:* silty clay

#### **Properties and qualities**

*Slope:* 8 to 15 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)

*Depth to water table:* About 18 to 30 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 9.8 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

## Minor Components

### **Buxton mod well drained**

*Percent of map unit:* 5 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### **Scio**

*Percent of map unit:* 4 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Footslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### **Tunbridge**

*Percent of map unit:* 2 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

### **Scantic**

*Percent of map unit:* 2 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

### **Rock outcrop**

*Percent of map unit:* 1 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

### **Lyman**

*Percent of map unit:* 1 percent  
*Landform:* Coastal plains  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

## Ch—Chocorua peat

### Map Unit Setting

*National map unit symbol:* 9k57  
*Elevation:* 0 to 2,100 feet  
*Mean annual precipitation:* 34 to 51 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 80 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Chocorua and similar soils:* 87 percent  
*Minor components:* 13 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Chocorua

#### Setting

*Landform:* Bogs  
*Parent material:* Organic material

#### Typical profile

*Oe - 0 to 32 inches:* mucky peat  
*H2 - 32 to 65 inches:* stratified gravelly sand to loamy fine sand

#### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Very poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to very high (1.42 to 14.17 in/hr)  
*Depth to water table:* About 0 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* Frequent  
*Available water supply, 0 to 60 inches:* High (about 11.2 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8w  
*Hydrologic Soil Group:* A/D  
*Hydric soil rating:* Yes

### Minor Components

#### Sebago

*Percent of map unit:* 8 percent  
*Landform:* Bogs  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear



*Across-slope shape:* Linear

*Hydric soil rating:* Yes

**Urban land**

*Percent of map unit:* 5 percent

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

**CoB—Colton gravelly sandy loam, 0 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2ym4k

*Elevation:* 10 to 2,000 feet

*Mean annual precipitation:* 31 to 65 inches

*Mean annual air temperature:* 36 to 52 degrees F

*Frost-free period:* 90 to 160 days

*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Colton and similar soils:* 85 percent

*Minor components:* 15 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Colton**

**Setting**

*Landform:* Eskers, kames

*Landform position (two-dimensional):* Summit, backslope

*Landform position (three-dimensional):* Crest, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Sandy-skeletal glaciofluvial deposits

**Typical profile**

*Oe - 0 to 4 inches:* moderately decomposed plant material

*E - 4 to 6 inches:* gravelly sandy loam

*Bs - 6 to 14 inches:* gravelly loamy sand

*BC - 14 to 24 inches:* very gravelly coarse sand

*C - 24 to 65 inches:* extremely gravelly coarse sand

**Properties and qualities**

*Slope:* 0 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(1.42 to 14.17 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

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*Frequency of ponding:* None

*Maximum salinity:* Nonsaline (0.0 to 1.9 mmhos/cm)

*Available water supply, 0 to 60 inches:* Very low (about 2.9 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3s

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Adams

*Percent of map unit:* 10 percent

*Landform:* Outwash deltas

*Landform position (two-dimensional):* Backslope, summit

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Sheepscot

*Percent of map unit:* 3 percent

*Landform:* Outwash deltas

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Hydric soil rating:* No

#### Croghan

*Percent of map unit:* 2 percent

*Landform:* Outwash deltas

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Base slope

*Down-slope shape:* Linear

*Across-slope shape:* Concave

*Hydric soil rating:* No

## CrB—Croghan loamy fine sand, 0 to 8 percent slopes, wooded

### Map Unit Setting

*National map unit symbol:* 2wqp0

*Elevation:* 150 to 2,300 feet

*Mean annual precipitation:* 40 to 55 inches

*Mean annual air temperature:* 37 to 46 degrees F

*Frost-free period:* 90 to 135 days

*Farmland classification:* Farmland of statewide importance

### Map Unit Composition

*Croghan and similar soils:* 85 percent

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*Minor components: 15 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Croghan

#### Setting

*Landform:* Marine terraces, outwash deltas

*Landform position (two-dimensional):* Backslope

*Landform position (three-dimensional):* Side slope, base slope

*Down-slope shape:* Linear

*Across-slope shape:* Convex

*Parent material:* Sandy glaciofluvial deposits

#### Typical profile

*Oa - 0 to 4 inches:* highly decomposed plant material

*E - 4 to 6 inches:* loamy fine sand

*Bs - 6 to 17 inches:* loamy fine sand

*BC - 17 to 30 inches:* fine sand

*C - 30 to 65 inches:* sand

#### Properties and qualities

*Slope:* 0 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(1.42 to 14.17 in/hr)

*Depth to water table:* About 18 to 30 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

*Available water supply, 0 to 60 inches:* Low (about 4.1 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* A

*Hydric soil rating:* No

### Minor Components

#### Adams

*Percent of map unit:* 5 percent

*Landform:* Outwash deltas, marine terraces

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Colton

*Percent of map unit:* 5 percent

*Landform:* Marine terraces, outwash deltas

*Landform position (two-dimensional):* Summit, shoulder

*Landform position (three-dimensional):* Crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

**Naumburg**

*Percent of map unit:* 3 percent  
*Landform:* Marine terraces, outwash deltas  
*Landform position (two-dimensional):* Footslope, toeslope  
*Landform position (three-dimensional):* Base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Nicholville**

*Percent of map unit:* 2 percent  
*Landform:* Outwash deltas, marine terraces  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Side slope, base slope  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**LyB—Lyman-Rock outcrop complex, 3 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2trqh  
*Elevation:* 0 to 560 feet  
*Mean annual precipitation:* 36 to 65 inches  
*Mean annual air temperature:* 36 to 52 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Lyman, very stony, and similar soils:* 65 percent  
*Rock outcrop:* 20 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Lyman, Very Stony**

**Setting**

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Shoulder, summit, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

**Typical profile**

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam

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*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

### Properties and qualities

*Slope:* 3 to 8 percent  
*Surface area covered with cobbles, stones or boulders:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6s  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* No

## Description of Rock Outcrop

### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Shoulder, backslope, summit  
*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Igneous and metamorphic rock

### Typical profile

*R - 0 to 10 inches:* bedrock

### Properties and qualities

*Slope:* 3 to 8 percent  
*Depth to restrictive feature:* 0 inches to lithic bedrock  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

## Minor Components

### Skerry, very stony

*Percent of map unit:* 5 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, footslope  
*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest  
*Microfeatures of landform position:* Closed depressions, closed depressions

*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* No

**Brayton, very stony**

*Percent of map unit:* 4 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Toeslope, footslope  
*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope  
*Microfeatures of landform position:* Closed depressions, closed depressions  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave  
*Hydric soil rating:* Yes

**Tunbridge, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Mountains, hills  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

**Hermon, very stony**

*Percent of map unit:* 3 percent  
*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Backslope, summit, shoulder  
*Landform position (three-dimensional):* Mountainbase, mountaintop, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Hydric soil rating:* No

**LyC—Lyman-Rock outcrop complex, 8 to 15 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 2trqj  
*Elevation:* 0 to 790 feet  
*Mean annual precipitation:* 36 to 65 inches  
*Mean annual air temperature:* 36 to 52 degrees F  
*Frost-free period:* 60 to 160 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Lyman, very stony, and similar soils:* 62 percent  
*Rock outcrop:* 25 percent  
*Minor components:* 13 percent



*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Lyman, Very Stony**

#### **Setting**

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Shoulder, summit, backslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### **Typical profile**

*Oe - 0 to 1 inches:* moderately decomposed plant material

*A - 1 to 3 inches:* loam

*E - 3 to 5 inches:* fine sandy loam

*Bhs - 5 to 7 inches:* loam

*Bs1 - 7 to 11 inches:* loam

*Bs2 - 11 to 18 inches:* channery loam

*R - 18 to 28 inches:* bedrock

#### **Properties and qualities**

*Slope:* 8 to 15 percent

*Surface area covered with cobbles, stones or boulders:* 1.5 percent

*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock

*Drainage class:* Somewhat excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### **Description of Rock Outcrop**

#### **Setting**

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Igneous and metamorphic rock

#### **Typical profile**

*R - 0 to 10 inches:* bedrock

#### **Properties and qualities**

*Slope:* 8 to 15 percent

## Custom Soil Resource Report

*Depth to restrictive feature:* 0 inches to lithic bedrock

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high  
(0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

### Minor Components

#### Skerry, very stony

*Percent of map unit:* 4 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Backslope, footslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope

*Microfeatures of landform position:* Closed depressions, closed depressions, open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* No

#### Hermon, very stony

*Percent of map unit:* 4 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Tunbridge, very stony

*Percent of map unit:* 3 percent

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Backslope, summit, shoulder

*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Brayton, very stony

*Percent of map unit:* 2 percent

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Toeslope, footslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, crest, side slope

*Microfeatures of landform position:* Closed depressions, closed depressions, open depressions, open depressions

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

## **Pg—Pits, gravel**

### **Map Unit Setting**

*National map unit symbol:* 9k6b  
*Elevation:* 10 to 2,200 feet  
*Mean annual precipitation:* 30 to 50 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 70 to 160 days  
*Farmland classification:* Not prime farmland

### **Map Unit Composition**

*Pits:* 88 percent  
*Minor components:* 12 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Pits**

#### **Setting**

*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear

#### **Typical profile**

*H1 - 0 to 6 inches:* extremely gravelly sand  
*H2 - 6 to 60 inches:* extremely gravelly sand

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* No

### **Minor Components**

#### **Colton**

*Percent of map unit:* 5 percent  
*Landform:* Outwash terraces  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### **Adams**

*Percent of map unit:* 5 percent  
*Landform:* Outwash plains  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear

*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Croghan**

*Percent of map unit:* 2 percent  
*Landform:* Outwash plains  
*Landform position (two-dimensional):* Summit  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Ra—Raynham silt loam**

**Map Unit Setting**

*National map unit symbol:* 9k6d  
*Elevation:* 10 to 1,750 feet  
*Mean annual precipitation:* 34 to 48 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 80 to 160 days  
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Raynham and similar soils:* 92 percent  
*Minor components:* 8 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Raynham**

**Setting**

*Landform:* Lakebeds  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Coarse-silty glaciolacustrine deposits derived from sandstone and siltstone

**Typical profile**

*H1 - 0 to 6 inches:* silt loam  
*H2 - 6 to 36 inches:* silt loam  
*H3 - 36 to 65 inches:* silt loam

**Properties and qualities**

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.60 in/hr)  
*Depth to water table:* About 0 to 18 inches  
*Frequency of flooding:* None

## Custom Soil Resource Report

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Very high (about 14.3 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 4w

*Hydrologic Soil Group:* C/D

*Hydric soil rating:* Yes

### Minor Components

#### Scantic

*Percent of map unit:* 4 percent

*Landform:* Lakebeds

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* Yes

#### Scio

*Percent of map unit:* 2 percent

*Landform:* Lakebeds

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Hydric soil rating:* No

#### Raynham, slopes >3%

*Percent of map unit:* 1 percent

*Landform:* Lakebeds

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* Yes

#### Biddeford

*Percent of map unit:* 1 percent

*Landform:* Coastal plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* Yes

### Sc—Scantic silt loam, 0 to 3 percent slopes

#### Map Unit Setting

*National map unit symbol:* 2slv3

## Custom Soil Resource Report

*Elevation:* 10 to 900 feet  
*Mean annual precipitation:* 33 to 60 inches  
*Mean annual air temperature:* 39 to 45 degrees F  
*Frost-free period:* 90 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Scantic and similar soils:* 85 percent  
*Minor components:* 15 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Scantic

#### Setting

*Landform:* Marine terraces, river valleys  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Glaciomarine deposits

#### Typical profile

*Ap - 0 to 9 inches:* silt loam  
*Bg1 - 9 to 16 inches:* silty clay loam  
*Bg2 - 16 to 29 inches:* silty clay  
*Cg - 29 to 65 inches:* silty clay

#### Properties and qualities

*Slope:* 0 to 3 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)  
*Depth to water table:* About 0 to 12 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Moderate (about 6.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 4w  
*Hydrologic Soil Group:* D  
*Hydric soil rating:* Yes

### Minor Components

#### Lamoine

*Percent of map unit:* 8 percent  
*Landform:* River valleys, marine terraces  
*Landform position (three-dimensional):* Riser, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

#### Biddeford

*Percent of map unit:* 3 percent  
*Landform:* Marine terraces, river valleys  
*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Dip  
*Down-slope shape:* Concave  
*Across-slope shape:* Concave, linear  
*Ecological site:* F144BY002ME - Marine Terrace Depression  
*Hydric soil rating:* Yes

**Buxton**

*Percent of map unit:* 2 percent  
*Landform:* Marine terraces, river valleys  
*Landform position (three-dimensional):* Riser, rise  
*Down-slope shape:* Convex  
*Across-slope shape:* Linear  
*Hydric soil rating:* No

**Roundabout**

*Percent of map unit:* 2 percent  
*Landform:* River valleys, marine terraces  
*Landform position (three-dimensional):* Tread, talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Hydric soil rating:* Yes

**SeB—Scio silt loam, 3 to 8 percent slopes**

**Map Unit Setting**

*National map unit symbol:* 9k6l  
*Elevation:* 0 to 2,000 feet  
*Mean annual precipitation:* 34 to 51 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 80 to 160 days  
*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

*Scio and similar soils:* 89 percent  
*Minor components:* 11 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Scio**

**Setting**

*Landform:* Lakebeds  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Tread  
*Down-slope shape:* Concave  
*Across-slope shape:* Linear  
*Parent material:* Very fine sand glaciolacustrine deposits

**Typical profile**

*H1 - 0 to 7 inches:* silt loam  
*H2 - 7 to 26 inches:* silt loam  
*H3 - 26 to 36 inches:* silt loam



## Custom Soil Resource Report

*H4 - 36 to 65 inches: very fine sandy loam*

### Properties and qualities

*Slope: 3 to 8 percent*

*Depth to restrictive feature: More than 80 inches*

*Drainage class: Moderately well drained*

*Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high  
(0.60 to 2.00 in/hr)*

*Depth to water table: About 18 to 30 inches*

*Frequency of flooding: None*

*Frequency of ponding: None*

*Available water supply, 0 to 60 inches: High (about 10.1 inches)*

### Interpretive groups

*Land capability classification (irrigated): None specified*

*Land capability classification (nonirrigated): 2e*

*Hydrologic Soil Group: C*

*Hydric soil rating: No*

### Minor Components

#### Raynham

*Percent of map unit: 6 percent*

*Landform: Lakebeds*

*Landform position (two-dimensional): Toeslope*

*Landform position (three-dimensional): Tread*

*Down-slope shape: Concave*

*Across-slope shape: Concave*

*Hydric soil rating: Yes*

#### Madawaska

*Percent of map unit: 5 percent*

*Landform: Stream terraces*

*Landform position (two-dimensional): Summit*

*Landform position (three-dimensional): Tread*

*Down-slope shape: Linear*

*Across-slope shape: Linear*

*Hydric soil rating: No*

## Ur—Urban land

### Map Unit Setting

*National map unit symbol: 9k6x*

*Elevation: 10 to 2,200 feet*

*Mean annual precipitation: 30 to 50 inches*

*Mean annual air temperature: 37 to 46 degrees F*

*Frost-free period: 70 to 160 days*

*Farmland classification: Not prime farmland*

### Map Unit Composition

*Urban land: 90 percent*

*Minor components: 10 percent*

*Estimates are based on observations, descriptions, and transects of the mapunit.*

## **Description of Urban Land**

### **Setting**

*Landform position (two-dimensional):* Footslope, toeslope

*Landform position (three-dimensional):* Base slope, tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

### **Typical profile**

*H1 - 0 to 6 inches:* variable

### **Properties and qualities**

*Slope:* 0 to 8 percent

*Drainage class:* Moderately well drained

*Depth to water table:* About 24 to 72 inches

*Available water supply, 0 to 60 inches:* Very low (about 0.0 inches)

### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* No

## **Minor Components**

### **Scantic**

*Percent of map unit:* 2 percent

*Landform:* Coastal plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Dip

*Down-slope shape:* Concave

*Across-slope shape:* Concave

*Hydric soil rating:* Yes

### **Sulfihemists**

*Percent of map unit:* 2 percent

*Landform:* Salt marshes

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Talf

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* Yes

### **Adams**

*Percent of map unit:* 2 percent

*Landform:* Outwash plains

*Landform position (two-dimensional):* Footslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* No

### **Buxton**

*Percent of map unit:* 2 percent

*Landform:* Coastal plains

*Landform position (two-dimensional):* Footslope

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*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Hydric soil rating:* No

### **Croghan**

*Percent of map unit:* 2 percent

*Landform:* Outwash plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Hydric soil rating:* No

## **W—Water bodies**

### **Map Unit Composition**

*Water:* 100 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Water**

#### **Setting**

*Landform:* Hills

# **Soil Information for All Uses**

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## **Soil Properties and Qualities**

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

## **Soil Qualities and Features**

Soil qualities are behavior and performance attributes that are not directly measured, but are inferred from observations of dynamic conditions and from soil properties. Example soil qualities include natural drainage, and frost action. Soil features are attributes that are not directly part of the soil. Example soil features include slope and depth to restrictive layer. These features can greatly impact the use and management of the soil.

## **Hydrologic Soil Group**

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

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

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

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

## Custom Soil Resource Report

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

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

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

# Custom Soil Resource Report Map—Hydrologic Soil Group



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

#### Soil Rating Polygons

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Lines

 A  
 A/D  
 B  
 B/D  
 C  
 C/D  
 D  
 Not rated or not available

#### Soil Rating Points

 A  
 A/D  
 B  
 B/D

 C  
 C/D  
 D  
 Not rated or not available

### Water Features

 Streams and Canals

### Transportation

 Rails  
 Interstate Highways  
 US Routes  
 Major Roads  
 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

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

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

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

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

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

Soil Survey Area: York County, Maine  
 Survey Area Data: Version 19, May 29, 2020

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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



**Table—Hydrologic Soil Group**

| Map unit symbol                    | Map unit name                                          | Rating | Acres in AOI | Percent of AOI |
|------------------------------------|--------------------------------------------------------|--------|--------------|----------------|
| AgB                                | Adams-Urban land complex, 0 to 8 percent slopes        | A      | 0.3          | 0.2%           |
| BuB                                | Buxton silt loam, 3 to 8 percent slopes                | D      | 2.8          | 1.9%           |
| BuC                                | Buxton silt loam, 8 to 15 percent slopes               | C      | 11.7         | 7.9%           |
| Ch                                 | Chocorua peat                                          | A/D    | 1.2          | 0.8%           |
| CoB                                | Colton gravelly sandy loam, 0 to 8 percent slopes      | A      | 23.9         | 16.2%          |
| CrB                                | Croghan loamy fine sand, 0 to 8 percent slopes, wooded | A      | 12.3         | 8.3%           |
| LyB                                | Lyman-Rock outcrop complex, 3 to 8 percent slopes      | D      | 0.1          | 0.0%           |
| LyC                                | Lyman-Rock outcrop complex, 8 to 15 percent slopes     | D      | 7.8          | 5.3%           |
| Pg                                 | Pits, gravel                                           |        | 10.6         | 7.2%           |
| Ra                                 | Raynham silt loam                                      | C/D    | 13.3         | 9.0%           |
| Sc                                 | Scantic silt loam, 0 to 3 percent slopes               | D      | 58.8         | 39.8%          |
| SeB                                | Scio silt loam, 3 to 8 percent slopes                  | C      | 0.3          | 0.2%           |
| Ur                                 | Urban land                                             |        | 3.7          | 2.5%           |
| W                                  | Water bodies                                           |        | 1.0          | 0.7%           |
| <b>Totals for Area of Interest</b> |                                                        |        | <b>147.8</b> | <b>100.0%</b>  |

**Rating Options—Hydrologic Soil Group***Aggregation Method: Dominant Condition**Component Percent Cutoff: None Specified**Tie-break Rule: Higher*

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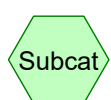
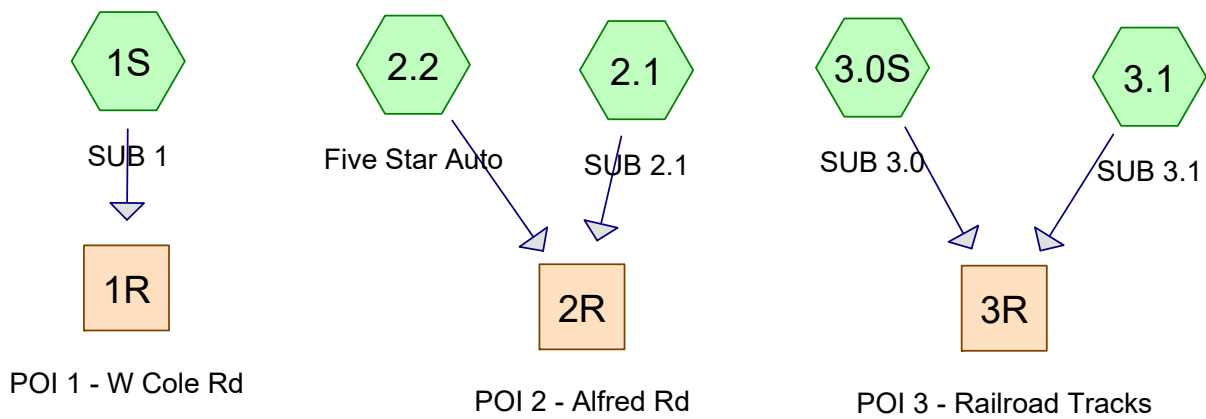
United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. [http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2\\_053624](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624)

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. [http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/nrcs142p2\\_052290.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf)

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# **PRE DEVELOPMENT HYDROCAD**

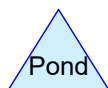




Subcat



Reach



Pond



Link

**Routing Diagram for Pre HC Biddeford 3.22**

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## Pre HC Biddeford 3.22

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### Area Listing (all nodes)

| Area<br>(acres) | CN        | Description<br>(subcatchment-numbers)     |
|-----------------|-----------|-------------------------------------------|
| 0.379           | 49        | 50-75% Grass cover, Fair, HSG A (1S, 2.1) |
| 0.049           | 84        | 50-75% Grass cover, Fair, HSG D (3.1)     |
| 0.081           | 68        | <50% Grass cover, Poor, HSG A (2.1)       |
| 0.375           | 39        | >75% Grass cover, Good, HSG A (2.1, 2.2)  |
| 0.113           | 35        | Brush, Fair, HSG A (1S, 2.1)              |
| 0.063           | 96        | Gravel (2.1)                              |
| 0.098           | 96        | Gravel roads (1S)                         |
| 0.152           | 98        | Paved parking, HSG D (3.1)                |
| 0.476           | 98        | Pavement (2.1)                            |
| 1.017           | 98        | Pavement/Roof (1S, 2.2)                   |
| 0.627           | 36        | Woods, Fair, HSG A (2.1, 3.0S)            |
| 1.393           | 82        | Woods/grass comb., Fair, HSG D (2.1, 3.1) |
| <b>4.824</b>    | <b>75</b> | <b>TOTAL AREA</b>                         |

## Pre HC Biddeford 3.22

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### Soil Listing (all nodes)

| Area<br>(acres) | Soil<br>Group | Subcatchment<br>Numbers |
|-----------------|---------------|-------------------------|
| 1.575           | HSG A         | 1S, 2.1, 2.2, 3.0S      |
| 0.000           | HSG B         |                         |
| 0.000           | HSG C         |                         |
| 1.595           | HSG D         | 2.1, 3.1                |
| 1.654           | Other         | 1S, 2.1, 2.2            |
| <b>4.824</b>    |               | <b>TOTAL AREA</b>       |



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**Ground Covers (all nodes)**

| HSG-A<br>(acres) | HSG-B<br>(acres) | HSG-C<br>(acres) | HSG-D<br>(acres) | Other<br>(acres) | Total<br>(acres) | Ground<br>Cover          | Subcatchment<br>Numbers |
|------------------|------------------|------------------|------------------|------------------|------------------|--------------------------|-------------------------|
| 0.379            | 0.000            | 0.000            | 0.049            | 0.000            | 0.428            | 50-75% Grass cover, Fair | 1S, 2.1,<br>3.1         |
| 0.081            | 0.000            | 0.000            | 0.000            | 0.000            | 0.081            | <50% Grass cover, Poor   | 2.1                     |
| 0.375            | 0.000            | 0.000            | 0.000            | 0.000            | 0.375            | >75% Grass cover, Good   | 2.1, 2.2                |
| 0.113            | 0.000            | 0.000            | 0.000            | 0.000            | 0.113            | Brush, Fair              | 1S, 2.1                 |
| 0.000            | 0.000            | 0.000            | 0.000            | 0.063            | 0.063            | Gravel                   | 2.1                     |
| 0.000            | 0.000            | 0.000            | 0.000            | 0.098            | 0.098            | Gravel roads             | 1S                      |
| 0.000            | 0.000            | 0.000            | 0.152            | 0.000            | 0.152            | Paved parking            | 3.1                     |
| 0.000            | 0.000            | 0.000            | 0.000            | 0.476            | 0.476            | Pavement                 | 2.1                     |
| 0.000            | 0.000            | 0.000            | 0.000            | 1.017            | 1.017            | Pavement/Roof            | 1S, 2.2                 |
| 0.627            | 0.000            | 0.000            | 0.000            | 0.000            | 0.627            | Woods, Fair              | 2.1, 3.0S               |
| 0.000            | 0.000            | 0.000            | 1.393            | 0.000            | 1.393            | Woods/grass comb., Fair  | 2.1, 3.1                |
| <b>1.575</b>     | <b>0.000</b>     | <b>0.000</b>     | <b>1.595</b>     | <b>1.654</b>     | <b>4.824</b>     | <b>TOTAL AREA</b>        |                         |

**Pre HC Biddeford 3.22**

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*Type III 24-hr 2-yr Rainfall=3.24"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                                          |                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment1S: SUB 1</b>             | Runoff Area=23,408 sf 37.14% Impervious Runoff Depth>1.03"<br>Tc=6.0 min CN=75 Runoff=0.67 cfs 0.046 af                                 |
| <b>Subcatchment2.1: SUB 2.1</b>          | Runoff Area=106,005 sf 19.58% Impervious Runoff Depth>0.63"<br>Flow Length=162' Tc=10.9 min CN=67 Runoff=1.40 cfs 0.128 af              |
| <b>Subcatchment2.2: Five Star Auto</b>   | Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>2.25"<br>Tc=6.0 min CN=92 Runoff=2.45 cfs 0.172 af                                 |
| <b>Subcatchment3.0S: SUB 3.0</b>         | Runoff Area=5,027 sf 0.00% Impervious Runoff Depth=0.00"<br>Flow Length=78' Slope=0.0630 '/' Tc=11.1 min CN=36 Runoff=0.00 cfs 0.000 af |
| <b>Subcatchment3.1: SUB 3.1</b>          | Runoff Area=35,803 sf 18.53% Impervious Runoff Depth>1.67"<br>Flow Length=72' Tc=10.8 min CN=85 Runoff=1.46 cfs 0.114 af                |
| <b>Reach 1R: POI 1 - W Cole Rd</b>       | Inflow=0.67 cfs 0.046 af<br>Outflow=0.67 cfs 0.046 af                                                                                   |
| <b>Reach 2R: POI 2 - Alfred Rd</b>       | Inflow=3.55 cfs 0.300 af<br>Outflow=3.55 cfs 0.300 af                                                                                   |
| <b>Reach 3R: POI 3 - Railroad Tracks</b> | Inflow=1.46 cfs 0.114 af<br>Outflow=1.46 cfs 0.114 af                                                                                   |

**Total Runoff Area = 4.824 ac Runoff Volume = 0.460 af Average Runoff Depth = 1.15"**  
**65.89% Pervious = 3.178 ac 34.11% Impervious = 1.645 ac**

**Pre HC Biddeford 3.22**

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Type III 24-hr 2-yr Rainfall=3.24"

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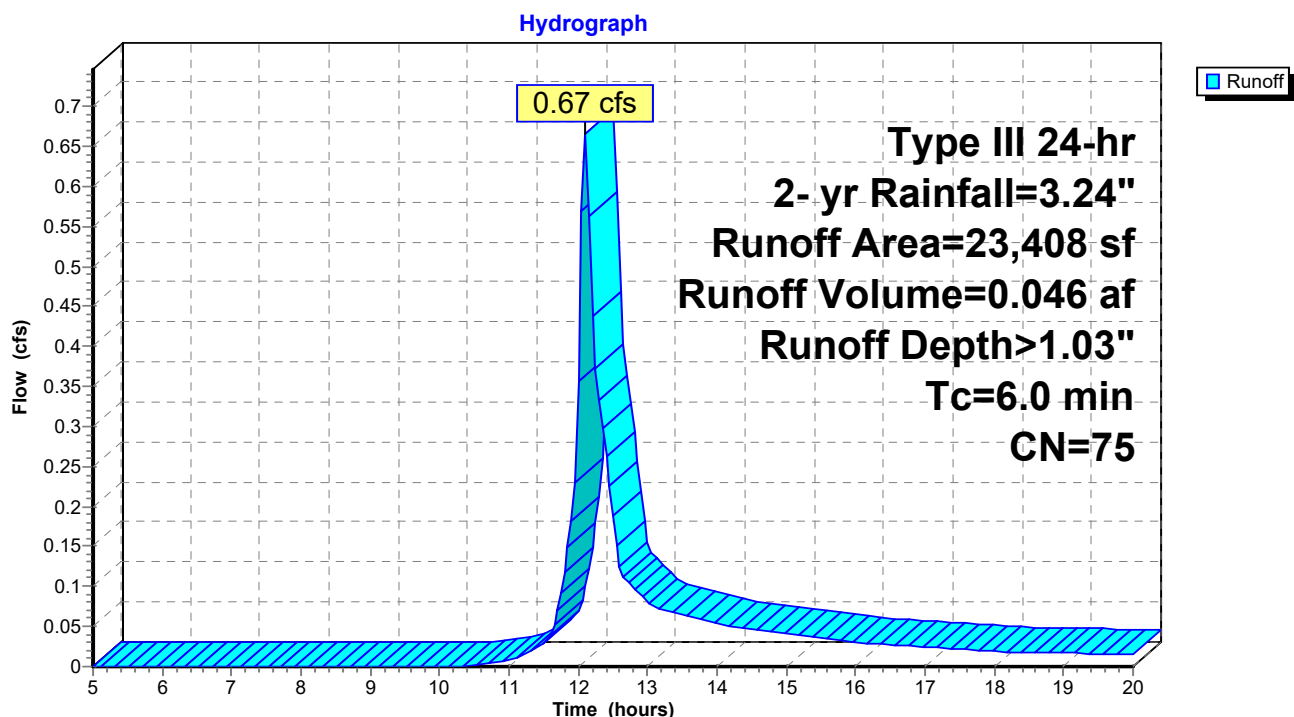
**Summary for Subcatchment 1S: SUB 1**

Runoff = 0.67 cfs @ 12.10 hrs, Volume= 0.046 af, Depth&gt; 1.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.24"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 4,281     | 96 | Gravel roads                    |
|   | 963       | 35 | Brush, Fair, HSG A              |
|   | 9,471     | 49 | 50-75% Grass cover, Fair, HSG A |
| * | 8,693     | 98 | Pavement/Roof                   |
|   | 23,408    | 75 | Weighted Average                |
|   | 14,715    |    | 62.86% Pervious Area            |
|   | 8,693     |    | 37.14% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, Direct - 0.1 hour |

**Subcatchment 1S: SUB 1**

**Pre HC Biddeford 3.22**

Type III 24-hr 2- yr Rainfall=3.24"

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**Summary for Subcatchment 2.1: SUB 2.1**

Runoff = 1.40 cfs @ 12.18 hrs, Volume= 0.128 af, Depth&gt; 0.63"

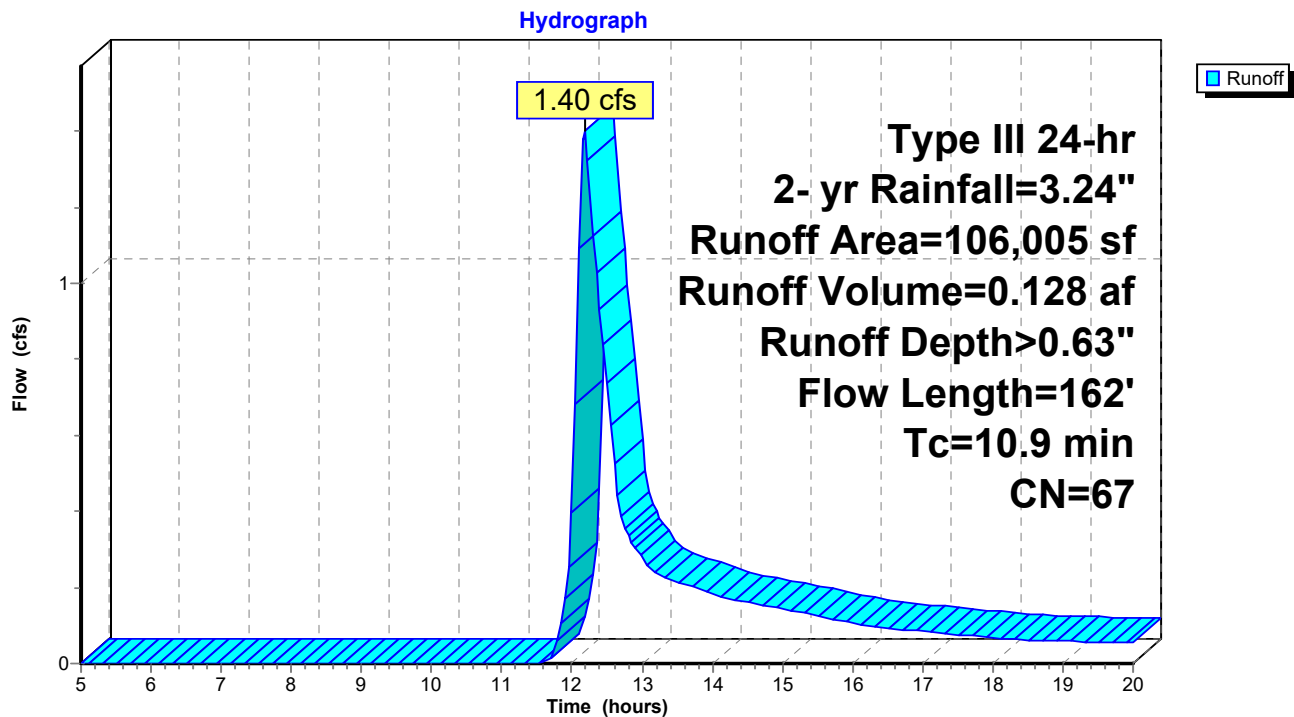
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 2,741     | 96 | Gravel                          |
| * | 20,754    | 98 | Pavement                        |
|   | 33,665    | 82 | Woods/grass comb., Fair, HSG D  |
|   | 3,512     | 68 | <50% Grass cover, Poor, HSG A   |
|   | 7,050     | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 12,042    | 39 | >75% Grass cover, Good, HSG A   |
|   | 22,274    | 36 | Woods, Fair, HSG A              |
|   | 3,967     | 35 | Brush, Fair, HSG A              |
|   | 106,005   | 67 | Weighted Average                |
|   | 85,251    |    | 80.42% Pervious Area            |
|   | 20,754    |    | 19.58% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                 |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------|
| 10.2     | 100           | 0.0460        | 0.16              |                | <b>Sheet Flow, A to B</b><br>Grass: Dense n= 0.240 P2= 3.24"                |
| 0.7      | 62            | 0.0510        | 1.58              |                | <b>Shallow Concentrated Flow, B to C</b><br>Short Grass Pasture Kv= 7.0 fps |
| 10.9     | 162           | Total         |                   |                |                                                                             |

## Subcatchment 2.1: SUB 2.1



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Type III 24-hr 2- yr Rainfall=3.24"

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### Summary for Subcatchment 2.2: Five Star Auto

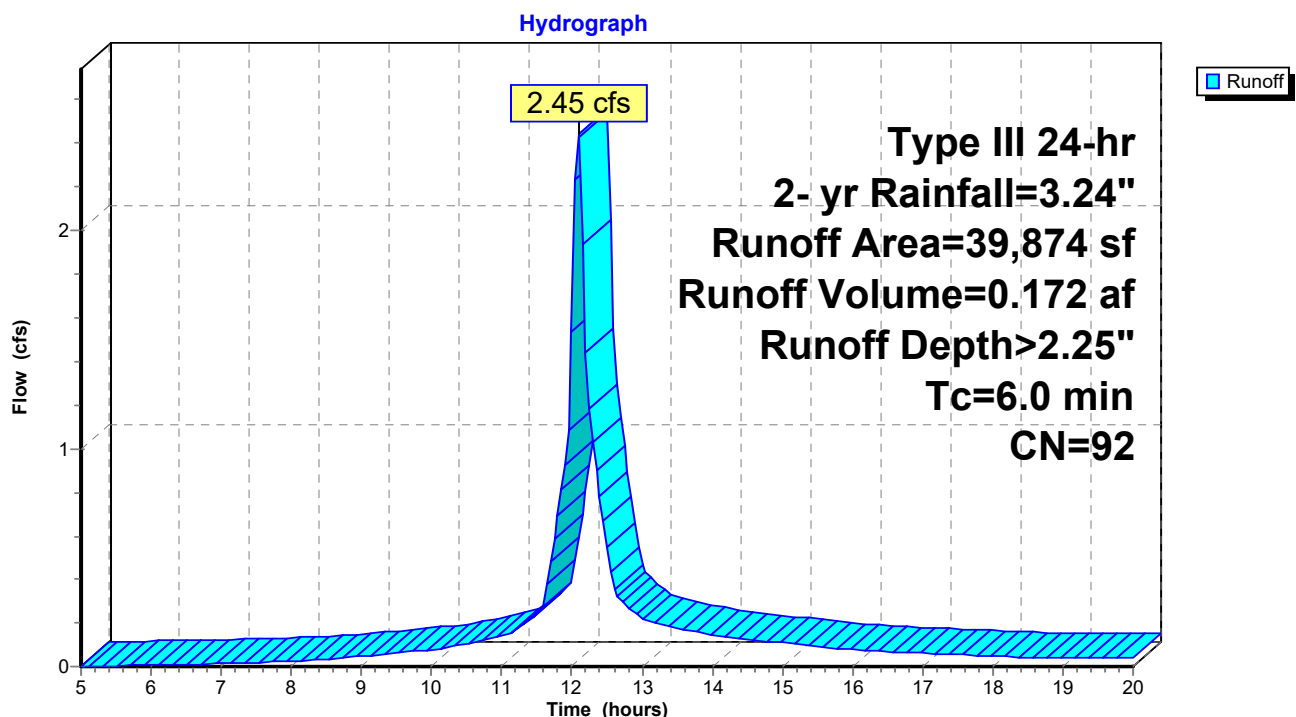
Runoff = 2.45 cfs @ 12.09 hrs, Volume= 0.172 af, Depth> 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description          |
|-------------|------------------|------------------|----------------------|-------------------|----------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, direct |

### Subcatchment 2.2: Five Star Auto



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Type III 24-hr 2- yr Rainfall=3.24"

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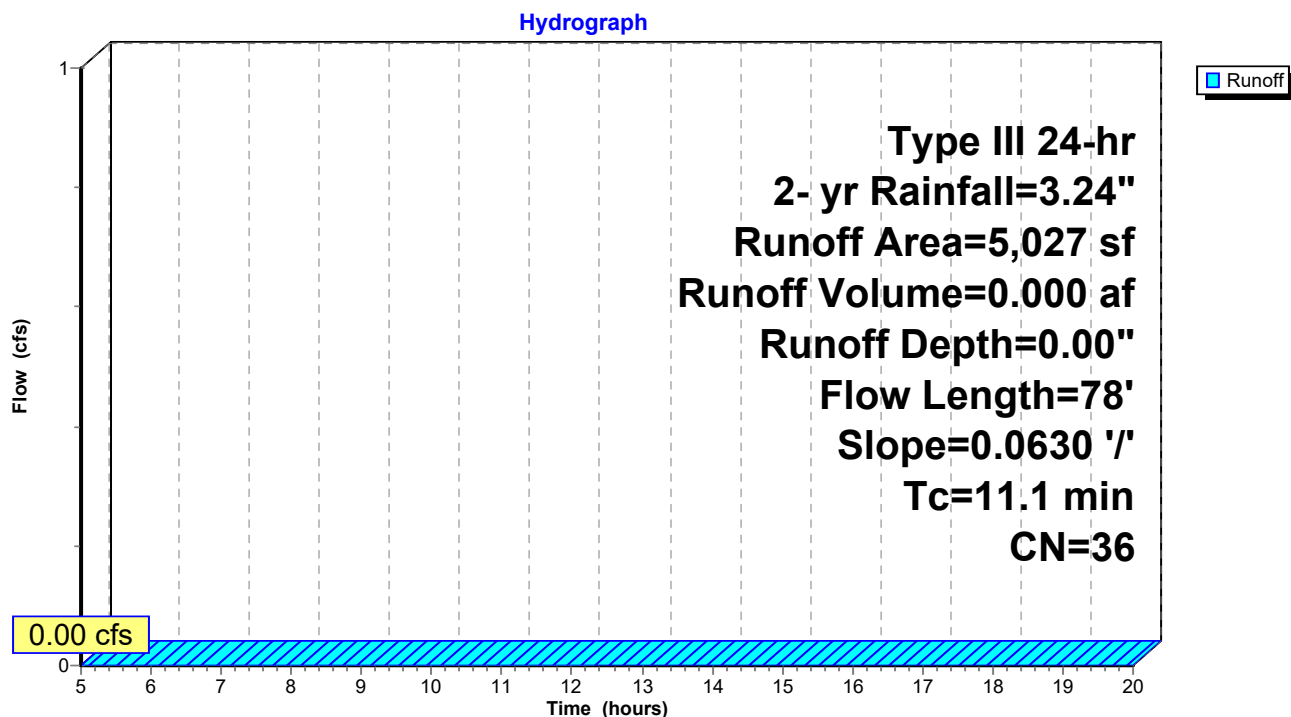
**Summary for Subcatchment 3.0S: SUB 3.0**

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

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 5,027     | 36 | Woods, Fair, HSG A    |
| 5,027     |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                      |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------------------------------|
| 11.1     | 78            | 0.0630        | 0.12              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |

**Subcatchment 3.0S: SUB 3.0**



**Pre HC Biddeford 3.22**

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Type III 24-hr 2- yr Rainfall=3.24"

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**Summary for Subcatchment 3.1: SUB 3.1**

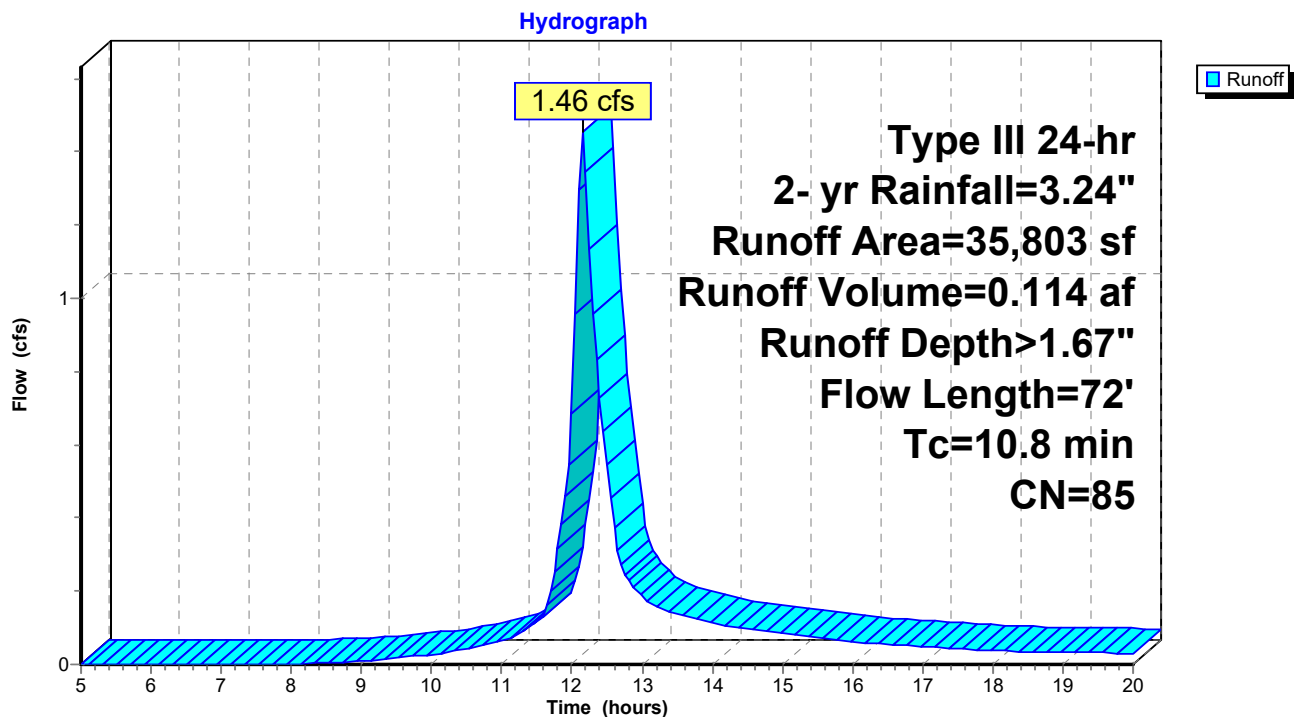
Runoff = 1.46 cfs @ 12.15 hrs, Volume= 0.114 af, Depth&gt; 1.67"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 27,033    | 82 | Woods/grass comb., Fair, HSG D  |
| 2,134     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,636     | 98 | Paved parking, HSG D            |
| 35,803    | 85 | Weighted Average                |
| 29,167    |    | 81.47% Pervious Area            |
| 6,636     |    | 18.53% Impervious Area          |

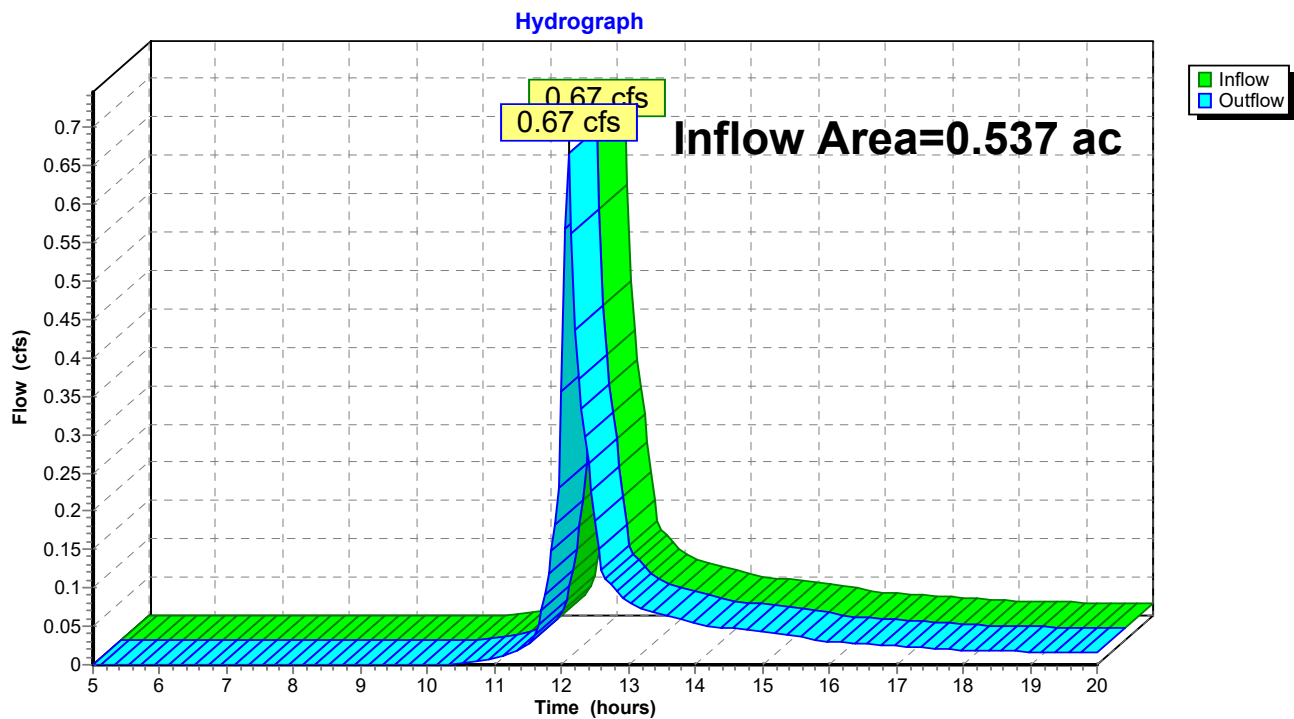
| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                             |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b><br>Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                                                         |

**Subcatchment 3.1: SUB 3.1**

**Summary for Reach 1R: POI 1 - W Cole Rd**

Inflow Area = 0.537 ac, 37.14% Impervious, Inflow Depth > 1.03" for 2- yr event  
Inflow = 0.67 cfs @ 12.10 hrs, Volume= 0.046 af  
Outflow = 0.67 cfs @ 12.10 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

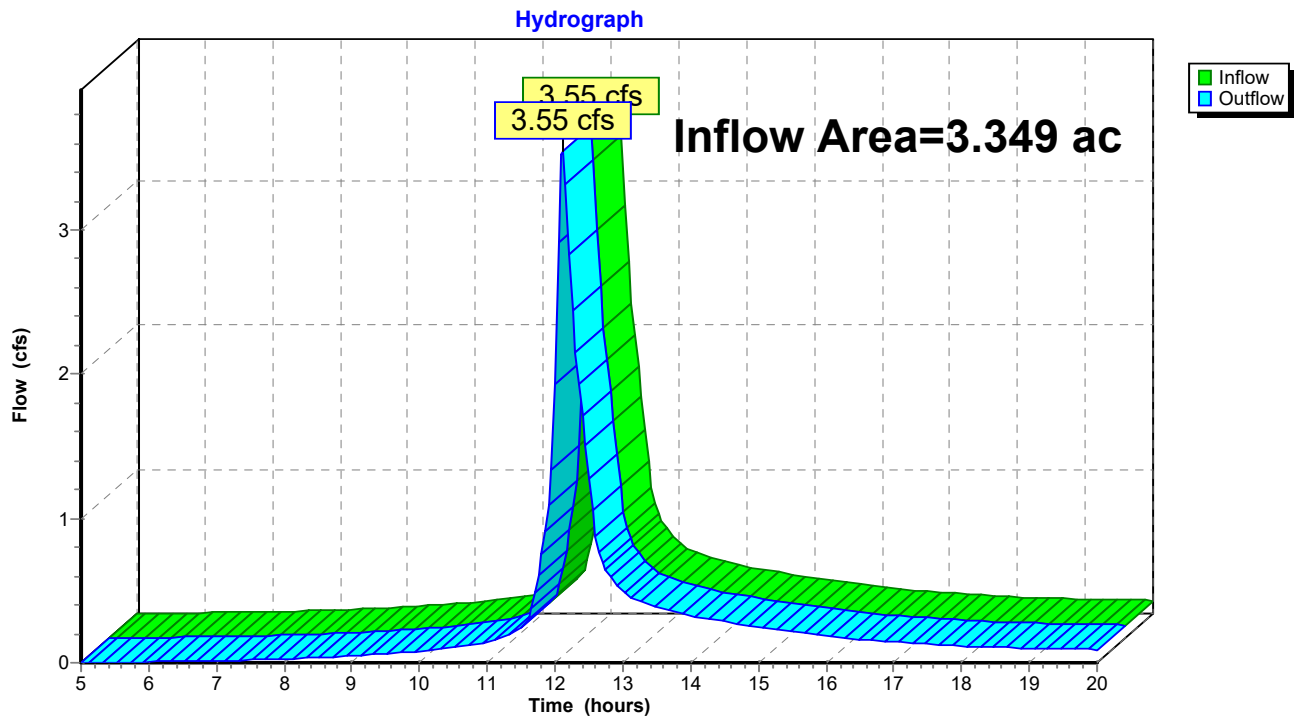
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 1R: POI 1 - W Cole Rd**

**Summary for Reach 2R: POI 2 - Alfred Rd**

Inflow Area = 3.349 ac, 38.62% Impervious, Inflow Depth > 1.08" for 2- yr event  
Inflow = 3.55 cfs @ 12.11 hrs, Volume= 0.300 af  
Outflow = 3.55 cfs @ 12.11 hrs, Volume= 0.300 af, Atten= 0%, Lag= 0.0 min

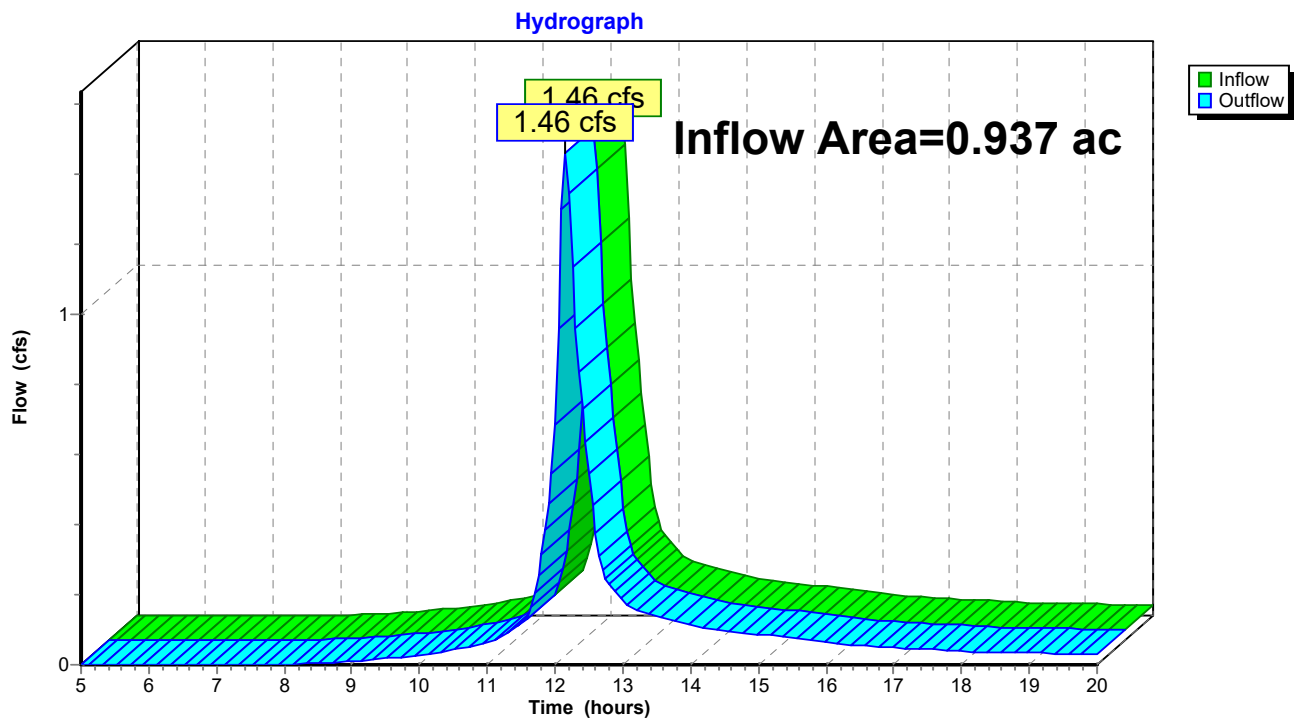
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 2R: POI 2 - Alfred Rd**

**Summary for Reach 3R: POI 3 - Railroad Tracks**

Inflow Area = 0.937 ac, 16.25% Impervious, Inflow Depth > 1.46" for 2- yr event  
Inflow = 1.46 cfs @ 12.15 hrs, Volume= 0.114 af  
Outflow = 1.46 cfs @ 12.15 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 3R: POI 3 - Railroad Tracks**

**Pre HC Biddeford 3.22***Type III 24-hr 10-yr Rainfall=5.11"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                                          |                                                                                                                                         |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment1S: SUB 1</b>             | Runoff Area=23,408 sf 37.14% Impervious Runoff Depth>2.36"<br>Tc=6.0 min CN=75 Runoff=1.57 cfs 0.106 af                                 |
| <b>Subcatchment2.1: SUB 2.1</b>          | Runoff Area=106,005 sf 19.58% Impervious Runoff Depth>1.72"<br>Flow Length=162' Tc=10.9 min CN=67 Runoff=4.37 cfs 0.349 af              |
| <b>Subcatchment2.2: Five Star Auto</b>   | Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>3.97"<br>Tc=6.0 min CN=92 Runoff=4.17 cfs 0.303 af                                 |
| <b>Subcatchment3.0S: SUB 3.0</b>         | Runoff Area=5,027 sf 0.00% Impervious Runoff Depth>0.09"<br>Flow Length=78' Slope=0.0630 '/' Tc=11.1 min CN=36 Runoff=0.00 cfs 0.001 af |
| <b>Subcatchment3.1: SUB 3.1</b>          | Runoff Area=35,803 sf 18.53% Impervious Runoff Depth>3.26"<br>Flow Length=72' Tc=10.8 min CN=85 Runoff=2.80 cfs 0.223 af                |
| <b>Reach 1R: POI 1 - W Cole Rd</b>       | Inflow=1.57 cfs 0.106 af<br>Outflow=1.57 cfs 0.106 af                                                                                   |
| <b>Reach 2R: POI 2 - Alfred Rd</b>       | Inflow=7.96 cfs 0.651 af<br>Outflow=7.96 cfs 0.651 af                                                                                   |
| <b>Reach 3R: POI 3 - Railroad Tracks</b> | Inflow=2.80 cfs 0.224 af<br>Outflow=2.80 cfs 0.224 af                                                                                   |

**Total Runoff Area = 4.824 ac Runoff Volume = 0.981 af Average Runoff Depth = 2.44"**  
**65.89% Pervious = 3.178 ac 34.11% Impervious = 1.645 ac**

**Pre HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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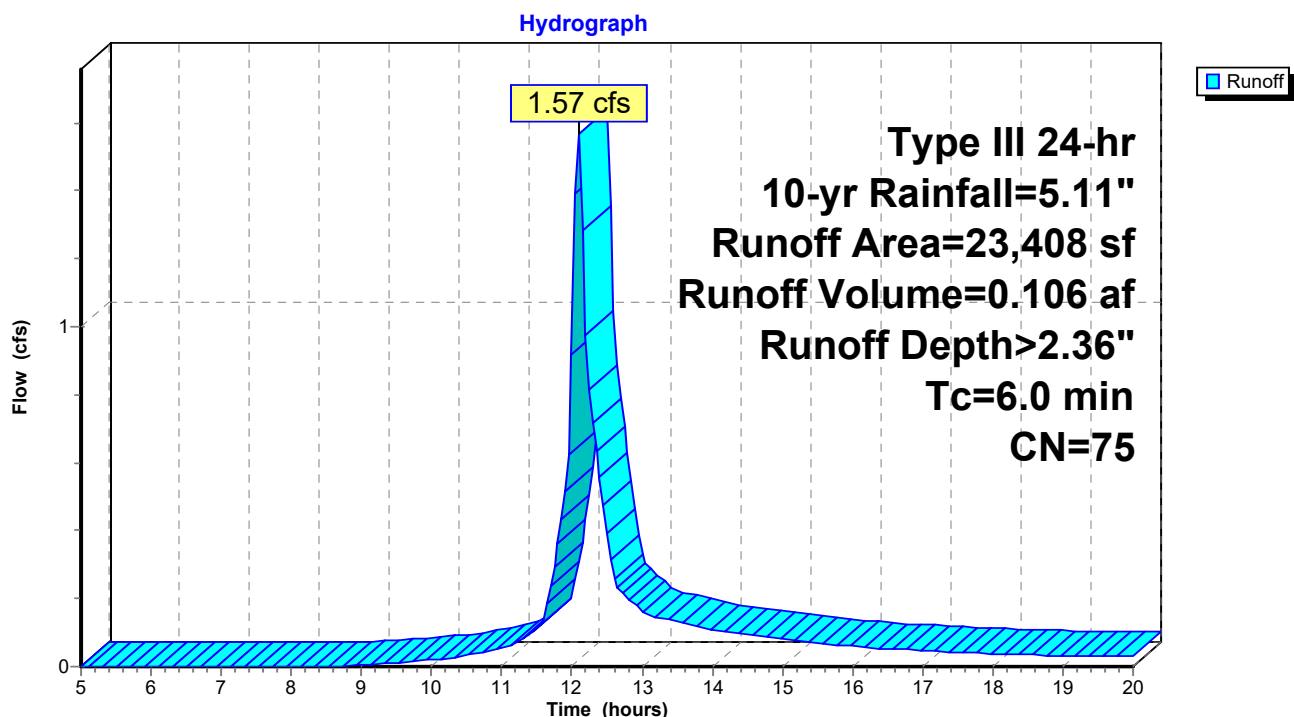
**Summary for Subcatchment 1S: SUB 1**

Runoff = 1.57 cfs @ 12.09 hrs, Volume= 0.106 af, Depth&gt; 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 4,281     | 96 | Gravel roads                    |
|   | 963       | 35 | Brush, Fair, HSG A              |
|   | 9,471     | 49 | 50-75% Grass cover, Fair, HSG A |
| * | 8,693     | 98 | Pavement/Roof                   |
|   | 23,408    | 75 | Weighted Average                |
|   | 14,715    |    | 62.86% Pervious Area            |
|   | 8,693     |    | 37.14% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                     |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, Direct - 0.1 hour |

**Subcatchment 1S: SUB 1**

**Pre HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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**Summary for Subcatchment 2.1: SUB 2.1**

Runoff = 4.37 cfs @ 12.16 hrs, Volume= 0.349 af, Depth&gt; 1.72"

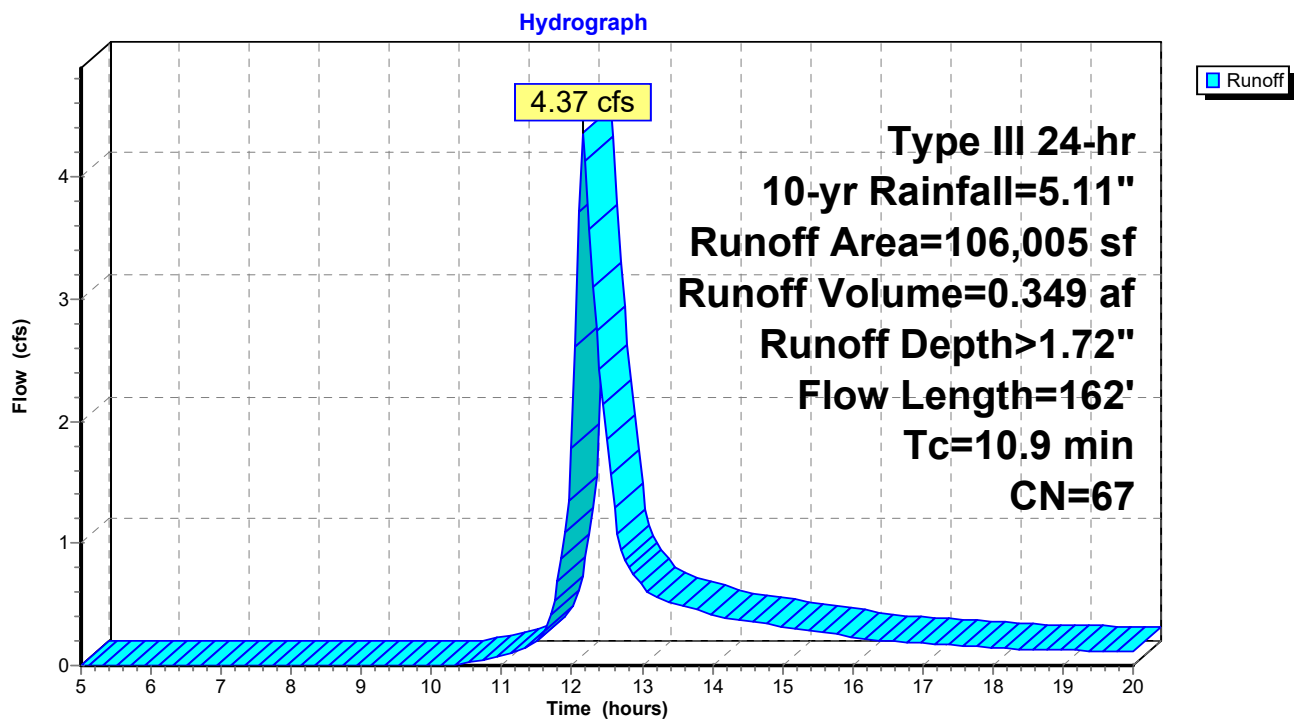
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 2,741     | 96 | Gravel                          |
| * | 20,754    | 98 | Pavement                        |
|   | 33,665    | 82 | Woods/grass comb., Fair, HSG D  |
|   | 3,512     | 68 | <50% Grass cover, Poor, HSG A   |
|   | 7,050     | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 12,042    | 39 | >75% Grass cover, Good, HSG A   |
|   | 22,274    | 36 | Woods, Fair, HSG A              |
|   | 3,967     | 35 | Brush, Fair, HSG A              |
|   | 106,005   | 67 | Weighted Average                |
|   | 85,251    |    | 80.42% Pervious Area            |
|   | 20,754    |    | 19.58% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                                 |
|-------------|------------------|------------------|----------------------|-------------------|-----------------------------------------------------------------------------|
| 10.2        | 100              | 0.0460           | 0.16                 |                   | <b>Sheet Flow, A to B</b><br>Grass: Dense n= 0.240 P2= 3.24"                |
| 0.7         | 62               | 0.0510           | 1.58                 |                   | <b>Shallow Concentrated Flow, B to C</b><br>Short Grass Pasture Kv= 7.0 fps |
| 10.9        | 162              | Total            |                      |                   |                                                                             |

## Subcatchment 2.1: SUB 2.1





**Pre HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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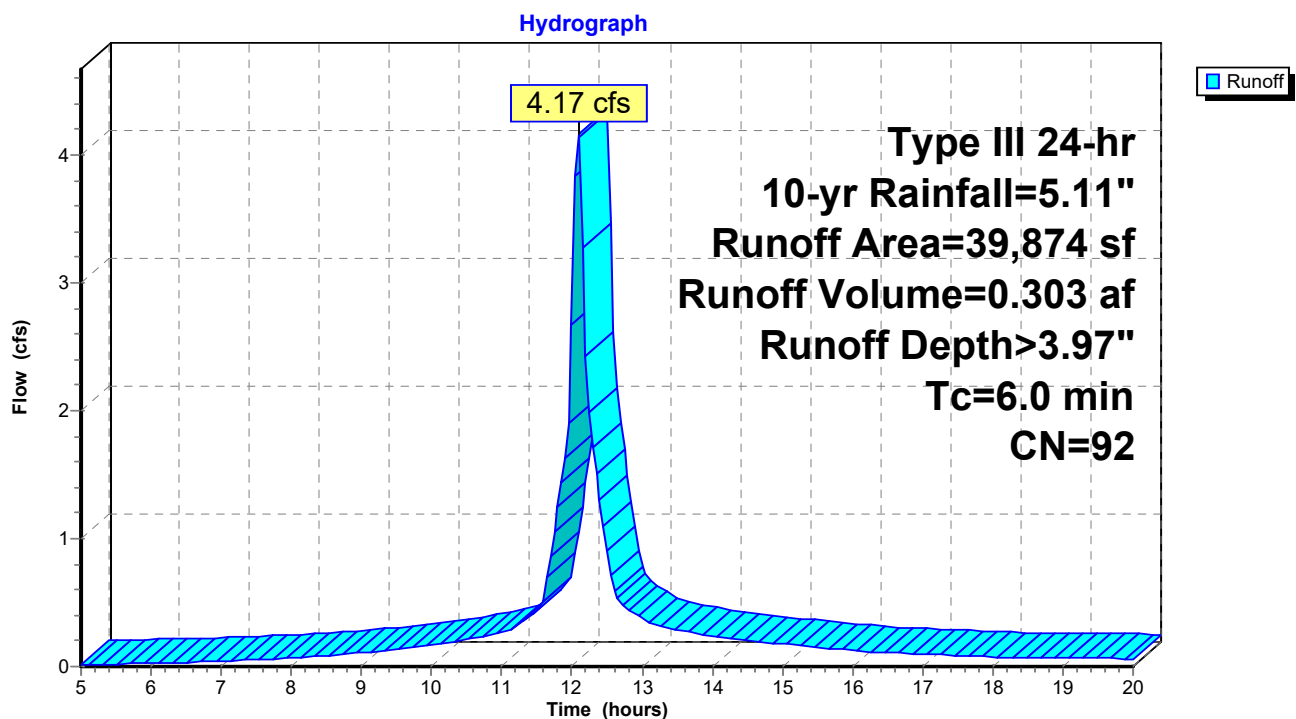
**Summary for Subcatchment 2.2: Five Star Auto**

Runoff = 4.17 cfs @ 12.09 hrs, Volume= 0.303 af, Depth&gt; 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description          |
|-------------|------------------|------------------|----------------------|-------------------|----------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, direct |

**Subcatchment 2.2: Five Star Auto**

**Summary for Subcatchment 3.0S: SUB 3.0**

Runoff = 0.00 cfs @ 14.79 hrs, Volume= 0.001 af, Depth> 0.09"

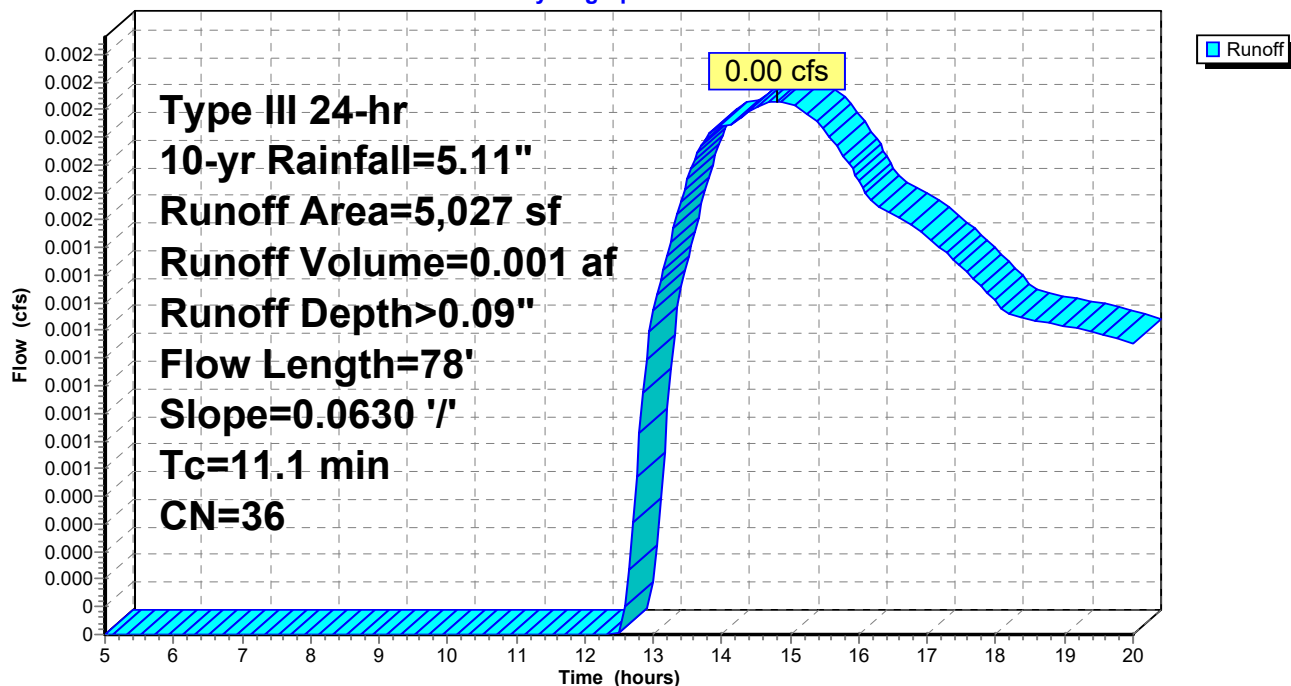
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 5,027     | 36 | Woods, Fair, HSG A    |
| 5,027     |    | 100.00% Pervious Area |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                      |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------------------|
| 11.1        | 78               | 0.0630           | 0.12                 |                   | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |

**Subcatchment 3.0S: SUB 3.0**

Hydrograph



**Pre HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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**Summary for Subcatchment 3.1: SUB 3.1**

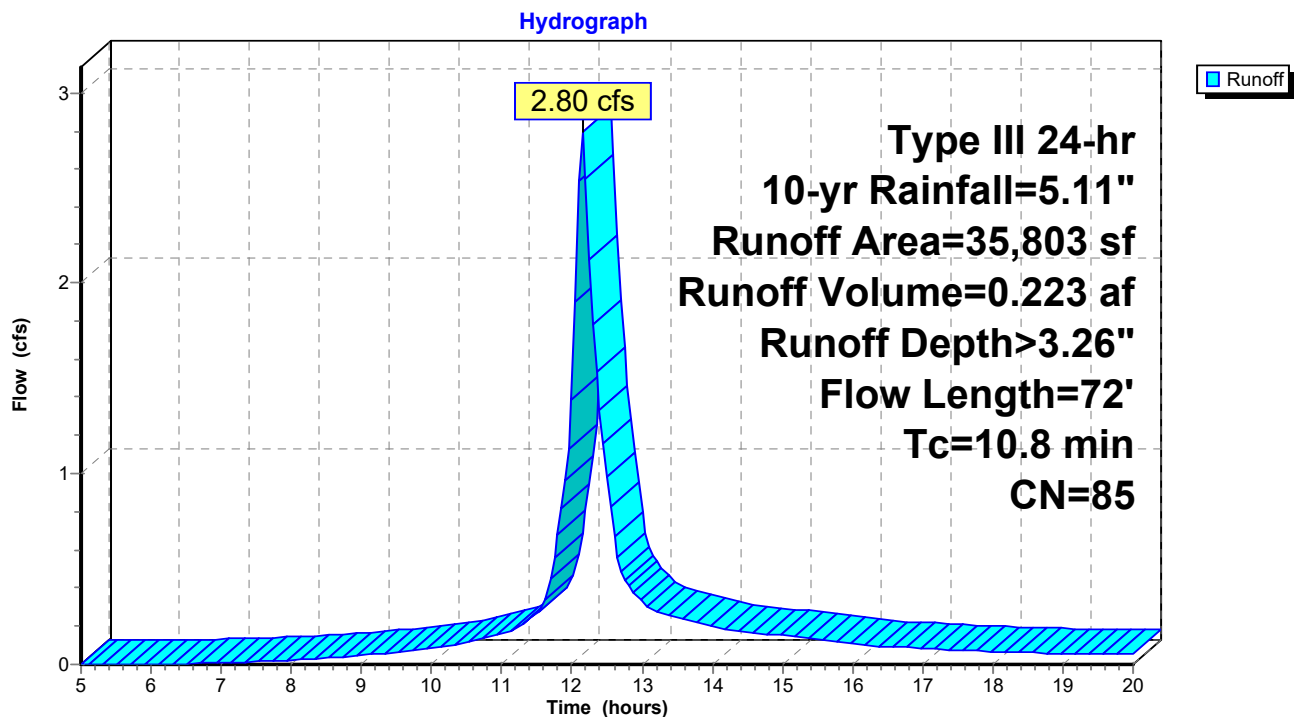
Runoff = 2.80 cfs @ 12.15 hrs, Volume= 0.223 af, Depth&gt; 3.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 27,033    | 82 | Woods/grass comb., Fair, HSG D  |
| 2,134     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,636     | 98 | Paved parking, HSG D            |
| 35,803    | 85 | Weighted Average                |
| 29,167    |    | 81.47% Pervious Area            |
| 6,636     |    | 18.53% Impervious Area          |

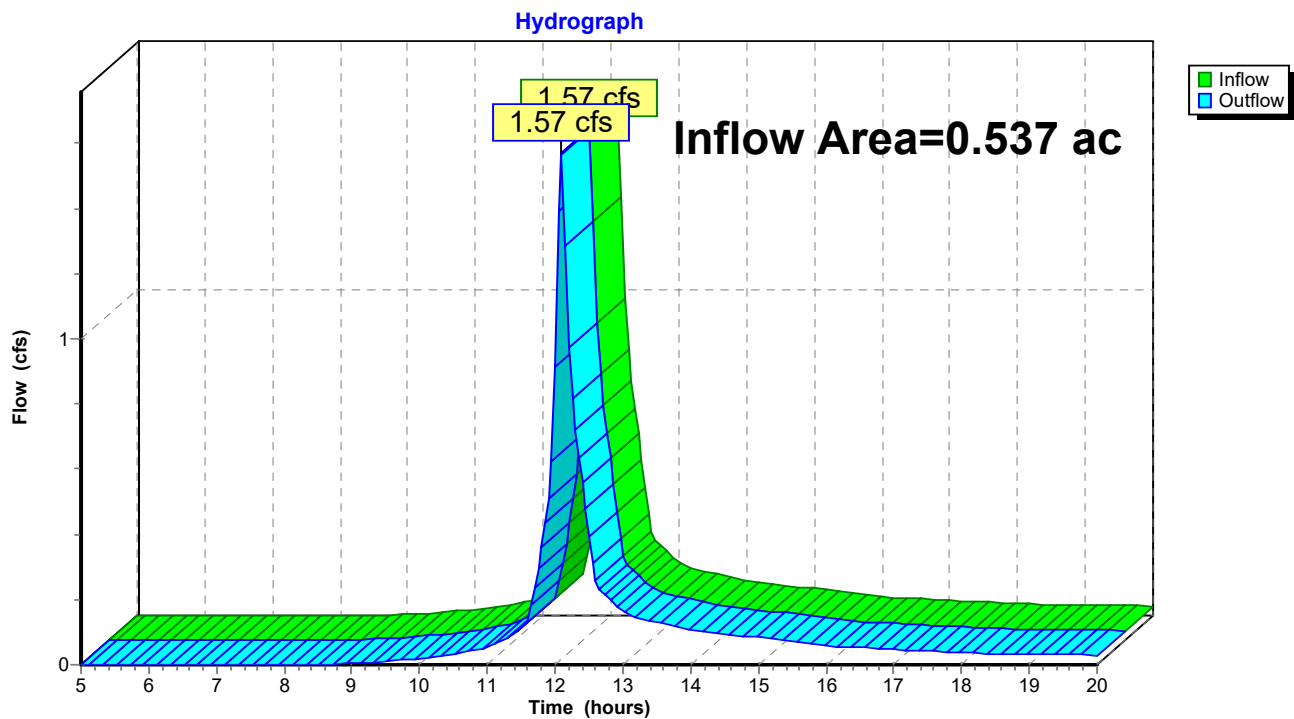
| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                             |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b><br>Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                                                         |

**Subcatchment 3.1: SUB 3.1**

**Summary for Reach 1R: POI 1 - W Cole Rd**

Inflow Area = 0.537 ac, 37.14% Impervious, Inflow Depth > 2.36" for 10-yr event  
Inflow = 1.57 cfs @ 12.09 hrs, Volume= 0.106 af  
Outflow = 1.57 cfs @ 12.09 hrs, Volume= 0.106 af, Atten= 0%, Lag= 0.0 min

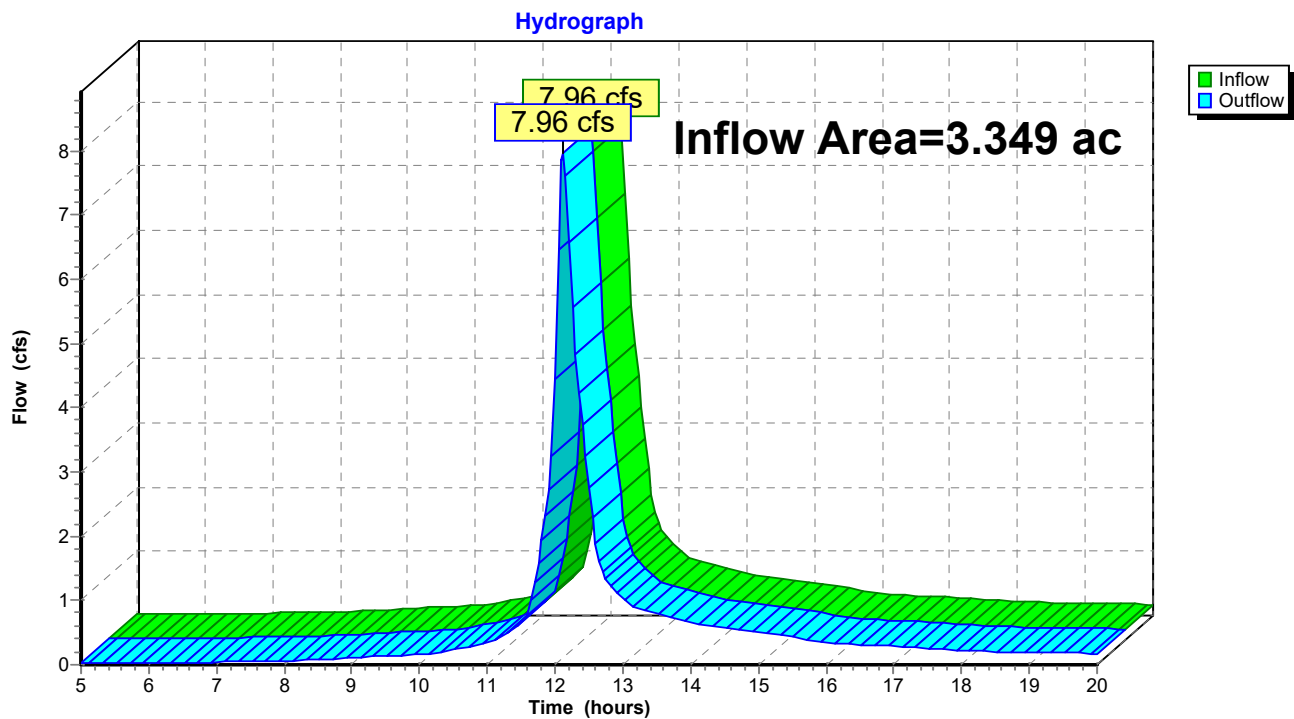
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 1R: POI 1 - W Cole Rd**

**Summary for Reach 2R: POI 2 - Alfred Rd**

Inflow Area = 3.349 ac, 38.62% Impervious, Inflow Depth > 2.33" for 10-yr event  
Inflow = 7.96 cfs @ 12.12 hrs, Volume= 0.651 af  
Outflow = 7.96 cfs @ 12.12 hrs, Volume= 0.651 af, Atten= 0%, Lag= 0.0 min

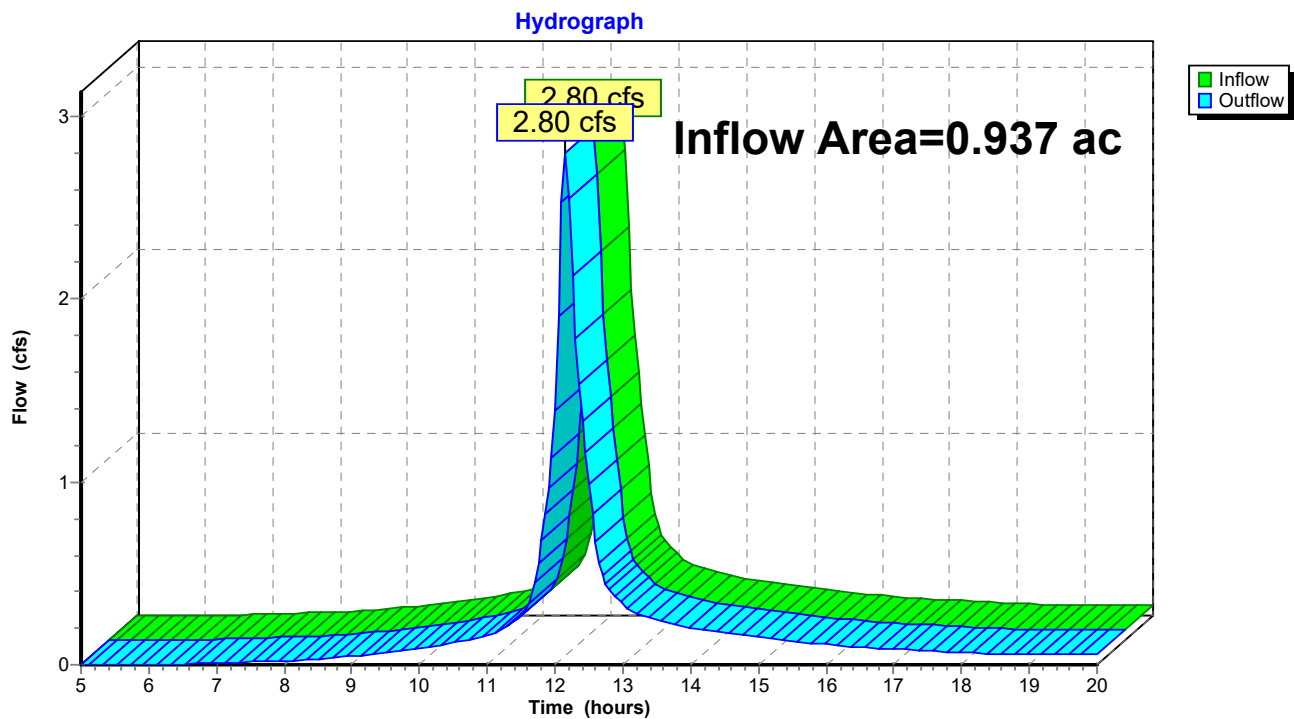
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 2R: POI 2 - Alfred Rd**

**Summary for Reach 3R: POI 3 - Railroad Tracks**

Inflow Area = 0.937 ac, 16.25% Impervious, Inflow Depth > 2.87" for 10-yr event  
Inflow = 2.80 cfs @ 12.15 hrs, Volume= 0.224 af  
Outflow = 2.80 cfs @ 12.15 hrs, Volume= 0.224 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 3R: POI 3 - Railroad Tracks**

**Pre HC Biddeford 3.22***Type III 24-hr 25-yr Rainfall=6.28"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: SUB 1**

Runoff Area=23,408 sf 37.14% Impervious Runoff Depth>3.29"  
Tc=6.0 min CN=75 Runoff=2.18 cfs 0.147 af

**Subcatchment2.1: SUB 2.1**

Runoff Area=106,005 sf 19.58% Impervious Runoff Depth>2.53"  
Flow Length=162' Tc=10.9 min CN=67 Runoff=6.51 cfs 0.513 af

**Subcatchment2.2: Five Star Auto**

Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>5.05"  
Tc=6.0 min CN=92 Runoff=5.24 cfs 0.385 af

**Subcatchment3.0S: SUB 3.0**

Runoff Area=5,027 sf 0.00% Impervious Runoff Depth>0.29"  
Flow Length=78' Slope=0.0630 '/' Tc=11.1 min CN=36 Runoff=0.01 cfs 0.003 af

**Subcatchment3.1: SUB 3.1**

Runoff Area=35,803 sf 18.53% Impervious Runoff Depth>4.30"  
Flow Length=72' Tc=10.8 min CN=85 Runoff=3.65 cfs 0.295 af

**Reach 1R: POI 1 - W Cole Rd**

Inflow=2.18 cfs 0.147 af  
Outflow=2.18 cfs 0.147 af

**Reach 2R: POI 2 - Alfred Rd**

Inflow=11.01 cfs 0.898 af  
Outflow=11.01 cfs 0.898 af

**Reach 3R: POI 3 - Railroad Tracks**

Inflow=3.65 cfs 0.297 af  
Outflow=3.65 cfs 0.297 af

**Total Runoff Area = 4.824 ac Runoff Volume = 1.342 af Average Runoff Depth = 3.34"**  
**65.89% Pervious = 3.178 ac 34.11% Impervious = 1.645 ac**

**Pre HC Biddeford 3.22**

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Type III 24-hr 25-yr Rainfall=6.28"

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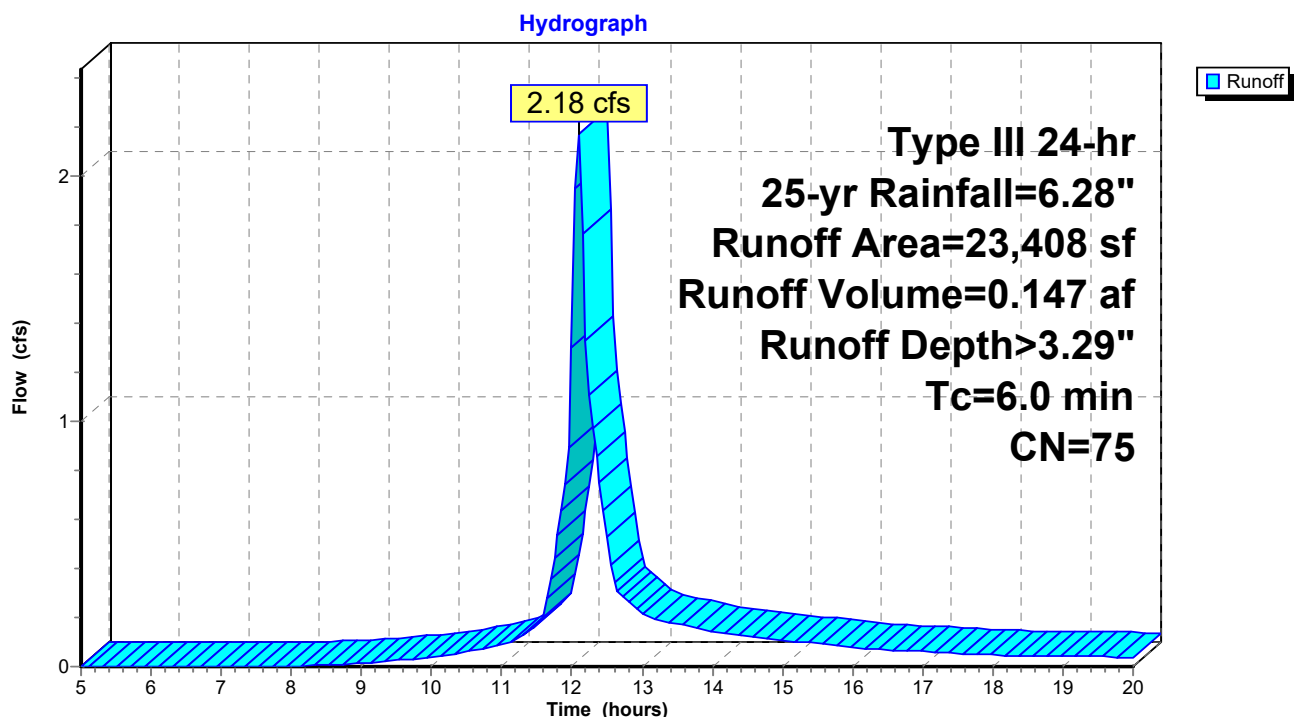
**Summary for Subcatchment 1S: SUB 1**

Runoff = 2.18 cfs @ 12.09 hrs, Volume= 0.147 af, Depth&gt; 3.29"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 4,281     | 96 | Gravel roads                    |
|   | 963       | 35 | Brush, Fair, HSG A              |
|   | 9,471     | 49 | 50-75% Grass cover, Fair, HSG A |
| * | 8,693     | 98 | Pavement/Roof                   |
|   | 23,408    | 75 | Weighted Average                |
|   | 14,715    |    | 62.86% Pervious Area            |
|   | 8,693     |    | 37.14% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------|
| 6.0      |               |               |                   |                | Direct Entry, Direct - 0.1 hour |

**Subcatchment 1S: SUB 1**



**Pre HC Biddeford 3.22**

Type III 24-hr 25-yr Rainfall=6.28"

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**Summary for Subcatchment 2.1: SUB 2.1**

Runoff = 6.51 cfs @ 12.16 hrs, Volume= 0.513 af, Depth&gt; 2.53"

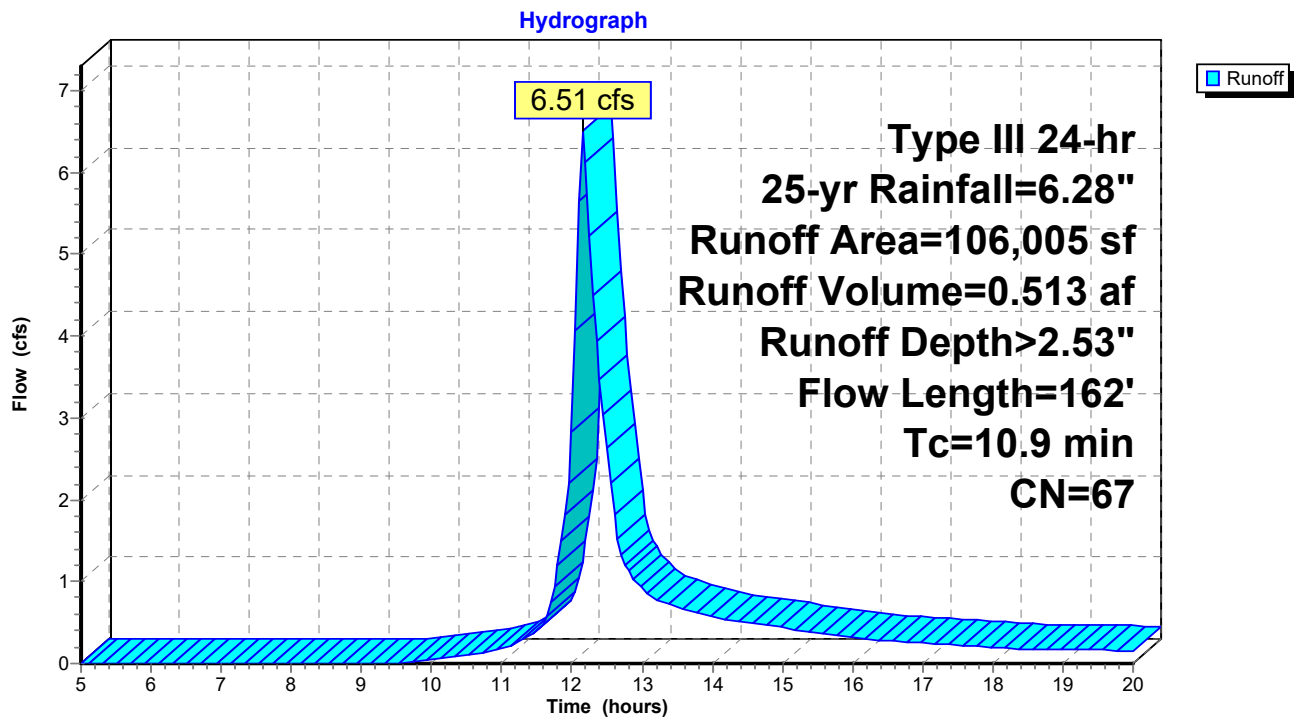
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 2,741     | 96 | Gravel                          |
| * | 20,754    | 98 | Pavement                        |
|   | 33,665    | 82 | Woods/grass comb., Fair, HSG D  |
|   | 3,512     | 68 | <50% Grass cover, Poor, HSG A   |
|   | 7,050     | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 12,042    | 39 | >75% Grass cover, Good, HSG A   |
|   | 22,274    | 36 | Woods, Fair, HSG A              |
|   | 3,967     | 35 | Brush, Fair, HSG A              |
|   | 106,005   | 67 | Weighted Average                |
|   | 85,251    |    | 80.42% Pervious Area            |
|   | 20,754    |    | 19.58% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                              |
|----------|---------------|---------------|-------------------|----------------|------------------------------------------|
| 10.2     | 100           | 0.0460        | 0.16              |                | <b>Sheet Flow, A to B</b>                |
|          |               |               |                   |                | Grass: Dense n= 0.240 P2= 3.24"          |
| 0.7      | 62            | 0.0510        | 1.58              |                | <b>Shallow Concentrated Flow, B to C</b> |
|          |               |               |                   |                | Short Grass Pasture Kv= 7.0 fps          |
| 10.9     | 162           | Total         |                   |                |                                          |

## Subcatchment 2.1: SUB 2.1



**Pre HC Biddeford 3.22**

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Type III 24-hr 25-yr Rainfall=6.28"

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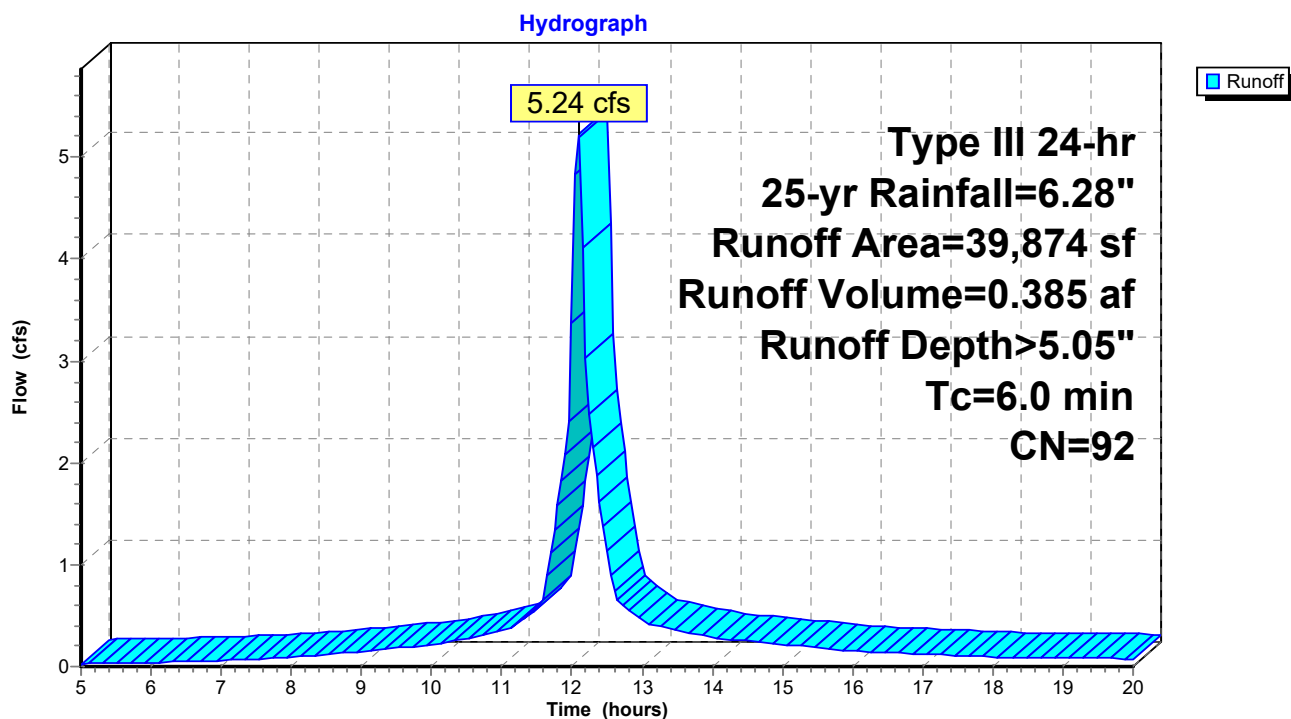
**Summary for Subcatchment 2.2: Five Star Auto**

Runoff = 5.24 cfs @ 12.09 hrs, Volume= 0.385 af, Depth&gt; 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description          |
|-------------|------------------|------------------|----------------------|-------------------|----------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, direct |

**Subcatchment 2.2: Five Star Auto**

**Summary for Subcatchment 3.0S: SUB 3.0**

Runoff = 0.01 cfs @ 12.48 hrs, Volume= 0.003 af, Depth> 0.29"

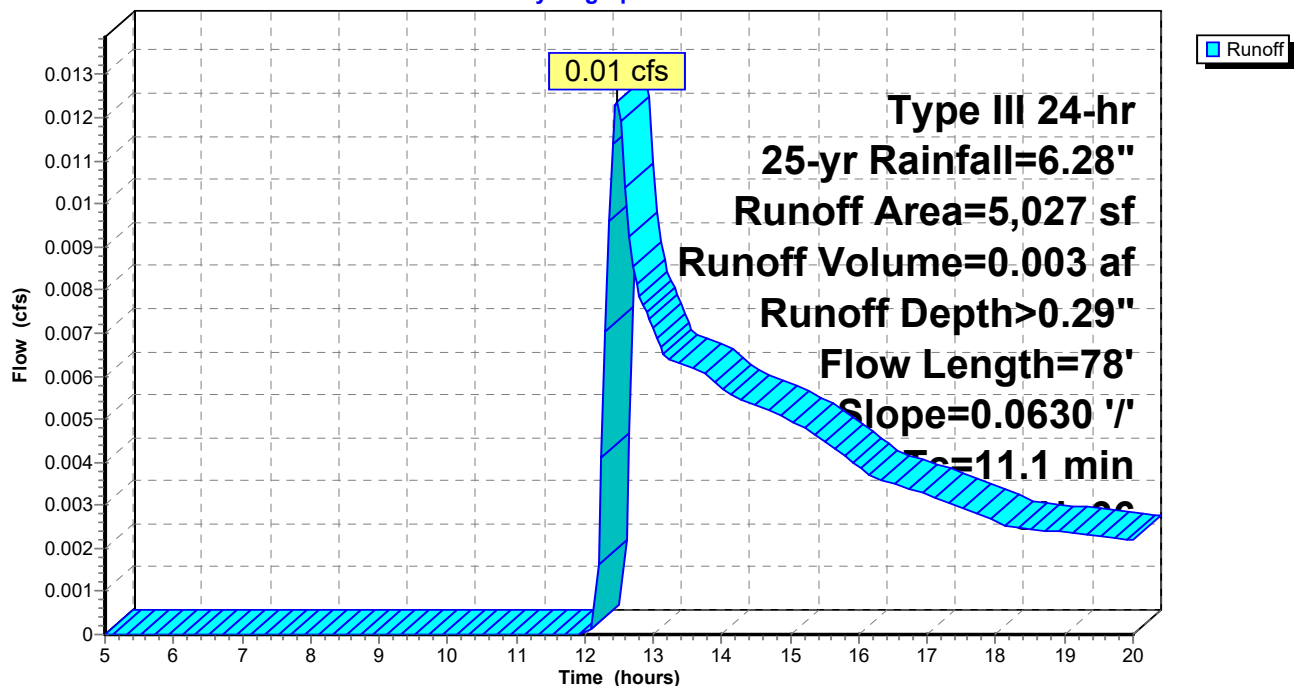
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 5,027     | 36 | Woods, Fair, HSG A    |
| 5,027     |    | 100.00% Pervious Area |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                      |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------------------|
| 11.1        | 78               | 0.0630           | 0.12                 |                   | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |

**Subcatchment 3.0S: SUB 3.0**

Hydrograph



**Pre HC Biddeford 3.22**

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Type III 24-hr 25-yr Rainfall=6.28"

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**Summary for Subcatchment 3.1: SUB 3.1**

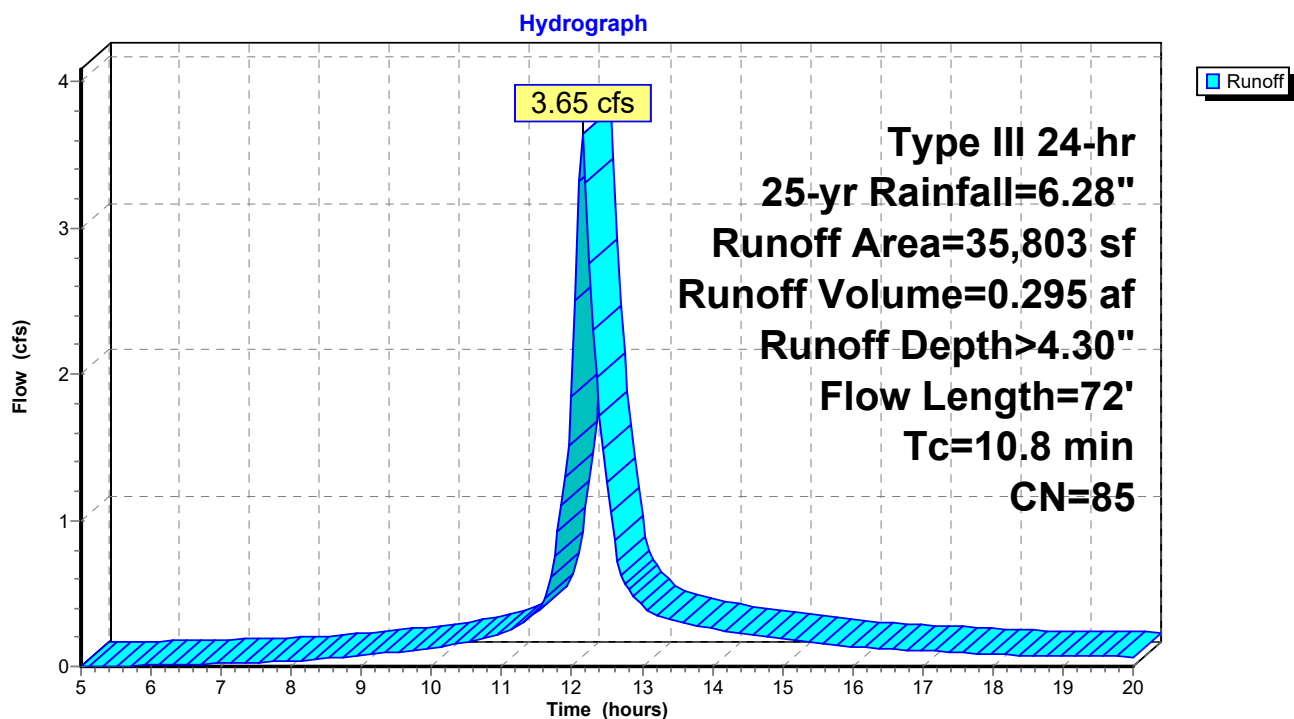
Runoff = 3.65 cfs @ 12.15 hrs, Volume= 0.295 af, Depth&gt; 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 27,033    | 82 | Woods/grass comb., Fair, HSG D  |
| 2,134     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,636     | 98 | Paved parking, HSG D            |
| 35,803    | 85 | Weighted Average                |
| 29,167    |    | 81.47% Pervious Area            |
| 6,636     |    | 18.53% Impervious Area          |

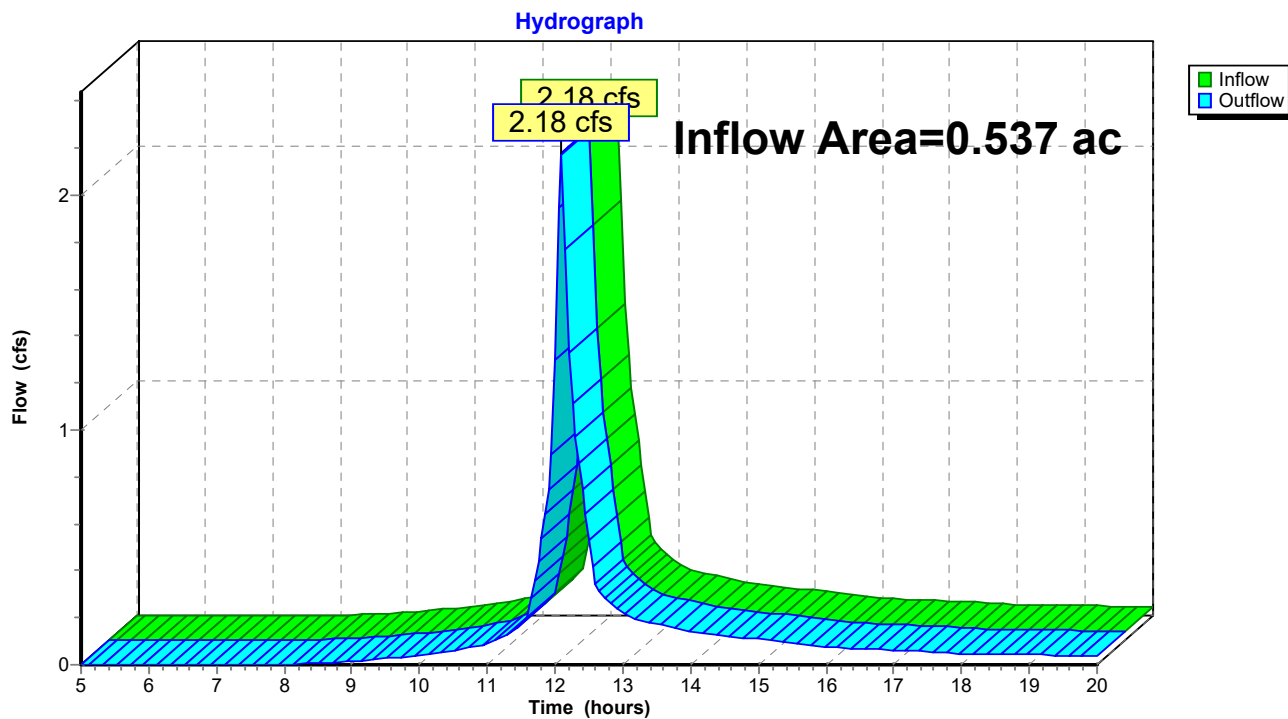
| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                             |
|----------|---------------|---------------|-------------------|----------------|-------------------------------------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b><br>Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b><br>Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                                                         |

**Subcatchment 3.1: SUB 3.1**

**Summary for Reach 1R: POI 1 - W Cole Rd**

Inflow Area = 0.537 ac, 37.14% Impervious, Inflow Depth > 3.29" for 25-yr event  
Inflow = 2.18 cfs @ 12.09 hrs, Volume= 0.147 af  
Outflow = 2.18 cfs @ 12.09 hrs, Volume= 0.147 af, Atten= 0%, Lag= 0.0 min

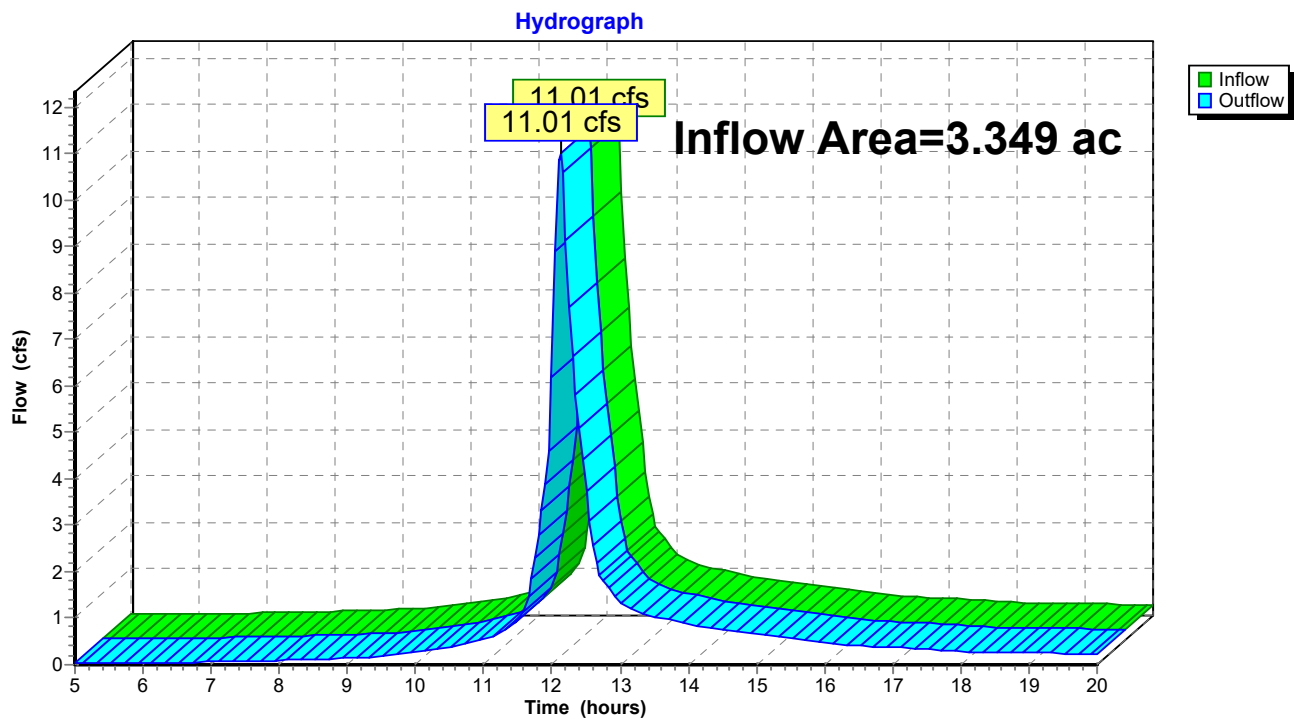
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 1R: POI 1 - W Cole Rd**

**Summary for Reach 2R: POI 2 - Alfred Rd**

Inflow Area = 3.349 ac, 38.62% Impervious, Inflow Depth > 3.22" for 25-yr event  
Inflow = 11.01 cfs @ 12.12 hrs, Volume= 0.898 af  
Outflow = 11.01 cfs @ 12.12 hrs, Volume= 0.898 af, Atten= 0%, Lag= 0.0 min

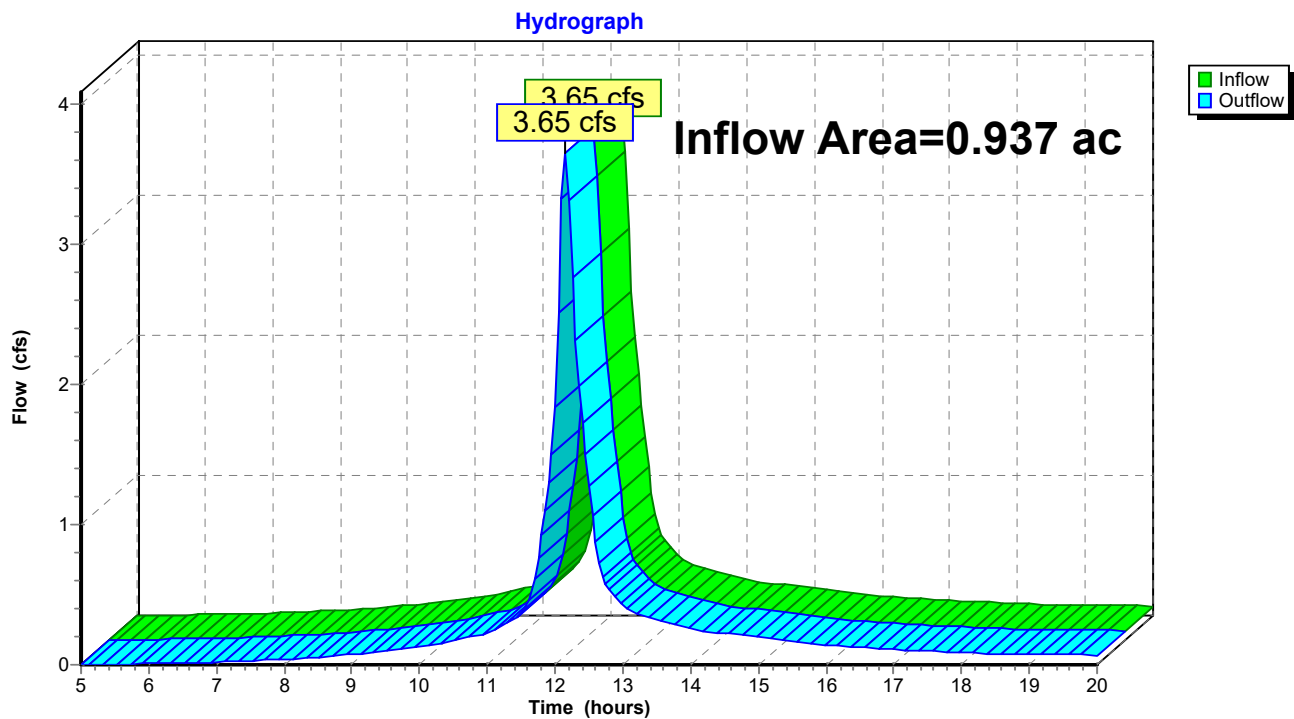
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Reach 2R: POI 2 - Alfred Rd**

**Summary for Reach 3R: POI 3 - Railroad Tracks**

Inflow Area = 0.937 ac, 16.25% Impervious, Inflow Depth > 3.81" for 25-yr event  
Inflow = 3.65 cfs @ 12.15 hrs, Volume= 0.297 af  
Outflow = 3.65 cfs @ 12.15 hrs, Volume= 0.297 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

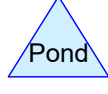
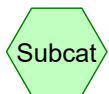
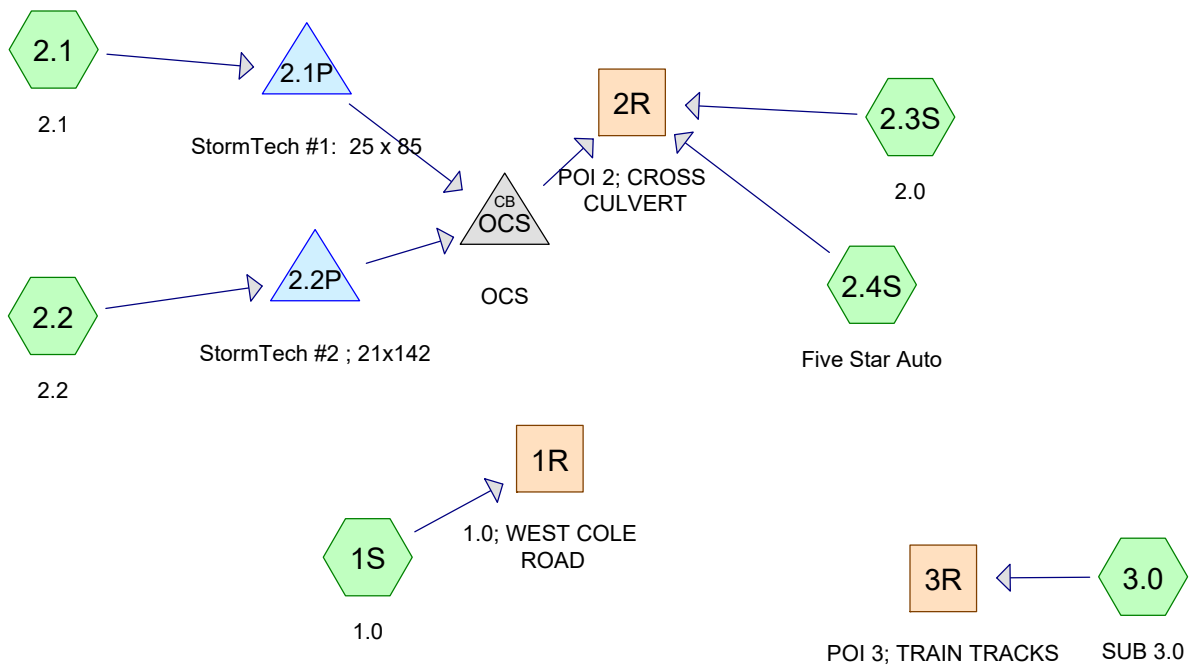
**Reach 3R: POI 3 - Railroad Tracks**



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# POST DEVELOPMENT HYDROCAD





**Routing Diagram for Post HC Biddeford 3.22**  
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## Post HC Biddeford 3.22

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### Area Listing (all nodes)

| Area<br>(acres) | CN        | Description<br>(subcatchment-numbers)          |
|-----------------|-----------|------------------------------------------------|
| 0.340           | 49        | 50-75% Grass cover, Fair, HSG A (1S, 2.3S)     |
| 0.114           | 84        | 50-75% Grass cover, Fair, HSG D (3.0)          |
| 0.206           | 39        | >75% Grass cover, Good, HSG A (2.1, 2.2, 2.4S) |
| 0.728           | 80        | >75% Grass cover, Good, HSG D (2.3S)           |
| 0.051           | 89        | Dirt roads, HSG D (3.0)                        |
| 0.756           | 98        | Paved parking, HSG A (2.1, 2.2)                |
| 0.159           | 98        | Paved parking, HSG D (3.0)                     |
| 0.221           | 98        | Pavement (2.3S)                                |
| 1.134           | 98        | Pavement/Roof (1S, 2.4S)                       |
| 0.461           | 98        | Roof (2.2)                                     |
| 0.653           | 82        | Woods/grass comb., Fair, HSG D (2.3S, 3.0)     |
| <b>4.823</b>    | <b>87</b> | <b>TOTAL AREA</b>                              |

## Post HC Biddeford 3.22

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### Soil Listing (all nodes)

| Area<br>(acres) | Soil<br>Group | Subcatchment<br>Numbers  |
|-----------------|---------------|--------------------------|
| 1.302           | HSG A         | 1S, 2.1, 2.2, 2.3S, 2.4S |
| 0.000           | HSG B         |                          |
| 0.000           | HSG C         |                          |
| 1.705           | HSG D         | 2.3S, 3.0                |
| 1.816           | Other         | 1S, 2.2, 2.3S, 2.4S      |
| <b>4.823</b>    |               | <b>TOTAL AREA</b>        |

**Post HC Biddeford 3.22**

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**Ground Covers (all nodes)**

| HSG-A<br>(acres) | HSG-B<br>(acres) | HSG-C<br>(acres) | HSG-D<br>(acres) | Other<br>(acres) | Total<br>(acres) | Ground<br>Cover          | Subcatchment<br>Numbers    |
|------------------|------------------|------------------|------------------|------------------|------------------|--------------------------|----------------------------|
| 0.340            | 0.000            | 0.000            | 0.114            | 0.000            | 0.454            | 50-75% Grass cover, Fair | 1S, 2.3S,<br>3.0           |
| 0.206            | 0.000            | 0.000            | 0.728            | 0.000            | 0.933            | >75% Grass cover, Good   | 2.1, 2.2,<br>2.3S,<br>2.4S |
| 0.000            | 0.000            | 0.000            | 0.051            | 0.000            | 0.051            | Dirt roads               | 3.0                        |
| 0.756            | 0.000            | 0.000            | 0.159            | 0.000            | 0.916            | Paved parking            | 2.1, 2.2,<br>3.0           |
| 0.000            | 0.000            | 0.000            | 0.000            | 0.221            | 0.221            | Pavement                 | 2.3S                       |
| 0.000            | 0.000            | 0.000            | 0.000            | 1.134            | 1.134            | Pavement/Roof            | 1S, 2.4S                   |
| 0.000            | 0.000            | 0.000            | 0.000            | 0.461            | 0.461            | Roof                     | 2.2                        |
| 0.000            | 0.000            | 0.000            | 0.653            | 0.000            | 0.653            | Woods/grass comb., Fair  | 2.3S, 3.0                  |
| <b>1.302</b>     | <b>0.000</b>     | <b>0.000</b>     | <b>1.705</b>     | <b>1.816</b>     | <b>4.823</b>     | <b>TOTAL AREA</b>        |                            |

**Post HC Biddeford 3.22**

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*Type III 24-hr 2-yr Rainfall=3.24"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                                         |                                                                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment1S: 1.0</b>              | Runoff Area=25,494 sf 54.09% Impervious Runoff Depth>1.08"<br>Tc=6.0 min CN=76 Runoff=0.77 cfs 0.053 af                                    |
| <b>Subcatchment2.1: 2.1</b>             | Runoff Area=24,378 sf 95.86% Impervious Runoff Depth>2.63"<br>Tc=6.0 min CN=96 Runoff=1.66 cfs 0.123 af                                    |
| <b>Subcatchment2.2: 2.2</b>             | Runoff Area=33,335 sf 89.03% Impervious Runoff Depth>2.25"<br>Tc=6.0 min CN=92 Runoff=2.05 cfs 0.144 af                                    |
| <b>Subcatchment2.3S: 2.0</b>            | Runoff Area=58,691 sf 16.40% Impervious Runoff Depth>1.45"<br>Tc=10.9 min CN=82 Runoff=2.08 cfs 0.163 af                                   |
| <b>Subcatchment2.4S: Five Star Auto</b> | Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>2.25"<br>Tc=6.0 min CN=92 Runoff=2.45 cfs 0.172 af                                    |
| <b>Subcatchment3.0: SUB 3.0</b>         | Runoff Area=28,312 sf 24.50% Impervious Runoff Depth>1.82"<br>Flow Length=72' Tc=10.8 min CN=87 Runoff=1.26 cfs 0.099 af                   |
| <b>Reach 1R: 1.0; WEST COLE ROAD</b>    | Inflow=0.77 cfs 0.053 af<br>Outflow=0.77 cfs 0.053 af                                                                                      |
| <b>Reach 2R: POI 2; CROSS CULVERT</b>   | Inflow=4.48 cfs 0.496 af<br>Outflow=4.48 cfs 0.496 af                                                                                      |
| <b>Reach 3R: POI 3; TRAIN TRACKS</b>    | Avg. Flow Depth=0.12' Max Vel=5.12 fps Inflow=1.26 cfs 0.099 af<br>n=0.041 L=1.0' S=0.4000 ' Capacity=107.22 cfs Outflow=1.25 cfs 0.099 af |
| <b>Pond 2.1P: StormTech #1: 25 x 85</b> | Peak Elev=120.16' Storage=3,400 cf Inflow=1.66 cfs 0.123 af<br>Outflow=0.09 cfs 0.067 af                                                   |
| <b>Pond 2.2P: StormTech #2 ; 21x142</b> | Peak Elev=119.73' Storage=3,666 cf Inflow=2.05 cfs 0.144 af<br>Outflow=0.13 cfs 0.094 af                                                   |
| <b>Pond OCS: OCS</b>                    | Peak Elev=118.17' Inflow=0.23 cfs 0.161 af<br>Outflow=0.23 cfs 0.161 af                                                                    |

**Total Runoff Area = 4.823 ac Runoff Volume = 0.753 af Average Runoff Depth = 1.87"**  
**43.36% Pervious = 2.091 ac 56.64% Impervious = 2.731 ac**

**Post HC Biddeford 3.22**

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Type III 24-hr 2- yr Rainfall=3.24"

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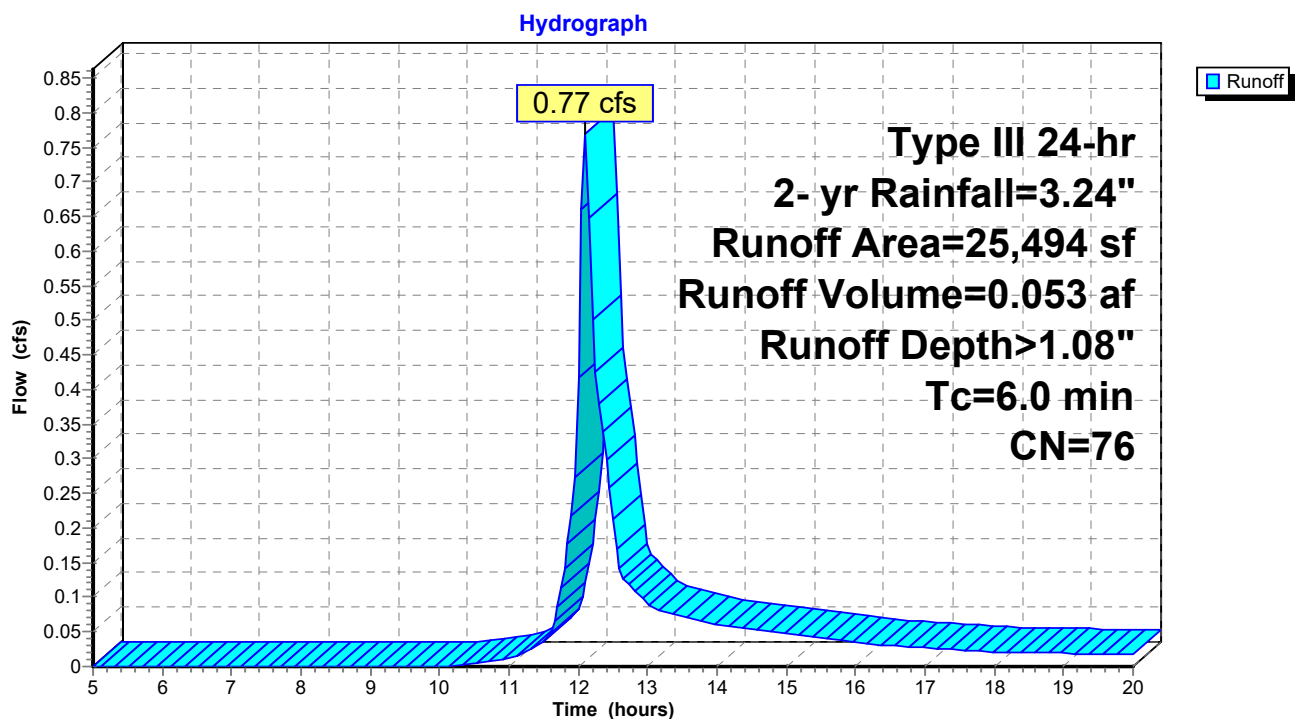
**Summary for Subcatchment 1S: 1.0**

Runoff = 0.77 cfs @ 12.10 hrs, Volume= 0.053 af, Depth&gt; 1.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 13,790    | 98 | Pavement/Roof                   |
|   | 11,704    | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 25,494    | 76 | Weighted Average                |
|   | 11,704    |    | 45.91% Pervious Area            |
|   | 13,790    |    | 54.09% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description            |
|----------|---------------|---------------|-------------------|----------------|------------------------|
| 6.0      |               |               |                   |                | Direct Entry, 0.1 hour |

**Subcatchment 1S: 1.0**

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Type III 24-hr 2-yr Rainfall=3.24"

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### Summary for Subcatchment 2.1: 2.1

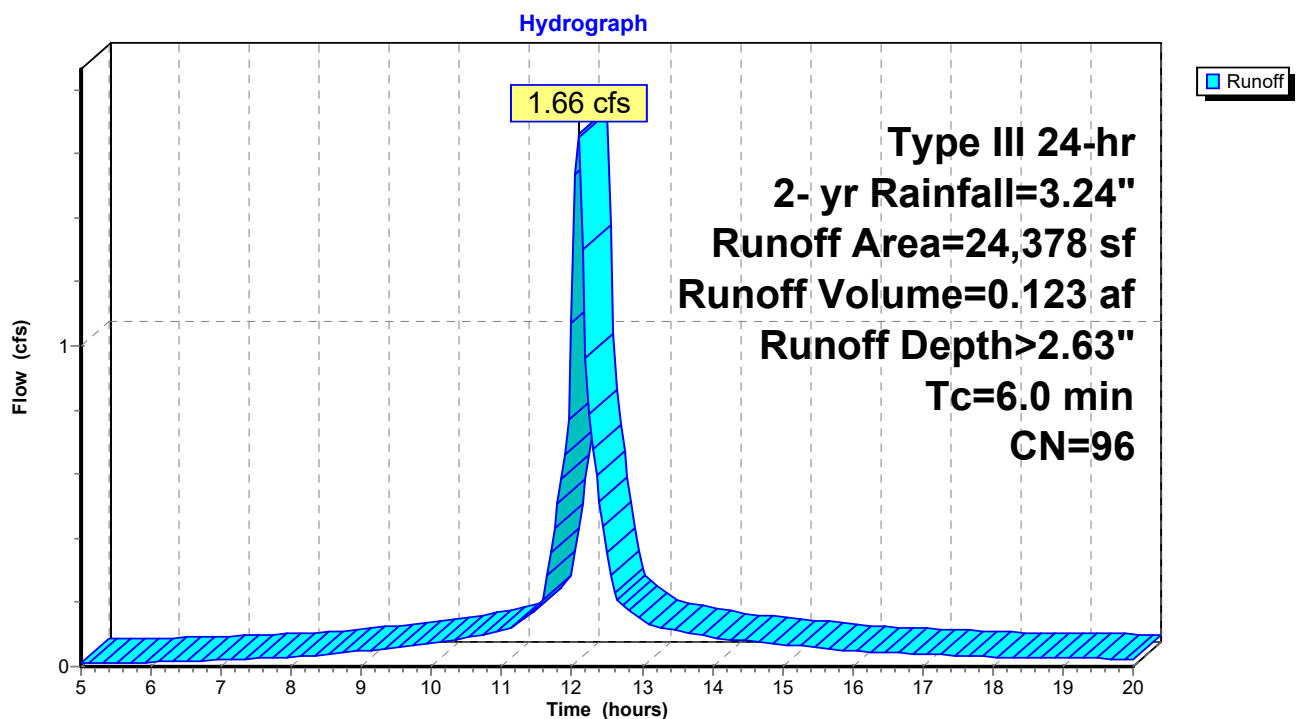
Runoff = 1.66 cfs @ 12.09 hrs, Volume= 0.123 af, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2-yr Rainfall=3.24"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 23,368    | 98 | Paved parking, HSG A          |
| 1,010     | 39 | >75% Grass cover, Good, HSG A |
| 24,378    | 96 | Weighted Average              |
| 1,010     |    | 4.14% Pervious Area           |
| 23,368    |    | 95.86% Impervious Area        |

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

### Subcatchment 2.1: 2.1





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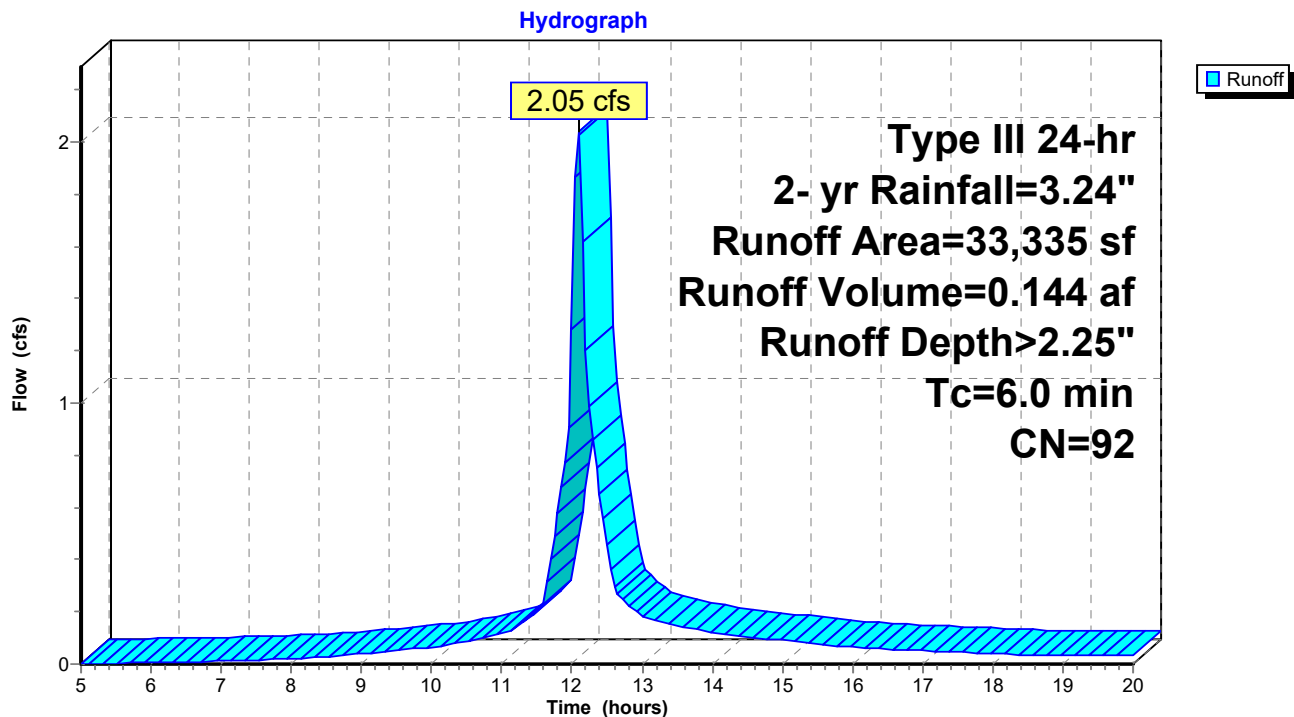
**Summary for Subcatchment 2.2: 2.2**

Runoff = 2.05 cfs @ 12.09 hrs, Volume= 0.144 af, Depth&gt; 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 20,098    | 98 | Roof                          |
|   | 9,579     | 98 | Paved parking, HSG A          |
|   | 3,658     | 39 | >75% Grass cover, Good, HSG A |
|   | 33,335    | 92 | Weighted Average              |
|   | 3,658     |    | 10.97% Pervious Area          |
|   | 29,677    |    | 89.03% Impervious Area        |

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

**Subcatchment 2.2: 2.2**

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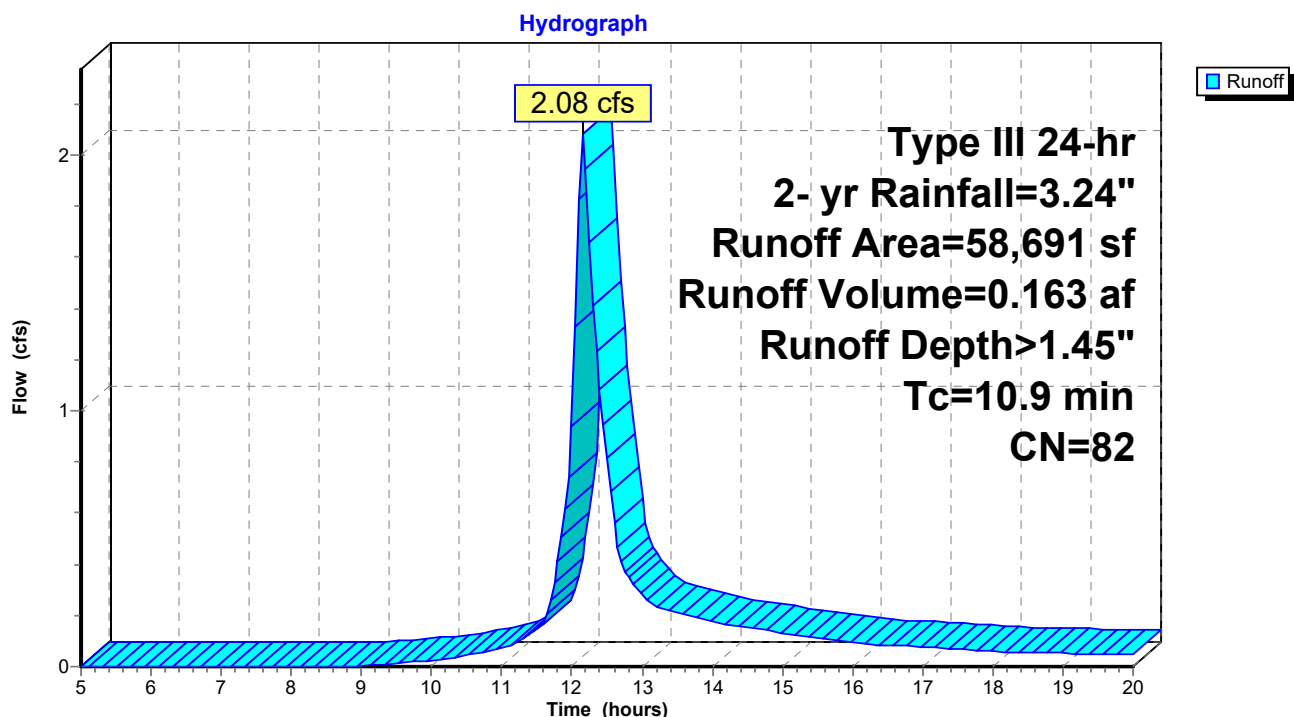
**Summary for Subcatchment 2.3S: 2.0**

Runoff = 2.08 cfs @ 12.16 hrs, Volume= 0.163 af, Depth&gt; 1.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,263    | 82 | Woods/grass comb., Fair, HSG D  |
| 31,709    | 80 | >75% Grass cover, Good, HSG D   |
| 3,096     | 49 | 50-75% Grass cover, Fair, HSG A |
| * 9,623   | 98 | Pavement                        |
| 58,691    | 82 | Weighted Average                |
| 49,068    |    | 83.60% Pervious Area            |
| 9,623     |    | 16.40% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description               |
|----------|---------------|---------------|-------------------|----------------|---------------------------|
| 10.9     |               |               |                   |                | Direct Entry, Pre Tc Copy |

**Subcatchment 2.3S: 2.0**

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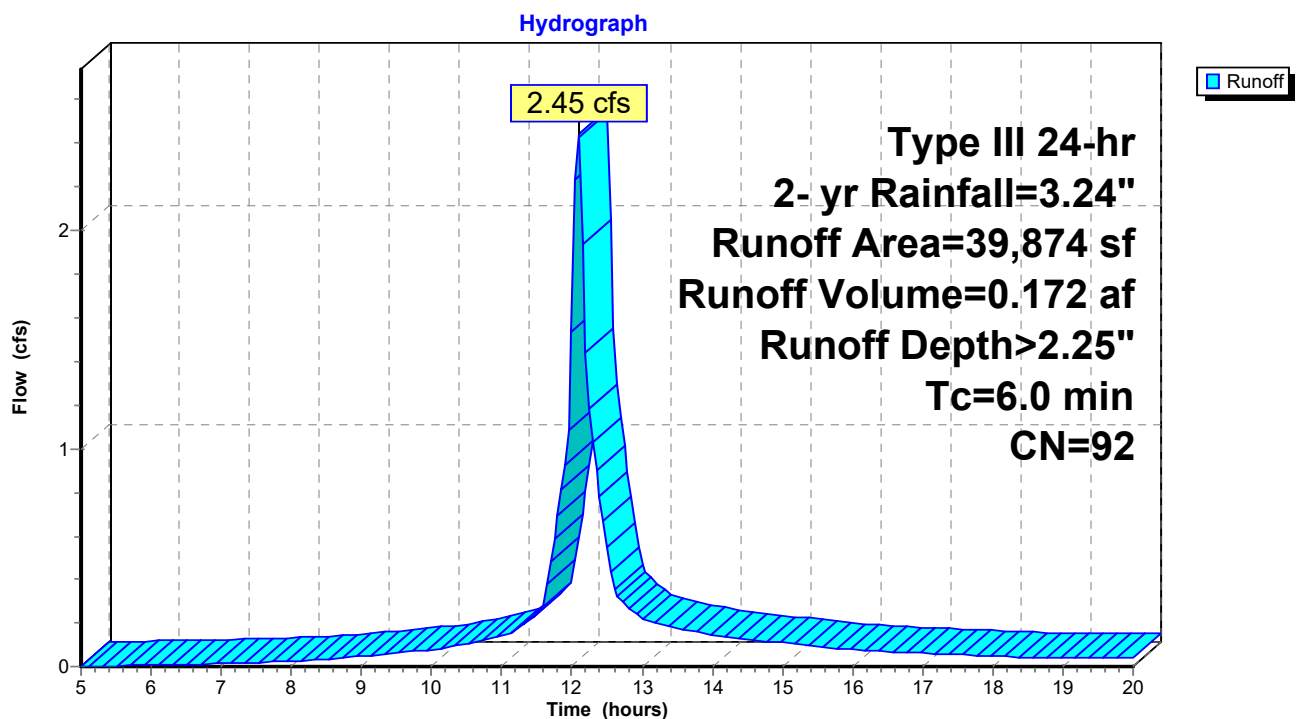
**Summary for Subcatchment 2.4S: Five Star Auto**

Runoff = 2.45 cfs @ 12.09 hrs, Volume= 0.172 af, Depth&gt; 2.25"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

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

**Subcatchment 2.4S: Five Star Auto**

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Type III 24-hr 2- yr Rainfall=3.24"

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**Summary for Subcatchment 3.0: SUB 3.0**

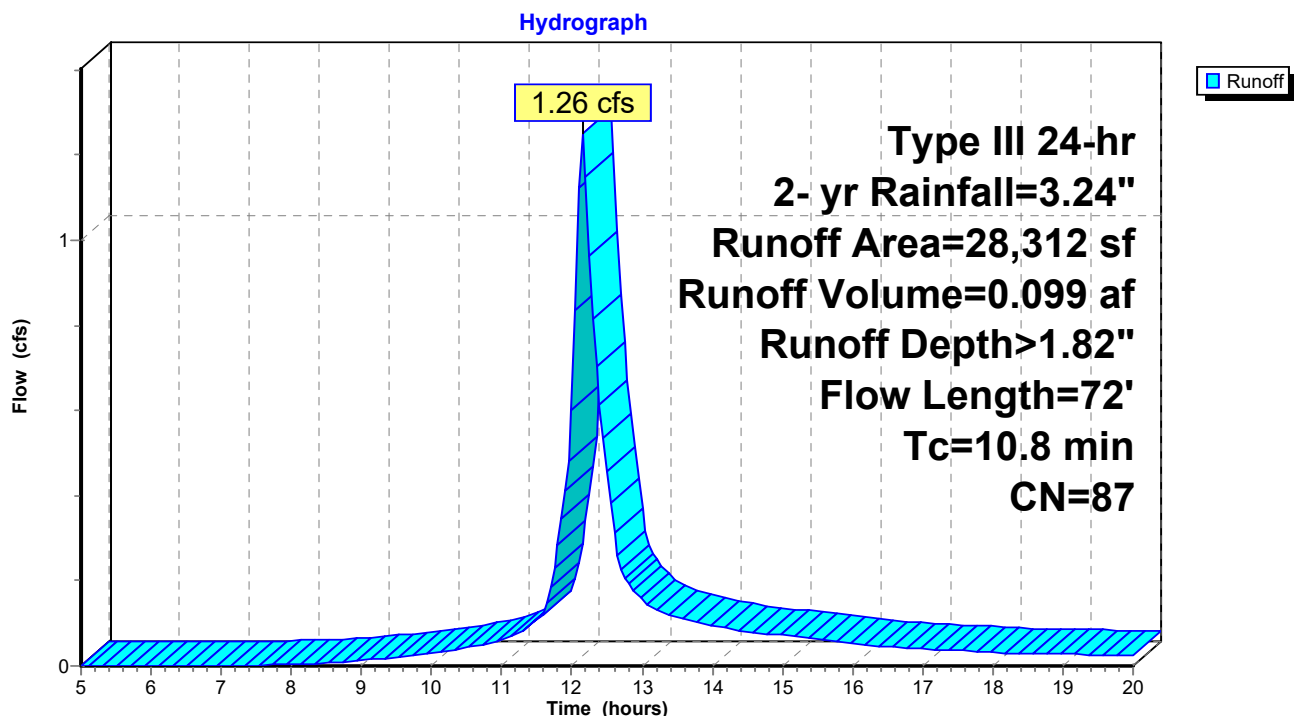
Runoff = 1.26 cfs @ 12.15 hrs, Volume= 0.099 af, Depth&gt; 1.82"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 2- yr Rainfall=3.24"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,170    | 82 | Woods/grass comb., Fair, HSG D  |
| 4,976     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,936     | 98 | Paved parking, HSG D            |
| 2,230     | 89 | Dirt roads, HSG D               |
| 28,312    | 87 | Weighted Average                |
| 21,376    |    | 75.50% Pervious Area            |
| 6,936     |    | 24.50% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b>                  |
|          |               |               |                   |                | Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b>                  |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                            |

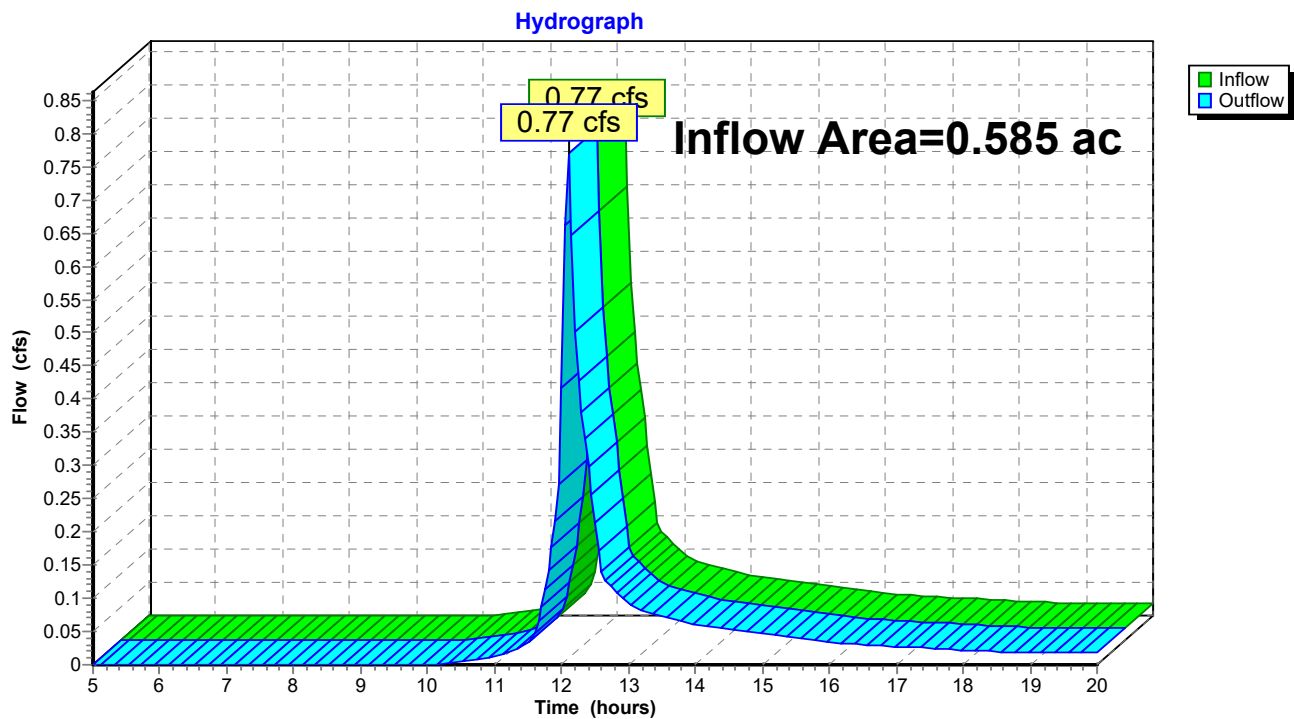
**Subcatchment 3.0: SUB 3.0**

### Summary for Reach 1R: 1.0; WEST COLE ROAD

Inflow Area = 0.585 ac, 54.09% Impervious, Inflow Depth > 1.08" for 2- yr event  
 Inflow = 0.77 cfs @ 12.10 hrs, Volume= 0.053 af  
 Outflow = 0.77 cfs @ 12.10 hrs, Volume= 0.053 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 1R: 1.0; WEST COLE ROAD

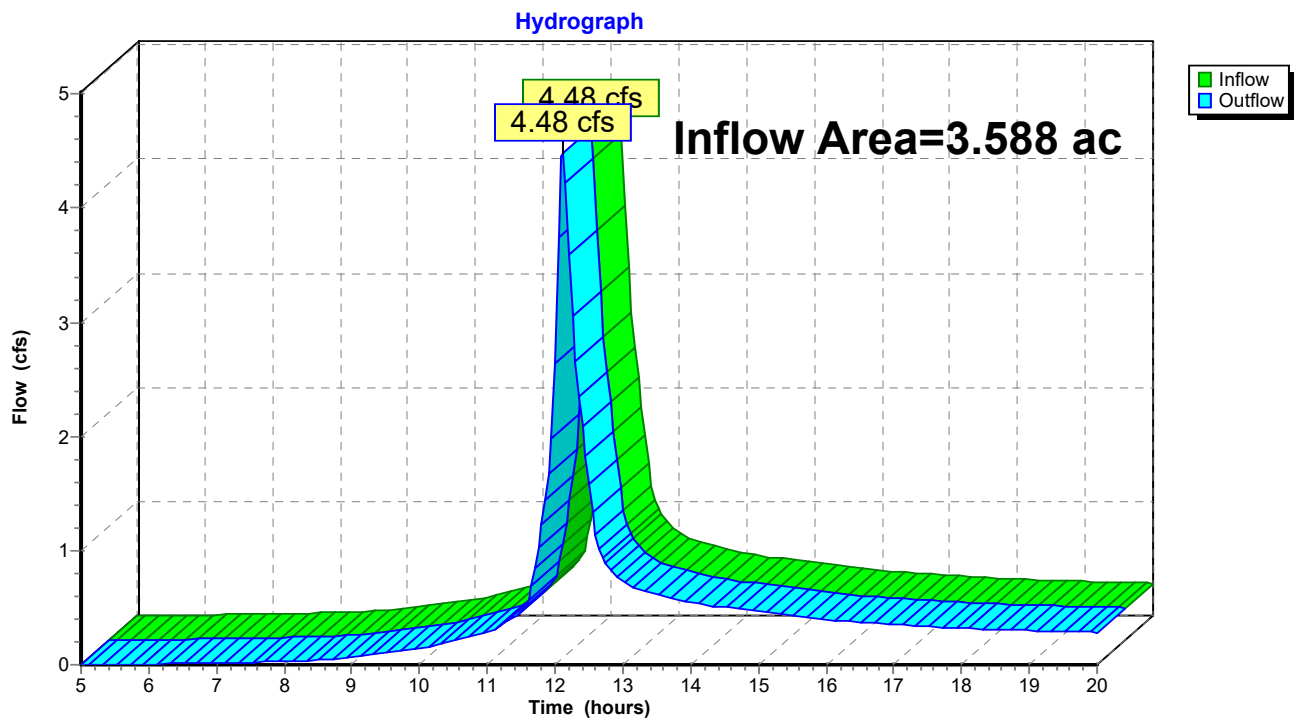


### Summary for Reach 2R: POI 2; CROSS CULVERT

Inflow Area = 3.588 ac, 62.87% Impervious, Inflow Depth > 1.66" for 2- yr event  
 Inflow = 4.48 cfs @ 12.11 hrs, Volume= 0.496 af  
 Outflow = 4.48 cfs @ 12.11 hrs, Volume= 0.496 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 2R: POI 2; CROSS CULVERT



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Type III 24-hr 2-yr Rainfall=3.24"

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### Summary for Reach 3R: POI 3; TRAIN TRACKS

Inflow Area = 0.650 ac, 24.50% Impervious, Inflow Depth > 1.82" for 2-yr event  
Inflow = 1.26 cfs @ 12.15 hrs, Volume= 0.099 af  
Outflow = 1.25 cfs @ 12.15 hrs, Volume= 0.099 af, Atten= 0%, Lag= 0.0 min

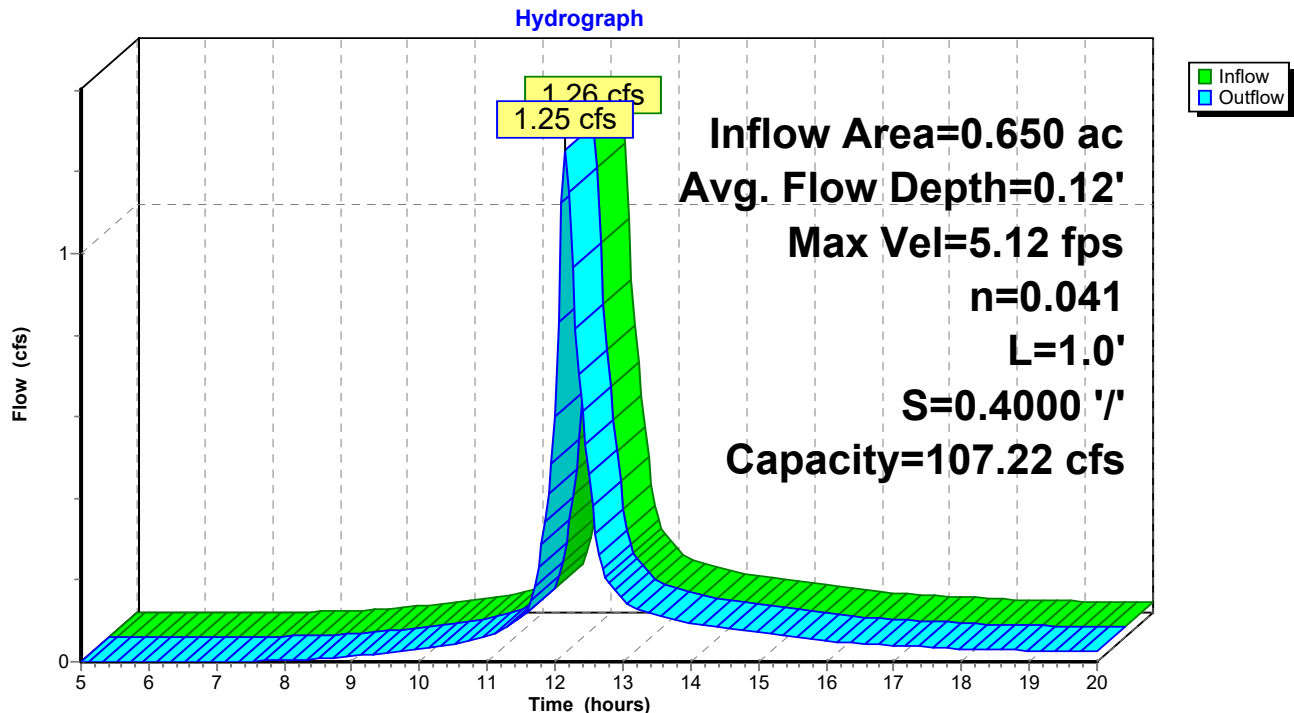
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 5.12 fps, Min. Travel Time= 0.0 min  
Avg. Velocity= 1.75 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.15 hrs  
Average Depth at Peak Storage= 0.12'  
Bank-Full Depth= 1.50' Flow Area= 5.3 sf, Capacity= 107.22 cfs

2.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch  
Side Slope Z-value= 1.0 '/' Top Width= 5.00'  
Length= 1.0' Slope= 0.4000 '/'  
Inlet Invert= 0.00', Outlet Invert= -0.40'



### Reach 3R: POI 3; TRAIN TRACKS



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Type III 24-hr 2-yr Rainfall=3.24"

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**Summary for Pond 2.1P: StormTech #1: 25 x 85**

Inflow Area = 0.560 ac, 95.86% Impervious, Inflow Depth > 2.63" for 2-yr event  
 Inflow = 1.66 cfs @ 12.09 hrs, Volume= 0.123 af  
 Outflow = 0.09 cfs @ 13.94 hrs, Volume= 0.067 af, Atten= 94%, Lag= 111.0 min  
 Primary = 0.09 cfs @ 13.94 hrs, Volume= 0.067 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 120.16' @ 13.94 hrs Surf.Area= 6,823 sf Storage= 3,400 cf  
 Flood Elev= 123.00' Surf.Area= 6,823 sf Storage= 5,244 cf

Plug-Flow detention time= 261.0 min calculated for 0.067 af (55% of inflow)  
 Center-of-Mass det. time= 177.1 min ( 925.5 - 748.4 )

| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.60' | 2,935 cf      | <b>27.00'W x 87.00'L x 3.50'H Stone</b><br>8,222 cf Overall - 885 cf Embedded = 7,337 cf x 40.0% Voids                                                                                                 |
| #2     | 119.10' | 885 cf        | <b>ADS_StormTech SC-310 +Cap x 60 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>60 Chambers in 4 Rows |
| #3     | 117.10' | 638 cf        | <b>25.00'W x 85.00'L x 1.50'H Sand</b><br>3,188 cf Overall x 20.0% Voids                                                                                                                               |
| #4     | 116.25' | 773 cf        | <b>27.00'W x 87.00'L x 0.83'H Crushed Stone</b><br>1,950 cf Overall - 17 cf Embedded = 1,933 cf x 40.0% Voids                                                                                          |
| #5     | 116.50' | 14 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 80.0' S= 0.0010 '/'<br>17 cf Overall - 0.2" Wall Thickness = 14 cf                                                                            |
|        |         | 5,244 cf      | Total Available Storage                                                                                                                                                                                |

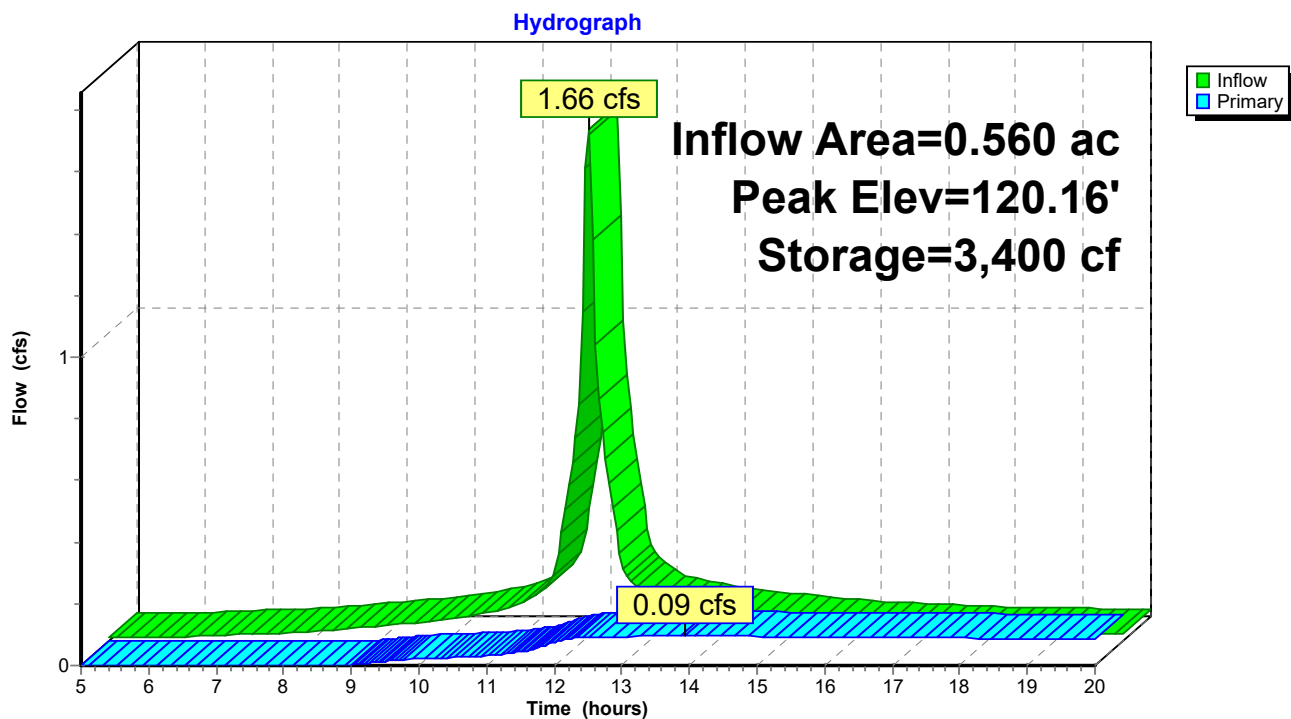
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                        |
|--------|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.40' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0017 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                               |
| #2     | Device 1 | 120.77' | <b>6.0" Round 6" overflows to header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.77' / 120.25' S= 0.1040 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.55' | <b>1.8" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.55' / 116.45' S= 0.0011 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.02 sf |

**Primary OutFlow** Max=0.09 cfs @ 13.94 hrs HW=120.16' (Free Discharge)

- 1=18" SD to OCS (Passes 0.09 cfs of 13.84 cfs potential flow)
- 2=6" overflows to header ( Controls 0.00 cfs)
- 3=Underdrains w orifice (Barrel Controls 0.09 cfs @ 2.67 fps)



**Pond 2.1P: StormTech #1: 25 x 85**



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**Summary for Pond 2.2P: StormTech #2 ; 21x142**

Inflow Area = 0.765 ac, 89.03% Impervious, Inflow Depth > 2.25" for 2- yr event  
 Inflow = 2.05 cfs @ 12.09 hrs, Volume= 0.144 af  
 Outflow = 0.13 cfs @ 13.73 hrs, Volume= 0.094 af, Atten= 93%, Lag= 98.2 min  
 Primary = 0.13 cfs @ 13.73 hrs, Volume= 0.094 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 119.73' @ 13.73 hrs Surf.Area= 9,606 sf Storage= 3,666 cf  
 Flood Elev= 123.00' Surf.Area= 9,606 sf Storage= 7,351 cf

Plug-Flow detention time= 230.2 min calculated for 0.094 af (65% of inflow)  
 Center-of-Mass det. time= 159.5 min ( 925.8 - 766.3 )

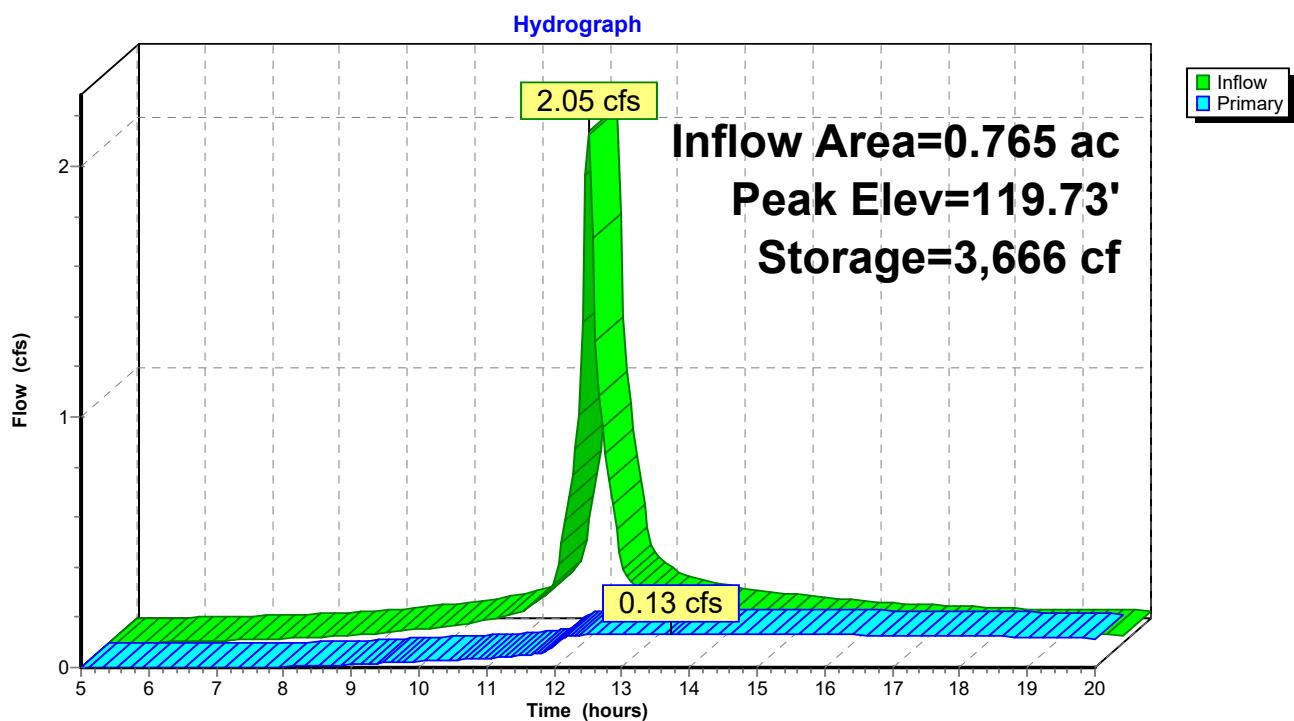
| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.75' | 4,165 cf      | <b>23.00'W x 144.00'L x 3.50'H Stone</b><br>11,592 cf Overall - 1,179 cf Embedded = 10,413 cf x 40.0% Voids                                                                                            |
| #2     | 119.25' | 1,179 cf      | <b>ADS_StormTech SC-310 +Cap x 80 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>80 Chambers in 4 Rows |
| #3     | 117.25' | 895 cf        | <b>21.00'W x 142.00'L x 1.50'H Sand</b><br>4,473 cf Overall x 20.0% Voids                                                                                                                              |
| #4     | 116.40' | 1,088 cf      | <b>23.00'W x 144.00'L x 0.83'H Crushed Stone</b><br>2,749 cf Overall - 30 cf Embedded = 2,719 cf x 40.0% Voids                                                                                         |
| #5     | 116.60' | 24 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 140.0' S= 0.0010 '/'<br>30 cf Overall - 0.2" Wall Thickness = 24 cf                                                                           |
|        |         | 7,351 cf      | Total Available Storage                                                                                                                                                                                |

| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                         |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.10' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.10' / 116.00' S= 0.0033 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                                 |
| #2     | Device 1 | 120.92' | <b>6.0" Round 6" overflows into header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.92' / 120.31' S= 0.1220 '/ Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.40' | <b>2.1" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0006 '/ Cc= 0.600<br>n= 0.012, Flow Area= 0.02 sf                                  |

**Primary OutFlow** Max=0.13 cfs @ 13.73 hrs HW=119.73' (Free Discharge)

- 1=18" SD to OCS (Passes 0.13 cfs of 13.53 cfs potential flow)
- 2=6" overflows into header ( Controls 0.00 cfs)
- 3=Underdrains w orifice (Barrel Controls 0.13 cfs @ 2.79 fps)

**Pond 2.2P: StormTech #2 ; 21x142**



**Summary for Pond OCS: OCS**

Inflow Area = 1.325 ac, 91.91% Impervious, Inflow Depth > 1.46" for 2- yr event  
 Inflow = 0.23 cfs @ 13.82 hrs, Volume= 0.161 af  
 Outflow = 0.23 cfs @ 13.82 hrs, Volume= 0.161 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.23 cfs @ 13.82 hrs, Volume= 0.161 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 118.17' @ 13.82 hrs

Flood Elev= 122.33'

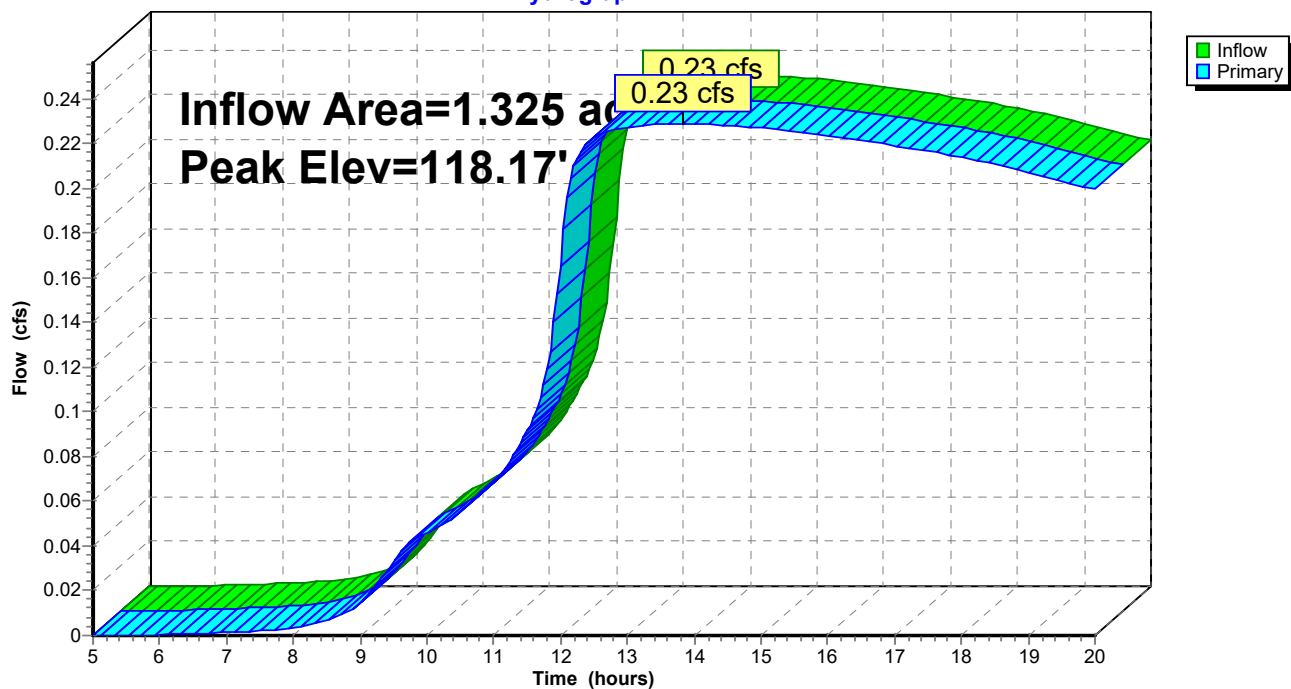
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                       |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.35' | <b>18.0" Round 18" Outlet</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.35' / 116.28' S= 0.0014 '/' Cc= 0.600<br>n= 0.010, Flow Area= 1.77 sf                                |
| #2     | Device 1 | 116.40' | <b>2.6" Vert. Quality Orifice</b> C= 0.600                                                                                                                                                                           |
| #3     | Device 1 | 118.25' | <b>6.0" Vert. Quantity Orifice</b> C= 0.600                                                                                                                                                                          |
| #4     | Device 1 | 121.00' | <b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50<br>Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32<br>3.31 3.32 |

**Primary OutFlow** Max=0.23 cfs @ 13.82 hrs HW=118.17' (Free Discharge)

- ↑ **1=18" Outlet** (Passes 0.23 cfs of 4.63 cfs potential flow)
- ↑ **2=Quality Orifice** (Orifice Controls 0.23 cfs @ 6.20 fps)
- ↑ **3=Quantity Orifice** ( Controls 0.00 cfs)
- ↑ **4=Broad-Crested Rectangular Weir** ( Controls 0.00 cfs)

# Pond OCS: OCS

## Hydrograph



**Post HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                                         |                                                                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment1S: 1.0</b>              | Runoff Area=25,494 sf 54.09% Impervious Runoff Depth>2.44"<br>Tc=6.0 min CN=76 Runoff=1.77 cfs 0.119 af                                    |
| <b>Subcatchment2.1: 2.1</b>             | Runoff Area=24,378 sf 95.86% Impervious Runoff Depth>4.36"<br>Tc=6.0 min CN=96 Runoff=2.69 cfs 0.203 af                                    |
| <b>Subcatchment2.2: 2.2</b>             | Runoff Area=33,335 sf 89.03% Impervious Runoff Depth>3.97"<br>Tc=6.0 min CN=92 Runoff=3.49 cfs 0.253 af                                    |
| <b>Subcatchment2.3S: 2.0</b>            | Runoff Area=58,691 sf 16.40% Impervious Runoff Depth>2.97"<br>Tc=10.9 min CN=82 Runoff=4.22 cfs 0.334 af                                   |
| <b>Subcatchment2.4S: Five Star Auto</b> | Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>3.97"<br>Tc=6.0 min CN=92 Runoff=4.17 cfs 0.303 af                                    |
| <b>Subcatchment3.0: SUB 3.0</b>         | Runoff Area=28,312 sf 24.50% Impervious Runoff Depth>3.46"<br>Flow Length=72' Tc=10.8 min CN=87 Runoff=2.32 cfs 0.187 af                   |
| <b>Reach 1R: 1.0; WEST COLE ROAD</b>    | Inflow=1.77 cfs 0.119 af<br>Outflow=1.77 cfs 0.119 af                                                                                      |
| <b>Reach 2R: POI 2; CROSS CULVERT</b>   | Inflow=8.21 cfs 0.916 af<br>Outflow=8.21 cfs 0.916 af                                                                                      |
| <b>Reach 3R: POI 3; TRAIN TRACKS</b>    | Avg. Flow Depth=0.17' Max Vel=6.39 fps Inflow=2.32 cfs 0.187 af<br>n=0.041 L=1.0' S=0.4000 ' Capacity=107.22 cfs Outflow=2.32 cfs 0.187 af |
| <b>Pond 2.1P: StormTech #1: 25 x 85</b> | Peak Elev=121.31' Storage=4,500 cf Inflow=2.69 cfs 0.203 af<br>Outflow=0.91 cfs 0.127 af                                                   |
| <b>Pond 2.2P: StormTech #2 ; 21x142</b> | Peak Elev=121.27' Storage=6,054 cf Inflow=3.49 cfs 0.253 af<br>Outflow=0.63 cfs 0.153 af                                                   |
| <b>Pond OCS: OCS</b>                    | Peak Elev=119.87' Inflow=1.43 cfs 0.280 af<br>Outflow=1.43 cfs 0.280 af                                                                    |

**Total Runoff Area = 4.823 ac Runoff Volume = 1.399 af Average Runoff Depth = 3.48"**  
**43.36% Pervious = 2.091 ac 56.64% Impervious = 2.731 ac**

**Post HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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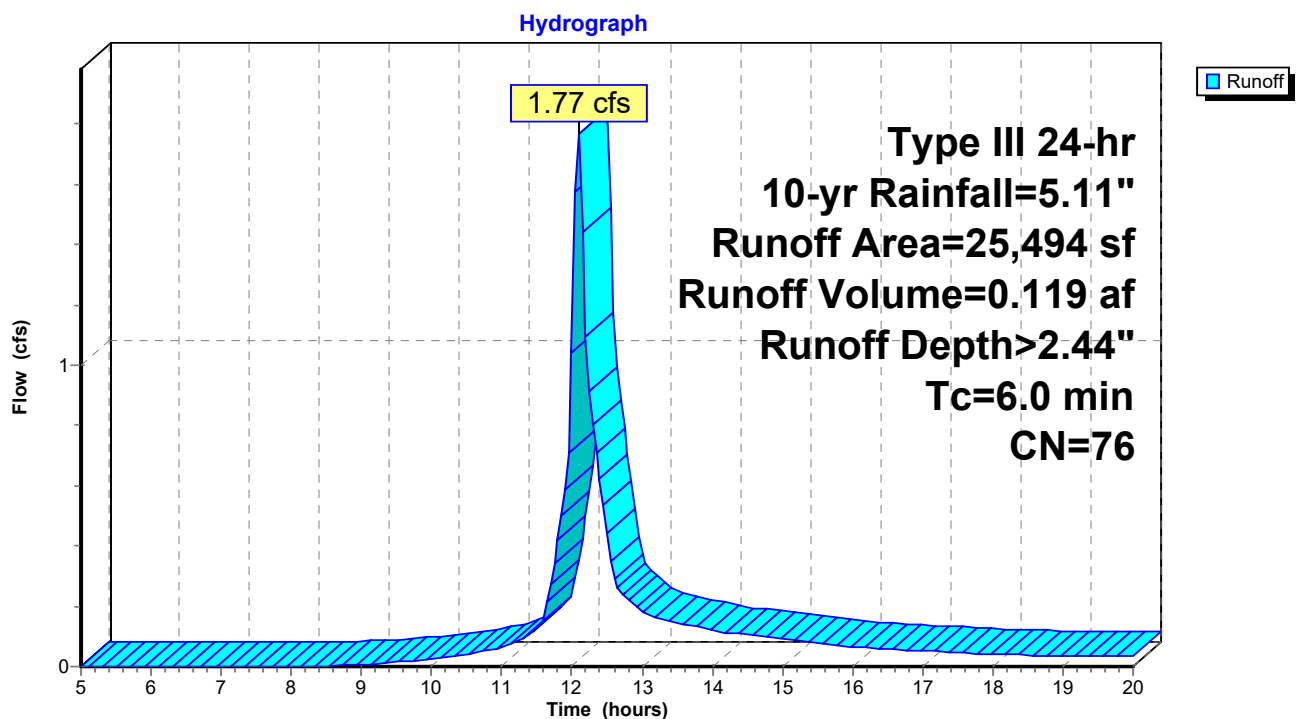
**Summary for Subcatchment 1S: 1.0**

Runoff = 1.77 cfs @ 12.09 hrs, Volume= 0.119 af, Depth&gt; 2.44"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 13,790    | 98 | Pavement/Roof                   |
|   | 11,704    | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 25,494    | 76 | Weighted Average                |
|   | 11,704    |    | 45.91% Pervious Area            |
|   | 13,790    |    | 54.09% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description            |
|----------|---------------|---------------|-------------------|----------------|------------------------|
| 6.0      |               |               |                   |                | Direct Entry, 0.1 hour |

**Subcatchment 1S: 1.0**

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Type III 24-hr 10-yr Rainfall=5.11"

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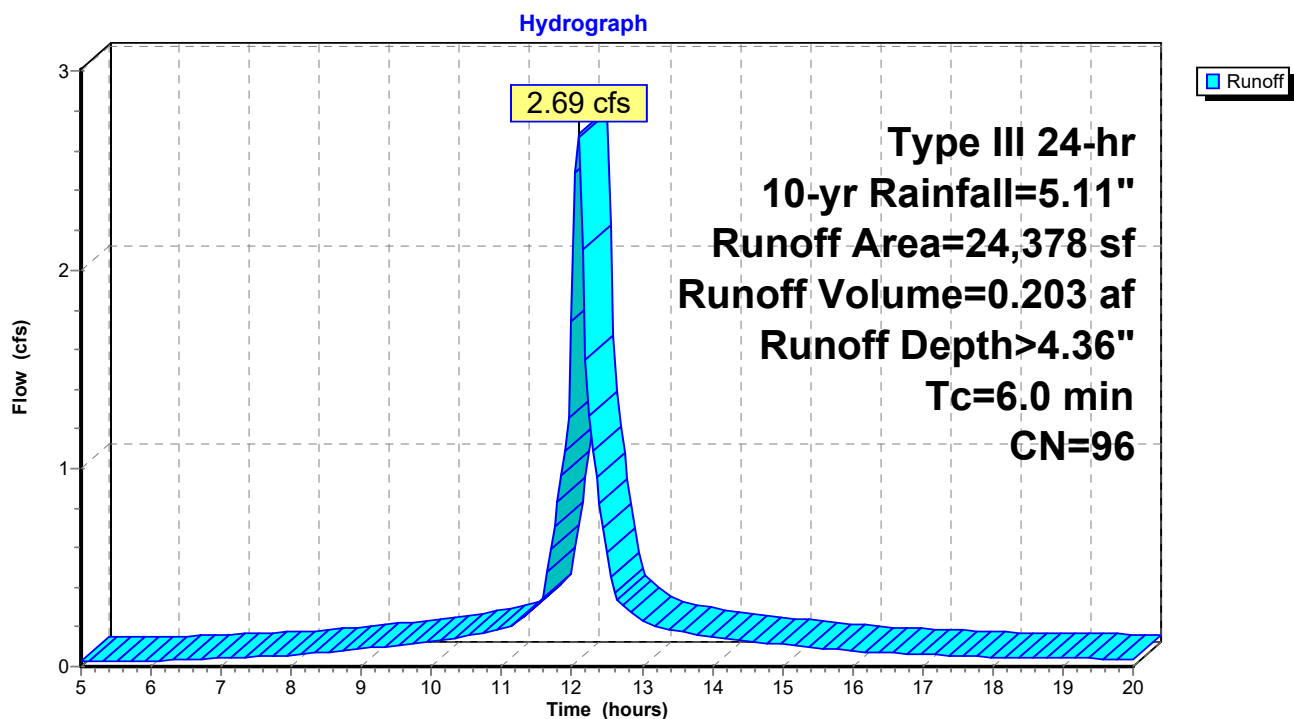
**Summary for Subcatchment 2.1: 2.1**

Runoff = 2.69 cfs @ 12.09 hrs, Volume= 0.203 af, Depth&gt; 4.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 23,368    | 98 | Paved parking, HSG A          |
| 1,010     | 39 | >75% Grass cover, Good, HSG A |
| 24,378    | 96 | Weighted Average              |
| 1,010     |    | 4.14% Pervious Area           |
| 23,368    |    | 95.86% Impervious Area        |

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

**Subcatchment 2.1: 2.1**



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Type III 24-hr 10-yr Rainfall=5.11"

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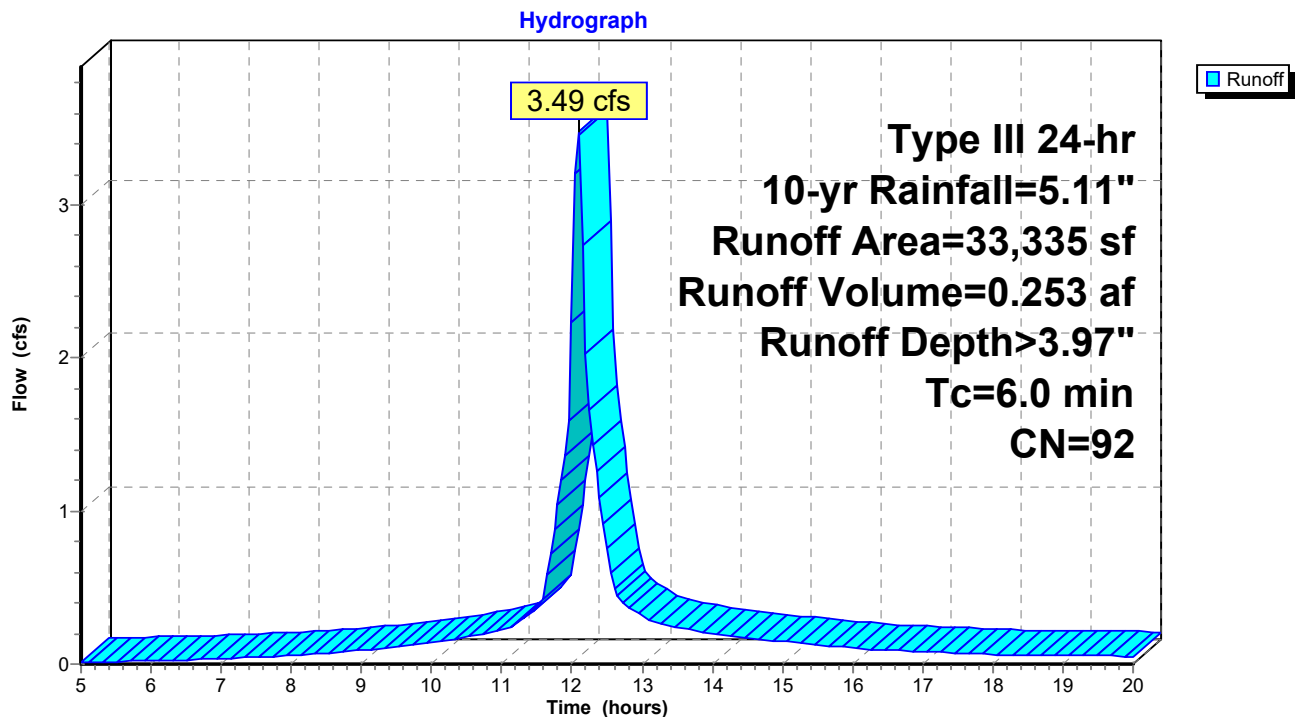
**Summary for Subcatchment 2.2: 2.2**

Runoff = 3.49 cfs @ 12.09 hrs, Volume= 0.253 af, Depth&gt; 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 20,098    | 98 | Roof                          |
|   | 9,579     | 98 | Paved parking, HSG A          |
|   | 3,658     | 39 | >75% Grass cover, Good, HSG A |
|   | 33,335    | 92 | Weighted Average              |
|   | 3,658     |    | 10.97% Pervious Area          |
|   | 29,677    |    | 89.03% Impervious Area        |

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

**Subcatchment 2.2: 2.2**

**Post HC Biddeford 3.22**

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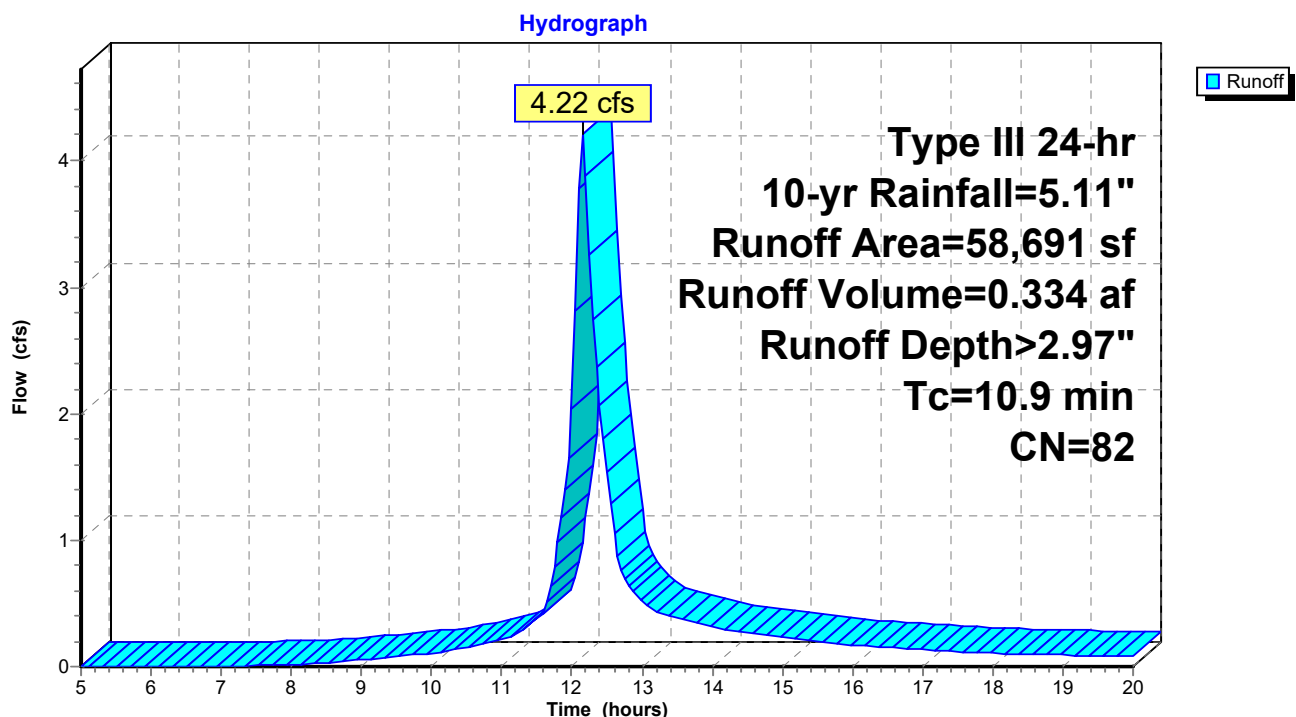
**Summary for Subcatchment 2.3S: 2.0**

Runoff = 4.22 cfs @ 12.15 hrs, Volume= 0.334 af, Depth&gt; 2.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,263    | 82 | Woods/grass comb., Fair, HSG D  |
| 31,709    | 80 | >75% Grass cover, Good, HSG D   |
| 3,096     | 49 | 50-75% Grass cover, Fair, HSG A |
| * 9,623   | 98 | Pavement                        |
| 58,691    | 82 | Weighted Average                |
| 49,068    |    | 83.60% Pervious Area            |
| 9,623     |    | 16.40% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description               |
|----------|---------------|---------------|-------------------|----------------|---------------------------|
| 10.9     |               |               |                   |                | Direct Entry, Pre Tc Copy |

**Subcatchment 2.3S: 2.0**

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Type III 24-hr 10-yr Rainfall=5.11"

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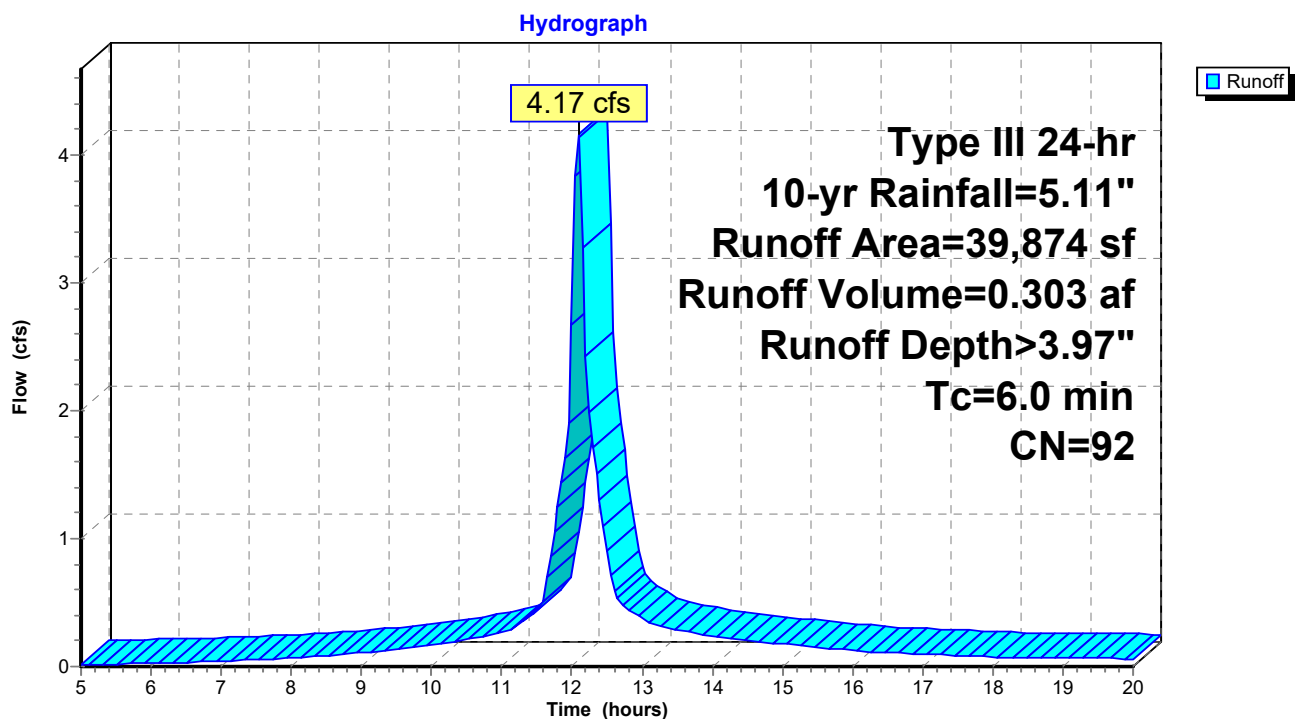
**Summary for Subcatchment 2.4S: Five Star Auto**

Runoff = 4.17 cfs @ 12.09 hrs, Volume= 0.303 af, Depth&gt; 3.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

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

**Subcatchment 2.4S: Five Star Auto**

**Post HC Biddeford 3.22**

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Type III 24-hr 10-yr Rainfall=5.11"

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**Summary for Subcatchment 3.0: SUB 3.0**

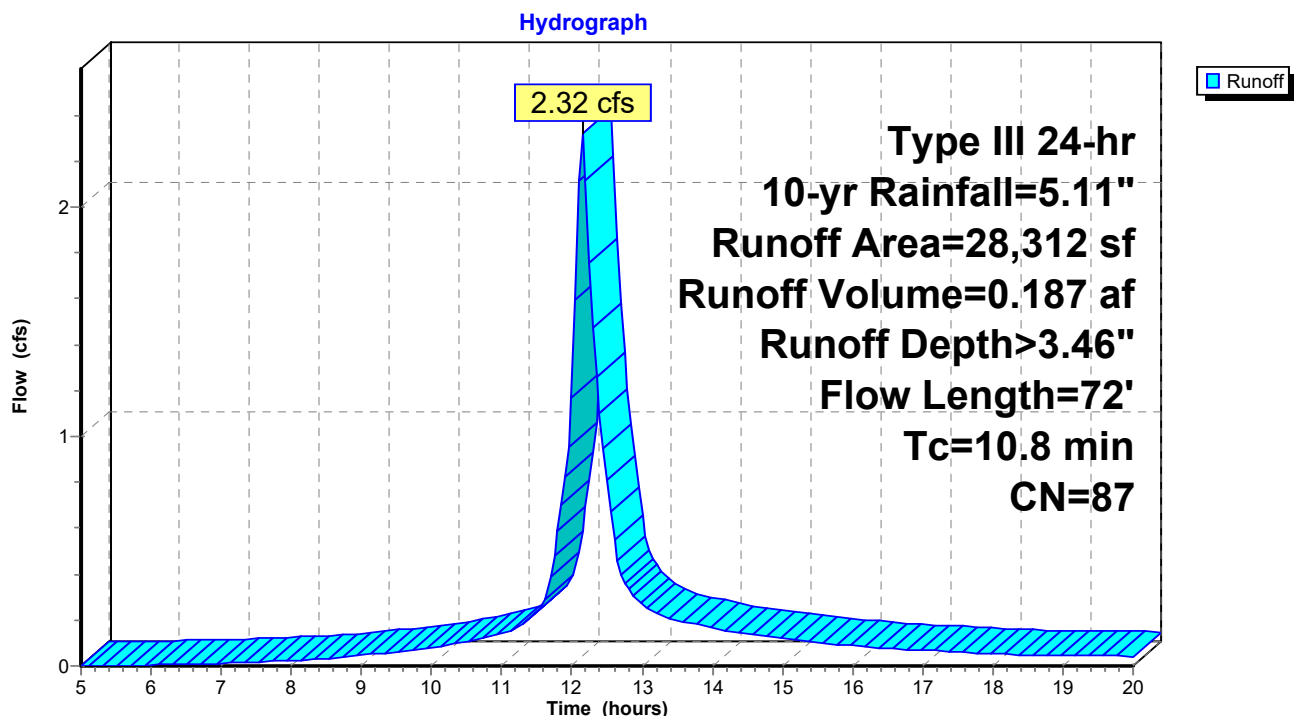
Runoff = 2.32 cfs @ 12.15 hrs, Volume= 0.187 af, Depth&gt; 3.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 10-yr Rainfall=5.11"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,170    | 82 | Woods/grass comb., Fair, HSG D  |
| 4,976     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,936     | 98 | Paved parking, HSG D            |
| 2,230     | 89 | Dirt roads, HSG D               |
| 28,312    | 87 | Weighted Average                |
| 21,376    |    | 75.50% Pervious Area            |
| 6,936     |    | 24.50% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b>                  |
|          |               |               |                   |                | Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b>                  |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                            |

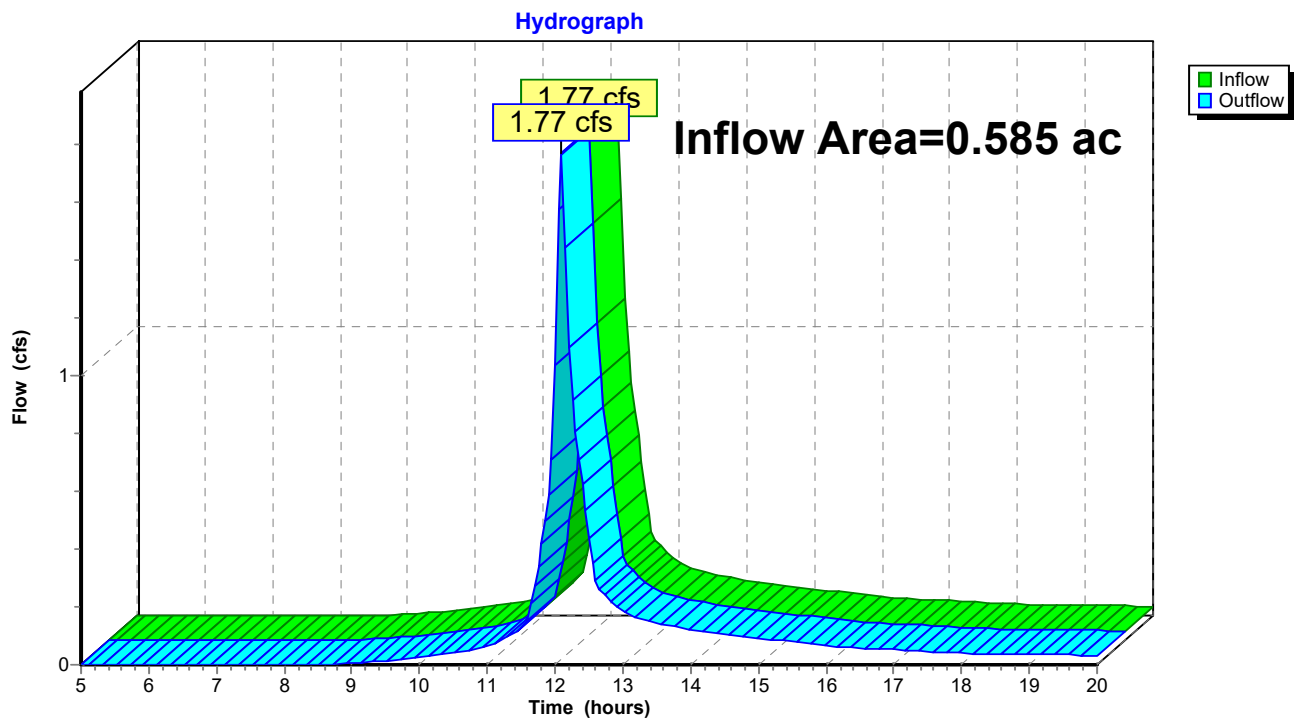
**Subcatchment 3.0: SUB 3.0**

### Summary for Reach 1R: 1.0; WEST COLE ROAD

Inflow Area = 0.585 ac, 54.09% Impervious, Inflow Depth > 2.44" for 10-yr event  
 Inflow = 1.77 cfs @ 12.09 hrs, Volume= 0.119 af  
 Outflow = 1.77 cfs @ 12.09 hrs, Volume= 0.119 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 1R: 1.0; WEST COLE ROAD

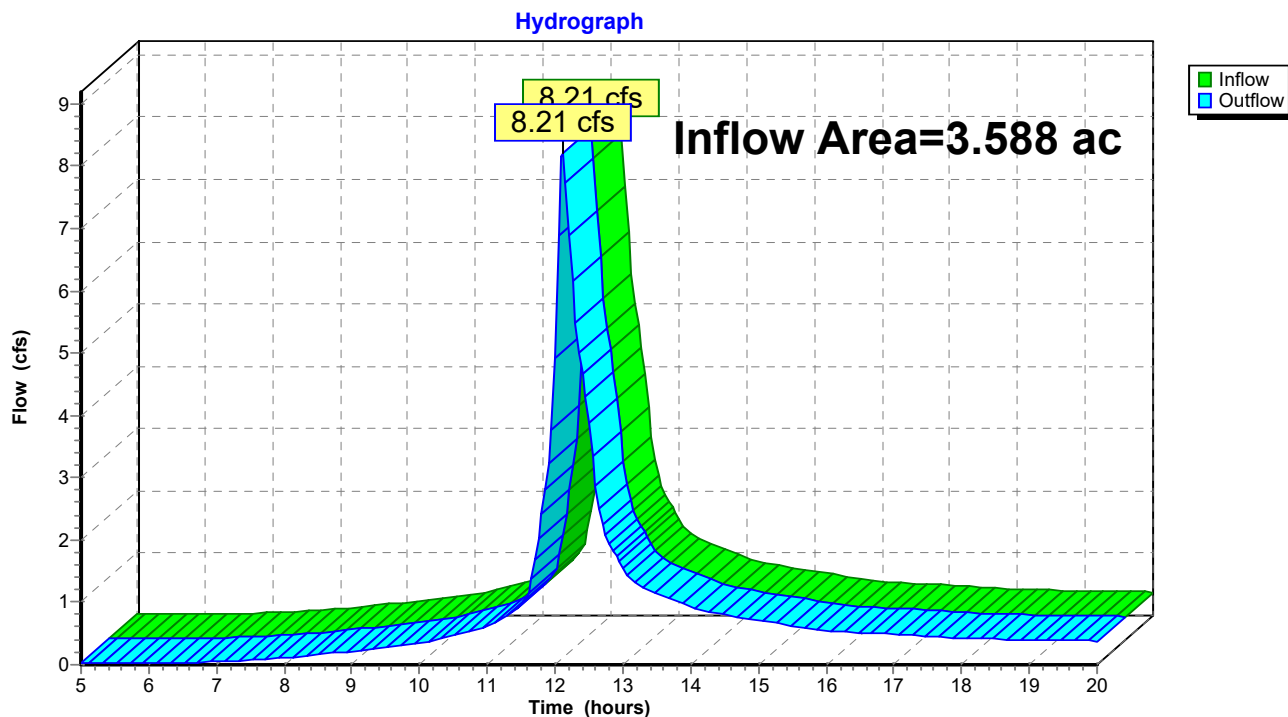


### Summary for Reach 2R: POI 2; CROSS CULVERT

Inflow Area = 3.588 ac, 62.87% Impervious, Inflow Depth > 3.06" for 10-yr event  
 Inflow = 8.21 cfs @ 12.11 hrs, Volume= 0.916 af  
 Outflow = 8.21 cfs @ 12.11 hrs, Volume= 0.916 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 2R: POI 2; CROSS CULVERT



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Type III 24-hr 10-yr Rainfall=5.11"

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### Summary for Reach 3R: POI 3; TRAIN TRACKS

Inflow Area = 0.650 ac, 24.50% Impervious, Inflow Depth > 3.46" for 10-yr event  
Inflow = 2.32 cfs @ 12.15 hrs, Volume= 0.187 af  
Outflow = 2.32 cfs @ 12.15 hrs, Volume= 0.187 af, Atten= 0%, Lag= 0.0 min

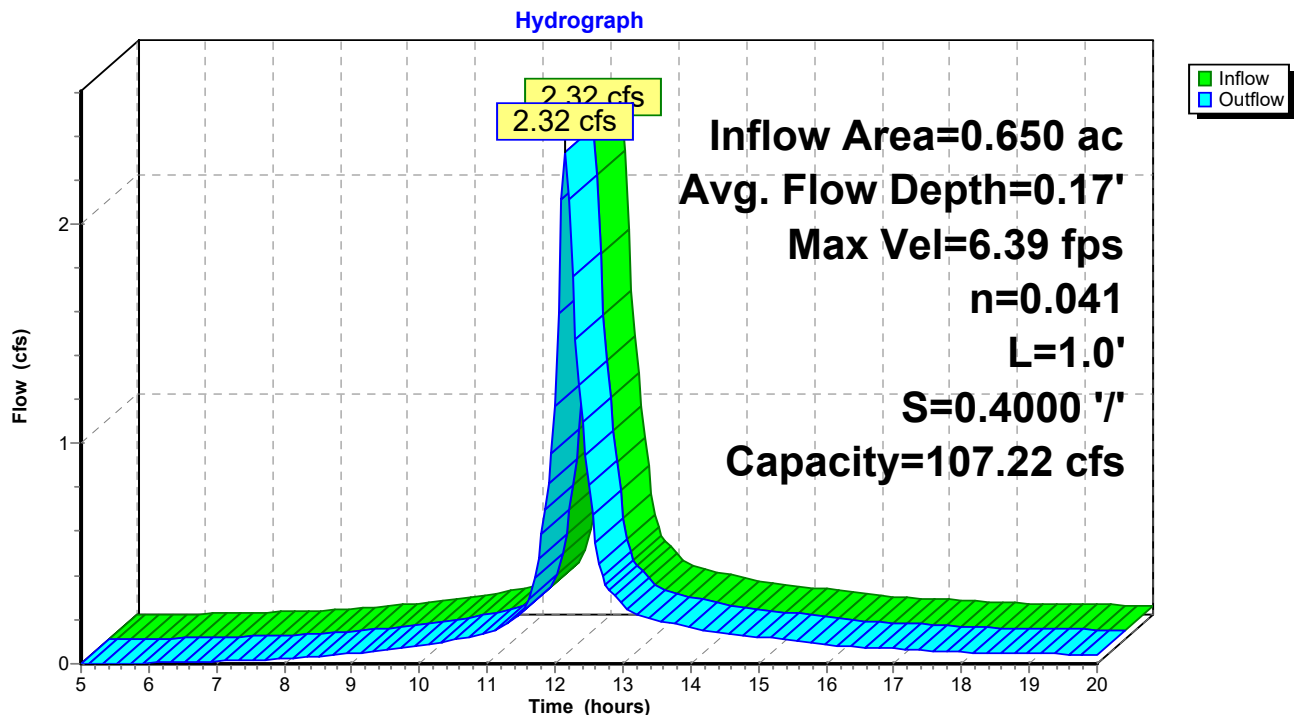
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 6.39 fps, Min. Travel Time= 0.0 min  
Avg. Velocity= 2.01 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.15 hrs  
Average Depth at Peak Storage= 0.17'  
Bank-Full Depth= 1.50' Flow Area= 5.3 sf, Capacity= 107.22 cfs

2.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch  
Side Slope Z-value= 1.0 '/' Top Width= 5.00'  
Length= 1.0' Slope= 0.4000 '/'  
Inlet Invert= 0.00', Outlet Invert= -0.40'



### Reach 3R: POI 3; TRAIN TRACKS



**Summary for Pond 2.1P: StormTech #1: 25 x 85**

Inflow Area = 0.560 ac, 95.86% Impervious, Inflow Depth > 4.36" for 10-yr event  
 Inflow = 2.69 cfs @ 12.09 hrs, Volume= 0.203 af  
 Outflow = 0.91 cfs @ 12.37 hrs, Volume= 0.127 af, Atten= 66%, Lag= 16.9 min  
 Primary = 0.91 cfs @ 12.37 hrs, Volume= 0.127 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 121.31' @ 12.37 hrs Surf.Area= 6,823 sf Storage= 4,500 cf  
 Flood Elev= 123.00' Surf.Area= 6,823 sf Storage= 5,244 cf

Plug-Flow detention time= 187.1 min calculated for 0.127 af (63% of inflow)  
 Center-of-Mass det. time= 110.8 min ( 852.1 - 741.3 )

| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.60' | 2,935 cf      | <b>27.00'W x 87.00'L x 3.50'H Stone</b><br>8,222 cf Overall - 885 cf Embedded = 7,337 cf x 40.0% Voids                                                                                                 |
| #2     | 119.10' | 885 cf        | <b>ADS_StormTech SC-310 +Cap x 60 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>60 Chambers in 4 Rows |
| #3     | 117.10' | 638 cf        | <b>25.00'W x 85.00'L x 1.50'H Sand</b><br>3,188 cf Overall x 20.0% Voids                                                                                                                               |
| #4     | 116.25' | 773 cf        | <b>27.00'W x 87.00'L x 0.83'H Crushed Stone</b><br>1,950 cf Overall - 17 cf Embedded = 1,933 cf x 40.0% Voids                                                                                          |
| #5     | 116.50' | 14 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 80.0' S= 0.0010 '/'<br>17 cf Overall - 0.2" Wall Thickness = 14 cf                                                                            |
|        |         | 5,244 cf      | Total Available Storage                                                                                                                                                                                |

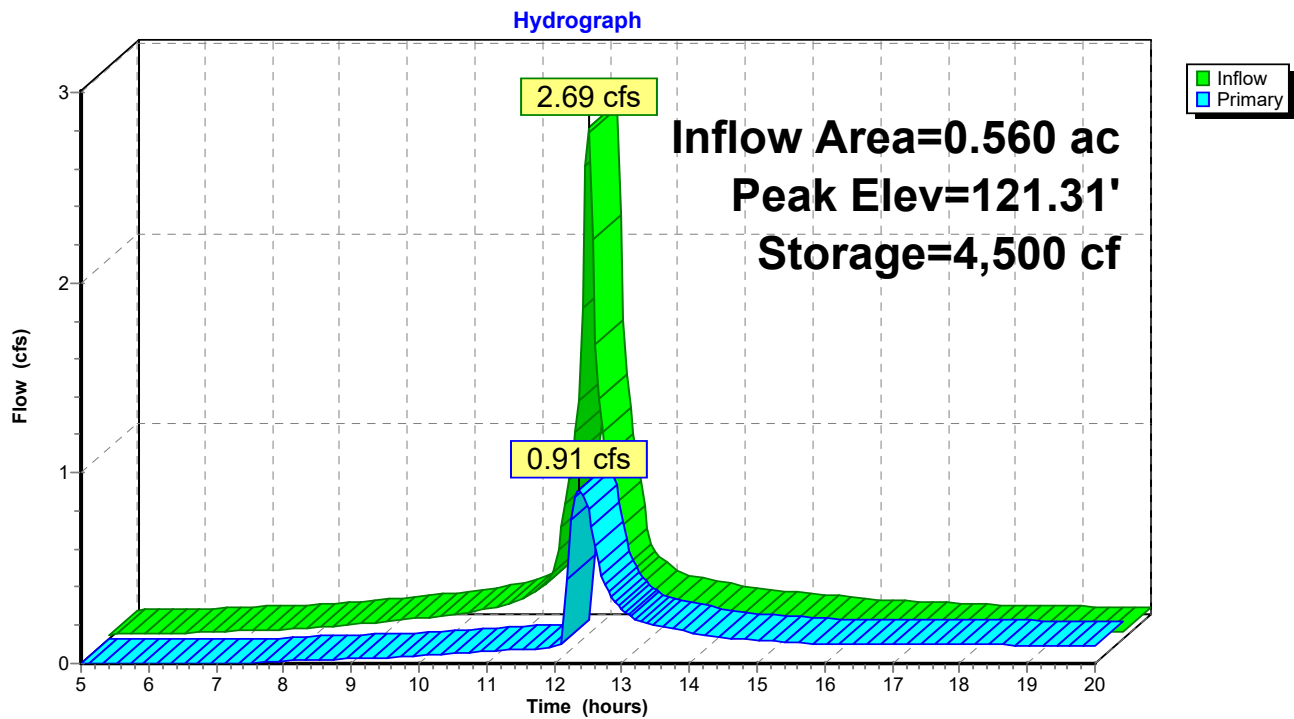
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                        |
|--------|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.40' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0017 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                               |
| #2     | Device 1 | 120.77' | <b>6.0" Round 6" overflows to header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.77' / 120.25' S= 0.1040 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.55' | <b>1.8" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.55' / 116.45' S= 0.0011 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.02 sf |

**Primary OutFlow** Max=0.91 cfs @ 12.37 hrs HW=121.30' (Free Discharge)

- 1=18" SD to OCS (Passes 0.91 cfs of 16.26 cfs potential flow)
- 2=6" overflows to header (Inlet Controls 0.80 cfs @ 1.35 fps)
- 3=Underdrains w orifice (Barrel Controls 0.11 cfs @ 3.07 fps)



**Pond 2.1P: StormTech #1: 25 x 85**



**Summary for Pond 2.2P: StormTech #2 ; 21x142**

Inflow Area = 0.765 ac, 89.03% Impervious, Inflow Depth > 3.97" for 10-yr event  
 Inflow = 3.49 cfs @ 12.09 hrs, Volume= 0.253 af  
 Outflow = 0.63 cfs @ 12.55 hrs, Volume= 0.153 af, Atten= 82%, Lag= 27.4 min  
 Primary = 0.63 cfs @ 12.55 hrs, Volume= 0.153 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 121.27' @ 12.55 hrs Surf.Area= 9,606 sf Storage= 6,054 cf  
 Flood Elev= 123.00' Surf.Area= 9,606 sf Storage= 7,351 cf

Plug-Flow detention time= 200.7 min calculated for 0.153 af (60% of inflow)  
 Center-of-Mass det. time= 124.2 min ( 878.3 - 754.1 )

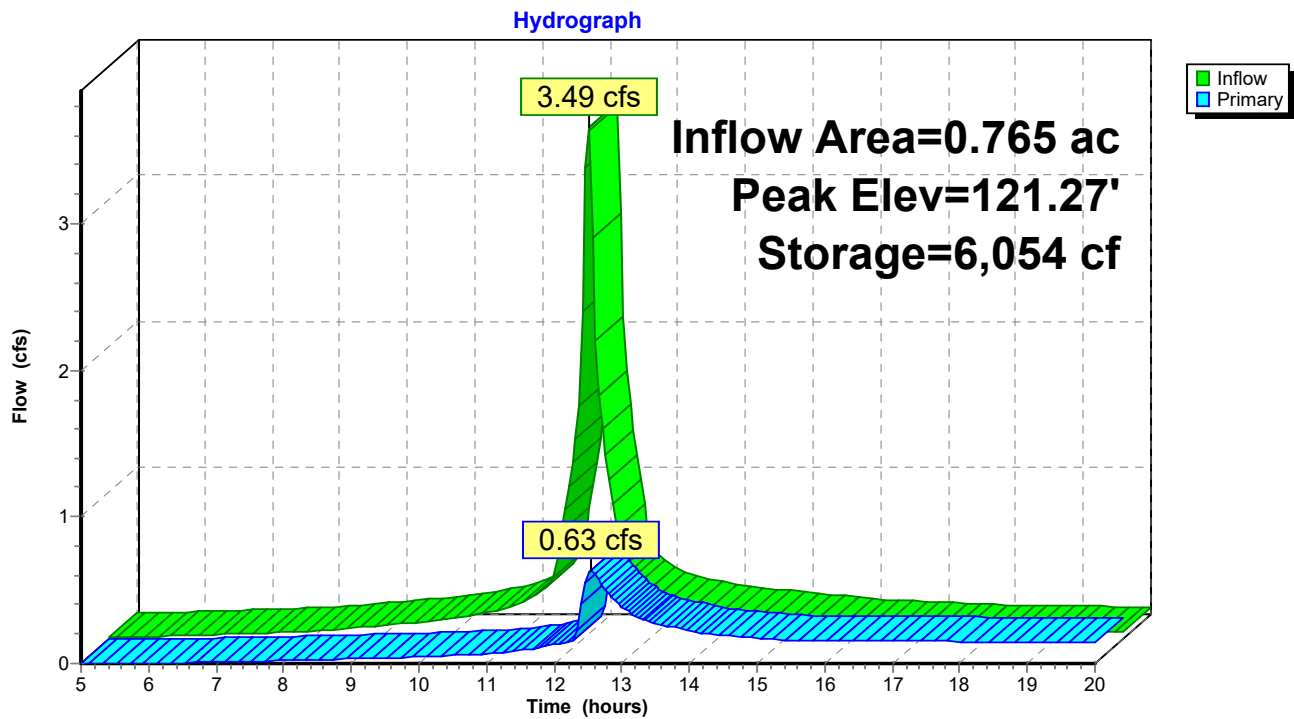
| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.75' | 4,165 cf      | <b>23.00'W x 144.00'L x 3.50'H Stone</b><br>11,592 cf Overall - 1,179 cf Embedded = 10,413 cf x 40.0% Voids                                                                                            |
| #2     | 119.25' | 1,179 cf      | <b>ADS_StormTech SC-310 +Cap x 80 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>80 Chambers in 4 Rows |
| #3     | 117.25' | 895 cf        | <b>21.00'W x 142.00'L x 1.50'H Sand</b><br>4,473 cf Overall x 20.0% Voids                                                                                                                              |
| #4     | 116.40' | 1,088 cf      | <b>23.00'W x 144.00'L x 0.83'H Crushed Stone</b><br>2,749 cf Overall - 30 cf Embedded = 2,719 cf x 40.0% Voids                                                                                         |
| #5     | 116.60' | 24 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 140.0' S= 0.0010 '/'<br>30 cf Overall - 0.2" Wall Thickness = 24 cf                                                                           |
|        |         | 7,351 cf      | Total Available Storage                                                                                                                                                                                |

| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                         |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.10' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.10' / 116.00' S= 0.0033 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                                 |
| #2     | Device 1 | 120.92' | <b>6.0" Round 6" overflows into header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.92' / 120.31' S= 0.1220 '/ Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.40' | <b>2.1" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0006 '/ Cc= 0.600<br>n= 0.012, Flow Area= 0.02 sf                                  |

**Primary OutFlow** Max=0.63 cfs @ 12.55 hrs HW=121.27' (Free Discharge)

- 1=18" SD to OCS (Passes 0.63 cfs of 16.77 cfs potential flow)
- 2=6" overflows into header (Inlet Controls 0.47 cfs @ 1.06 fps)
- 3=Underdrains w orifice (Barrel Controls 0.16 cfs @ 3.40 fps)

**Pond 2.2P: StormTech #2 ; 21x142**



**Summary for Pond OCS: OCS**

Inflow Area = 1.325 ac, 91.91% Impervious, Inflow Depth > 2.53" for 10-yr event  
 Inflow = 1.43 cfs @ 12.48 hrs, Volume= 0.280 af  
 Outflow = 1.43 cfs @ 12.48 hrs, Volume= 0.280 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.43 cfs @ 12.48 hrs, Volume= 0.280 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 119.87' @ 12.48 hrs

Flood Elev= 122.33'

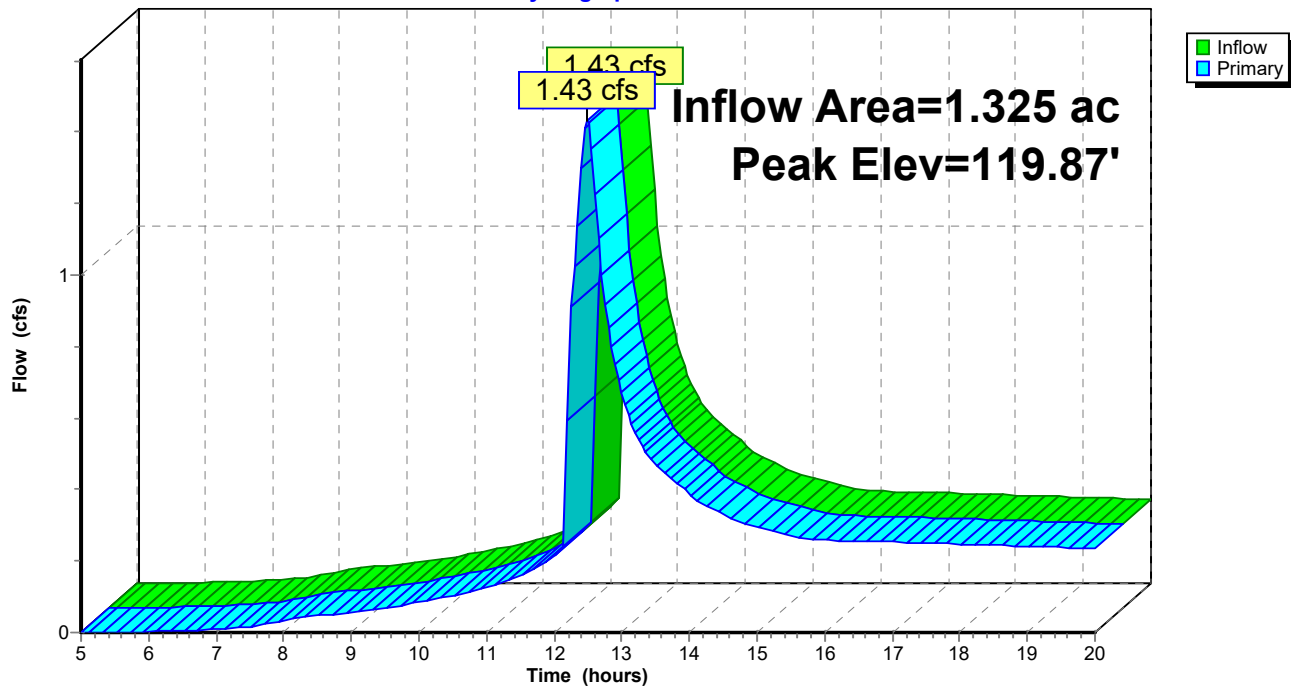
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                       |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.35' | <b>18.0" Round 18" Outlet</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.35' / 116.28' S= 0.0014 '/' Cc= 0.600<br>n= 0.010, Flow Area= 1.77 sf                                |
| #2     | Device 1 | 116.40' | <b>2.6" Vert. Quality Orifice</b> C= 0.600                                                                                                                                                                           |
| #3     | Device 1 | 118.25' | <b>6.0" Vert. Quantity Orifice</b> C= 0.600                                                                                                                                                                          |
| #4     | Device 1 | 121.00' | <b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50<br>Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32<br>3.31 3.32 |

**Primary OutFlow** Max=1.42 cfs @ 12.48 hrs HW=119.85' (Free Discharge)

- 1=18" Outlet (Passes 1.42 cfs of 7.43 cfs potential flow)
- 2=Quality Orifice (Orifice Controls 0.32 cfs @ 8.80 fps)
- 3=Quantity Orifice (Orifice Controls 1.10 cfs @ 5.60 fps)
- 4=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

# Pond OCS: OCS

Hydrograph



**Post HC Biddeford 3.22***Type III 24-hr 25-yr Rainfall=6.28"*

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                                         |                                                                                                                                            |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment1S: 1.0</b>              | Runoff Area=25,494 sf 54.09% Impervious Runoff Depth>3.38"<br>Tc=6.0 min CN=76 Runoff=2.44 cfs 0.165 af                                    |
| <b>Subcatchment2.1: 2.1</b>             | Runoff Area=24,378 sf 95.86% Impervious Runoff Depth>5.43"<br>Tc=6.0 min CN=96 Runoff=3.33 cfs 0.253 af                                    |
| <b>Subcatchment2.2: 2.2</b>             | Runoff Area=33,335 sf 89.03% Impervious Runoff Depth>5.05"<br>Tc=6.0 min CN=92 Runoff=4.38 cfs 0.322 af                                    |
| <b>Subcatchment2.3S: 2.0</b>            | Runoff Area=58,691 sf 16.40% Impervious Runoff Depth>3.99"<br>Tc=10.9 min CN=82 Runoff=5.60 cfs 0.447 af                                   |
| <b>Subcatchment2.4S: Five Star Auto</b> | Runoff Area=39,874 sf 89.26% Impervious Runoff Depth>5.05"<br>Tc=6.0 min CN=92 Runoff=5.24 cfs 0.385 af                                    |
| <b>Subcatchment3.0: SUB 3.0</b>         | Runoff Area=28,312 sf 24.50% Impervious Runoff Depth>4.51"<br>Flow Length=72' Tc=10.8 min CN=87 Runoff=2.99 cfs 0.245 af                   |
| <b>Reach 1R: 1.0; WEST COLE ROAD</b>    | Inflow=2.44 cfs 0.165 af<br>Outflow=2.44 cfs 0.165 af                                                                                      |
| <b>Reach 2R: POI 2; CROSS CULVERT</b>   | Inflow=11.47 cfs 1.220 af<br>Outflow=11.47 cfs 1.220 af                                                                                    |
| <b>Reach 3R: POI 3; TRAIN TRACKS</b>    | Avg. Flow Depth=0.20' Max Vel=6.98 fps Inflow=2.99 cfs 0.245 af<br>n=0.041 L=1.0' S=0.4000 ' Capacity=107.22 cfs Outflow=2.99 cfs 0.245 af |
| <b>Pond 2.1P: StormTech #1: 25 x 85</b> | Peak Elev=121.85' Storage=5,008 cf Inflow=3.33 cfs 0.253 af<br>Outflow=1.47 cfs 0.173 af                                                   |
| <b>Pond 2.2P: StormTech #2 ; 21x142</b> | Peak Elev=121.81' Storage=6,764 cf Inflow=4.38 cfs 0.322 af<br>Outflow=1.36 cfs 0.215 af                                                   |
| <b>Pond OCS: OCS</b>                    | Peak Elev=121.14' Inflow=2.79 cfs 0.388 af<br>Outflow=2.79 cfs 0.388 af                                                                    |

**Total Runoff Area = 4.823 ac Runoff Volume = 1.817 af Average Runoff Depth = 4.52"**  
**43.36% Pervious = 2.091 ac 56.64% Impervious = 2.731 ac**

**Post HC Biddeford 3.22**

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Type III 24-hr 25-yr Rainfall=6.28"

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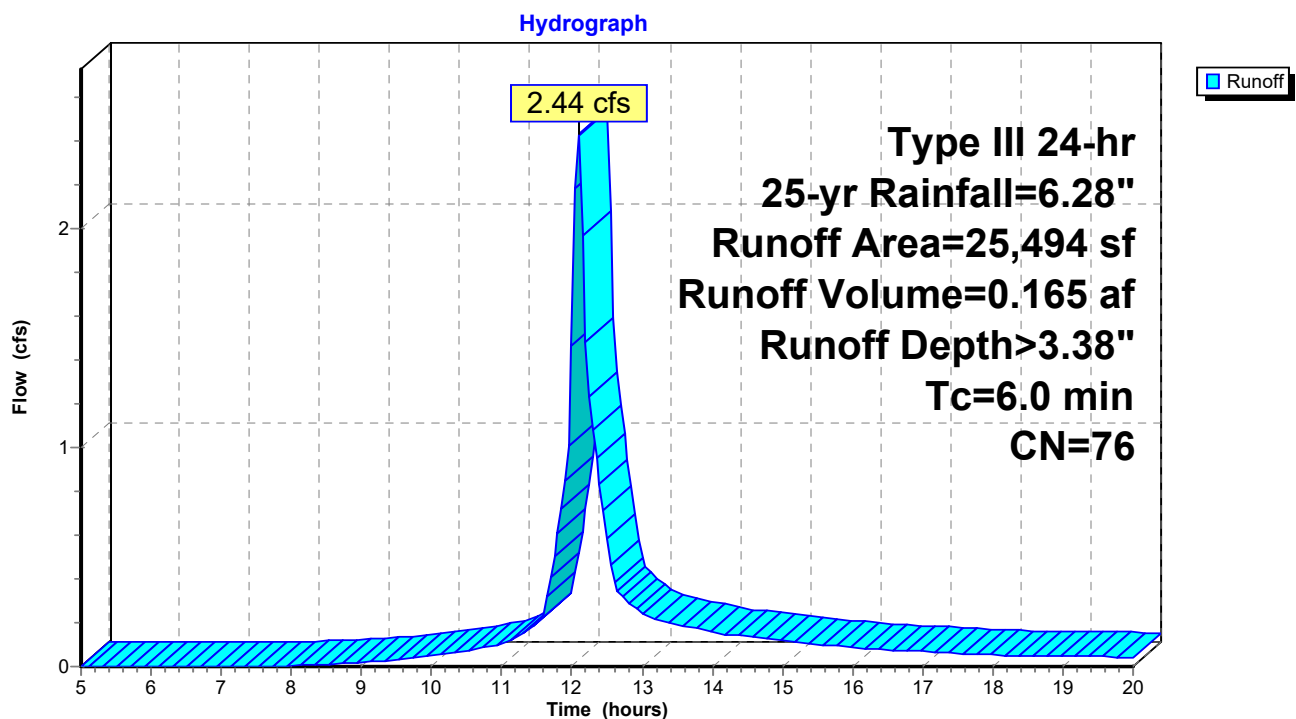
**Summary for Subcatchment 1S: 1.0**

Runoff = 2.44 cfs @ 12.09 hrs, Volume= 0.165 af, Depth&gt; 3.38"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                     |
|---|-----------|----|---------------------------------|
| * | 13,790    | 98 | Pavement/Roof                   |
|   | 11,704    | 49 | 50-75% Grass cover, Fair, HSG A |
|   | 25,494    | 76 | Weighted Average                |
|   | 11,704    |    | 45.91% Pervious Area            |
|   | 13,790    |    | 54.09% Impervious Area          |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description            |
|-------------|------------------|------------------|----------------------|-------------------|------------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, 0.1 hour |

**Subcatchment 1S: 1.0**

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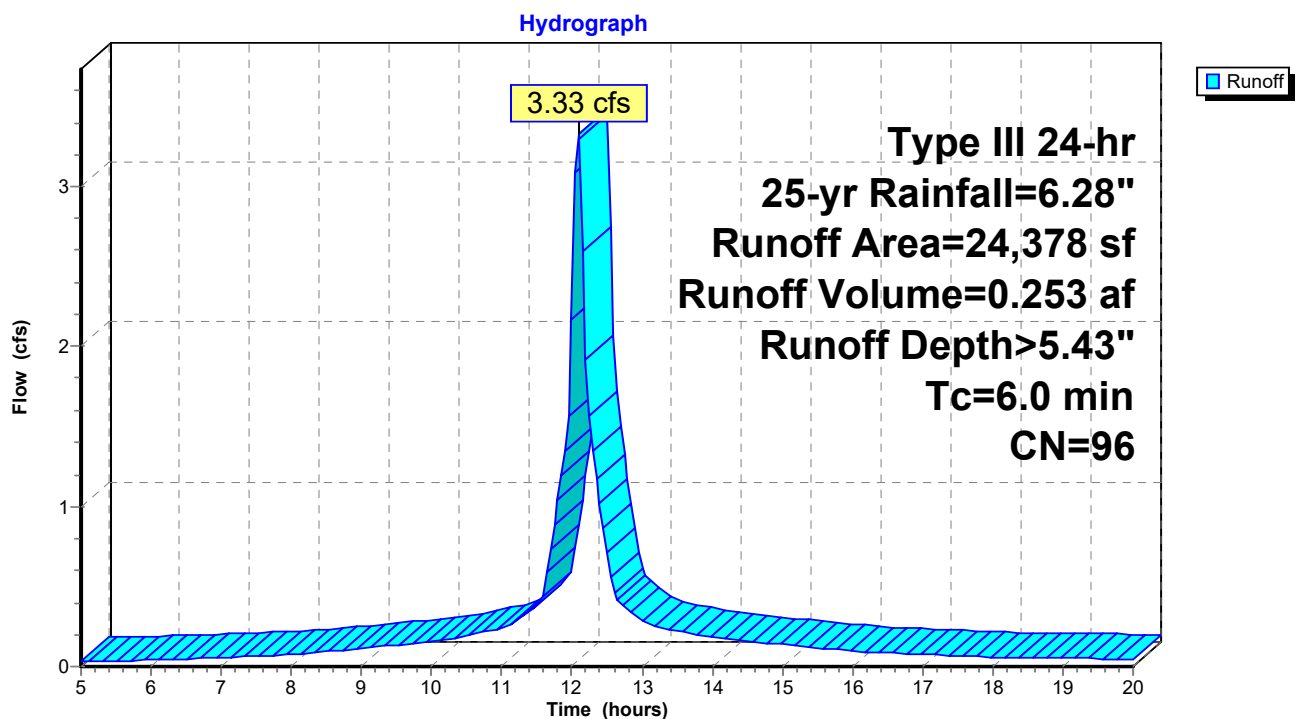
**Summary for Subcatchment 2.1: 2.1**

Runoff = 3.33 cfs @ 12.09 hrs, Volume= 0.253 af, Depth&gt; 5.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 23,368    | 98 | Paved parking, HSG A          |
| 1,010     | 39 | >75% Grass cover, Good, HSG A |
| 24,378    | 96 | Weighted Average              |
| 1,010     |    | 4.14% Pervious Area           |
| 23,368    |    | 95.86% Impervious Area        |

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

**Subcatchment 2.1: 2.1**



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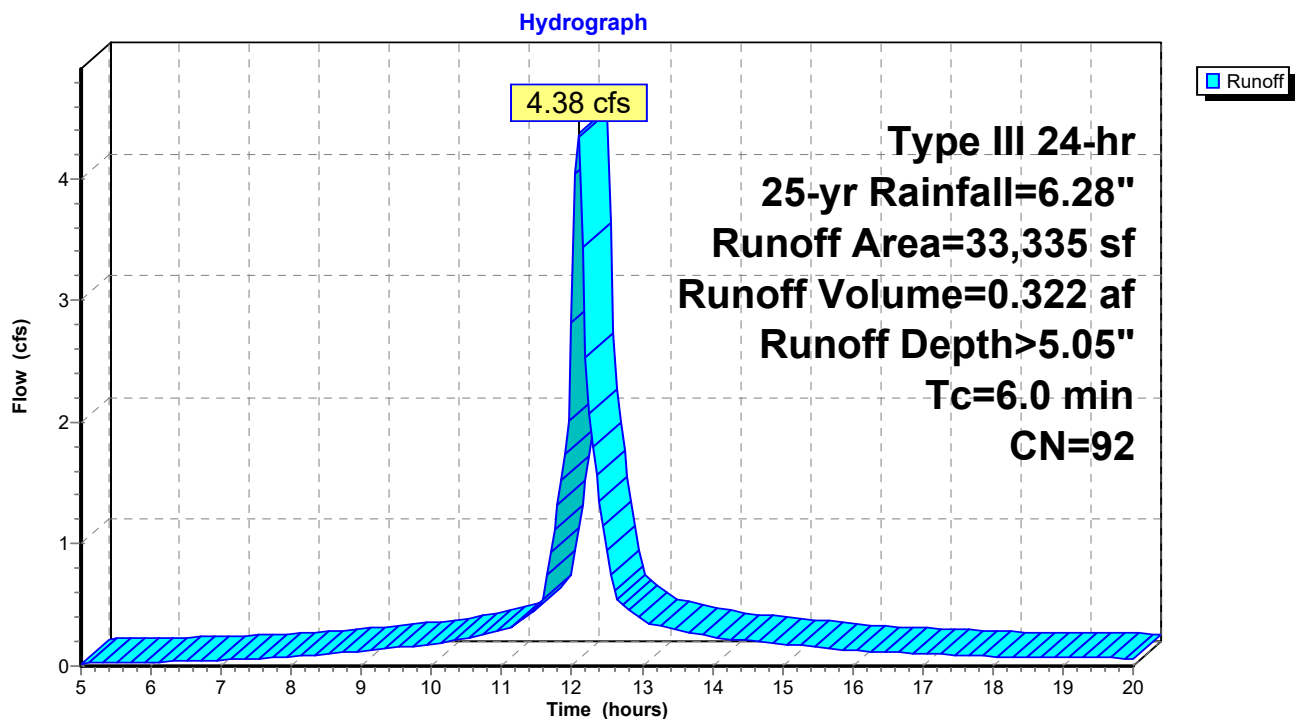
**Summary for Subcatchment 2.2: 2.2**

Runoff = 4.38 cfs @ 12.09 hrs, Volume= 0.322 af, Depth&gt; 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 20,098    | 98 | Roof                          |
|   | 9,579     | 98 | Paved parking, HSG A          |
|   | 3,658     | 39 | >75% Grass cover, Good, HSG A |
|   | 33,335    | 92 | Weighted Average              |
|   | 3,658     |    | 10.97% Pervious Area          |
|   | 29,677    |    | 89.03% Impervious Area        |

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

**Subcatchment 2.2: 2.2**

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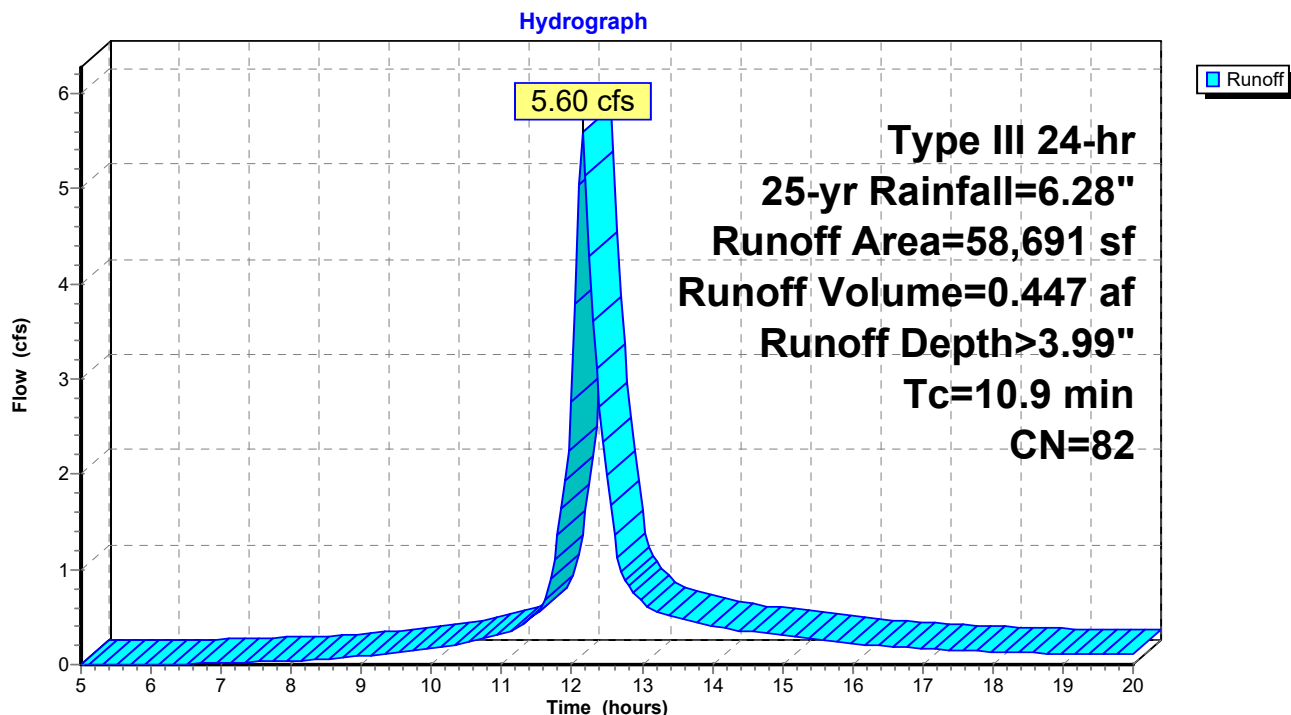
**Summary for Subcatchment 2.3S: 2.0**

Runoff = 5.60 cfs @ 12.15 hrs, Volume= 0.447 af, Depth&gt; 3.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,263    | 82 | Woods/grass comb., Fair, HSG D  |
| 31,709    | 80 | >75% Grass cover, Good, HSG D   |
| 3,096     | 49 | 50-75% Grass cover, Fair, HSG A |
| * 9,623   | 98 | Pavement                        |
| 58,691    | 82 | Weighted Average                |
| 49,068    |    | 83.60% Pervious Area            |
| 9,623     |    | 16.40% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description               |
|----------|---------------|---------------|-------------------|----------------|---------------------------|
| 10.9     |               |               |                   |                | Direct Entry, Pre Tc Copy |

**Subcatchment 2.3S: 2.0**

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Type III 24-hr 25-yr Rainfall=6.28"

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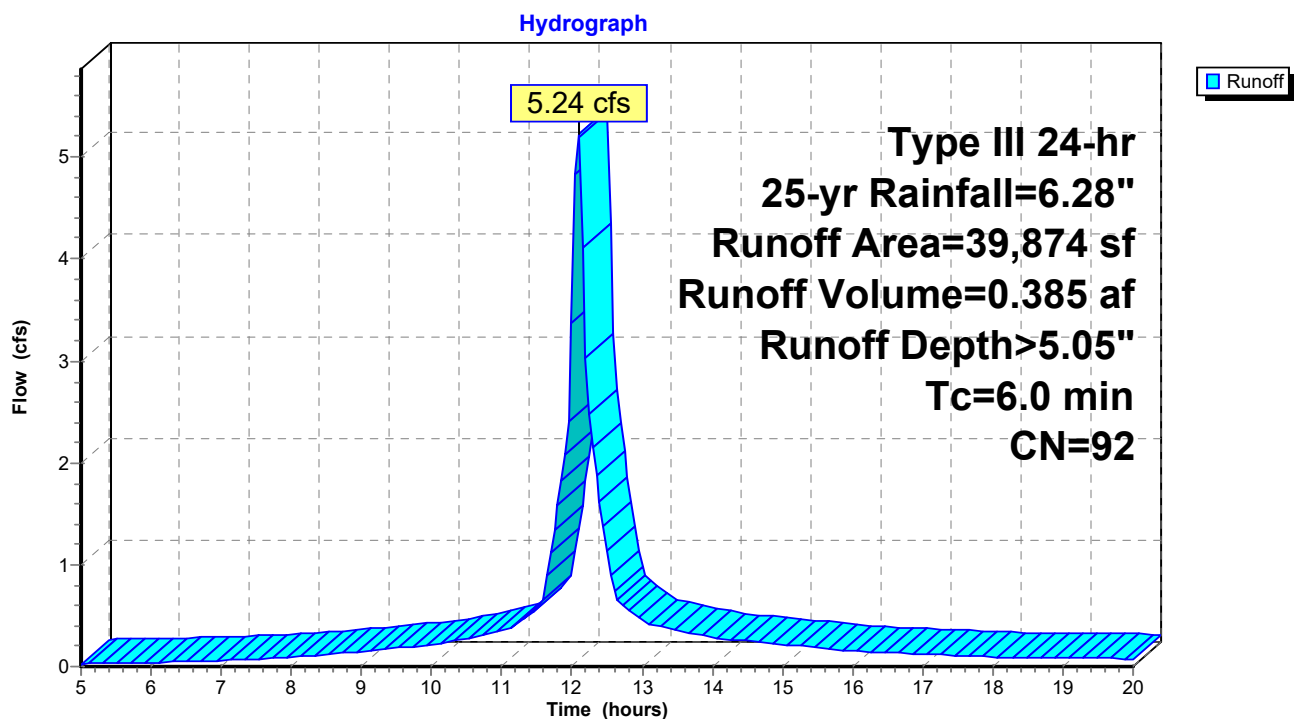
**Summary for Subcatchment 2.4S: Five Star Auto**

Runoff = 5.24 cfs @ 12.09 hrs, Volume= 0.385 af, Depth&gt; 5.05"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

|   | Area (sf) | CN | Description                   |
|---|-----------|----|-------------------------------|
| * | 35,590    | 98 | Pavement/Roof                 |
|   | 4,284     | 39 | >75% Grass cover, Good, HSG A |
|   | 39,874    | 92 | Weighted Average              |
|   | 4,284     |    | 10.74% Pervious Area          |
|   | 35,590    |    | 89.26% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description          |
|-------------|------------------|------------------|----------------------|-------------------|----------------------|
| 6.0         |                  |                  |                      |                   | Direct Entry, direct |

**Subcatchment 2.4S: Five Star Auto**

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Type III 24-hr 25-yr Rainfall=6.28"

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**Summary for Subcatchment 3.0: SUB 3.0**

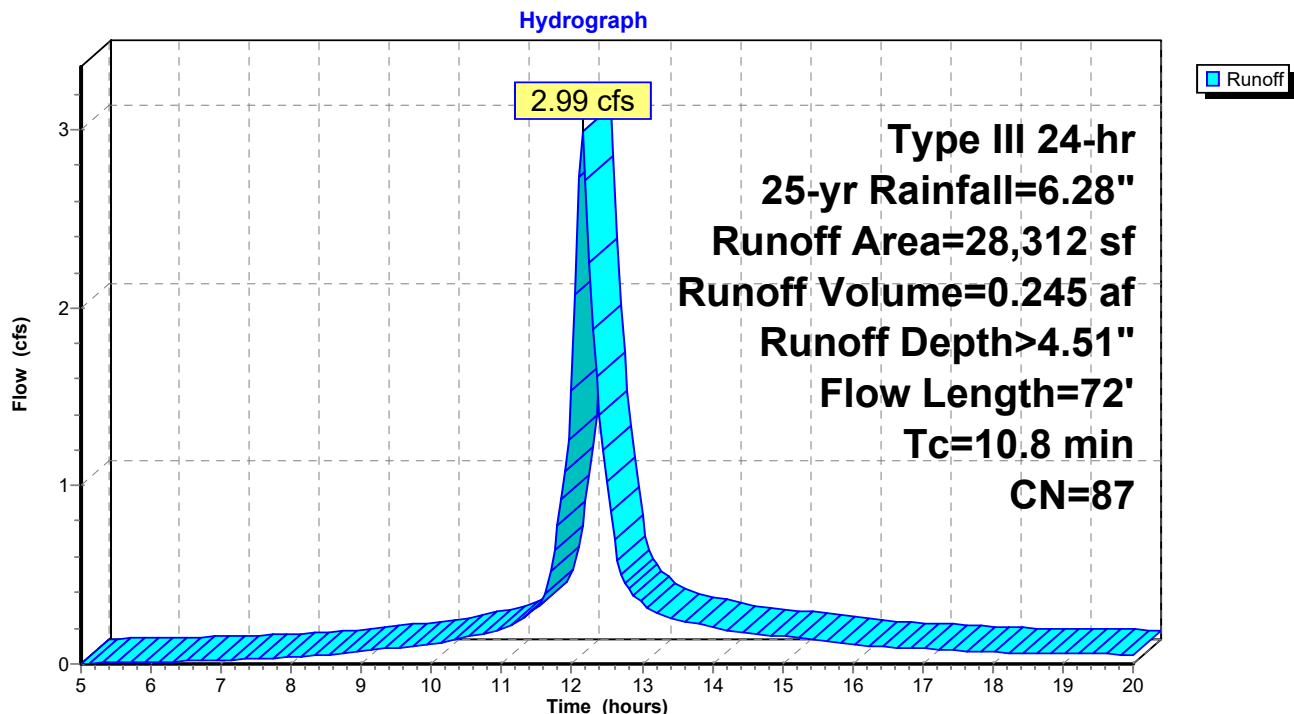
Runoff = 2.99 cfs @ 12.15 hrs, Volume= 0.245 af, Depth&gt; 4.51"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-yr Rainfall=6.28"

| Area (sf) | CN | Description                     |
|-----------|----|---------------------------------|
| 14,170    | 82 | Woods/grass comb., Fair, HSG D  |
| 4,976     | 84 | 50-75% Grass cover, Fair, HSG D |
| 6,936     | 98 | Paved parking, HSG D            |
| 2,230     | 89 | Dirt roads, HSG D               |
| 28,312    | 87 | Weighted Average                |
| 21,376    |    | 75.50% Pervious Area            |
| 6,936     |    | 24.50% Impervious Area          |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                |
|----------|---------------|---------------|-------------------|----------------|--------------------------------------------|
| 5.6      | 40            | 0.0320        | 0.12              |                | <b>Sheet Flow, A to B</b>                  |
|          |               |               |                   |                | Grass: Dense n= 0.240 P2= 3.24"            |
| 5.2      | 32            | 0.0690        | 0.10              |                | <b>Sheet Flow, B to C</b>                  |
|          |               |               |                   |                | Woods: Light underbrush n= 0.400 P2= 3.24" |
| 10.8     | 72            | Total         |                   |                |                                            |

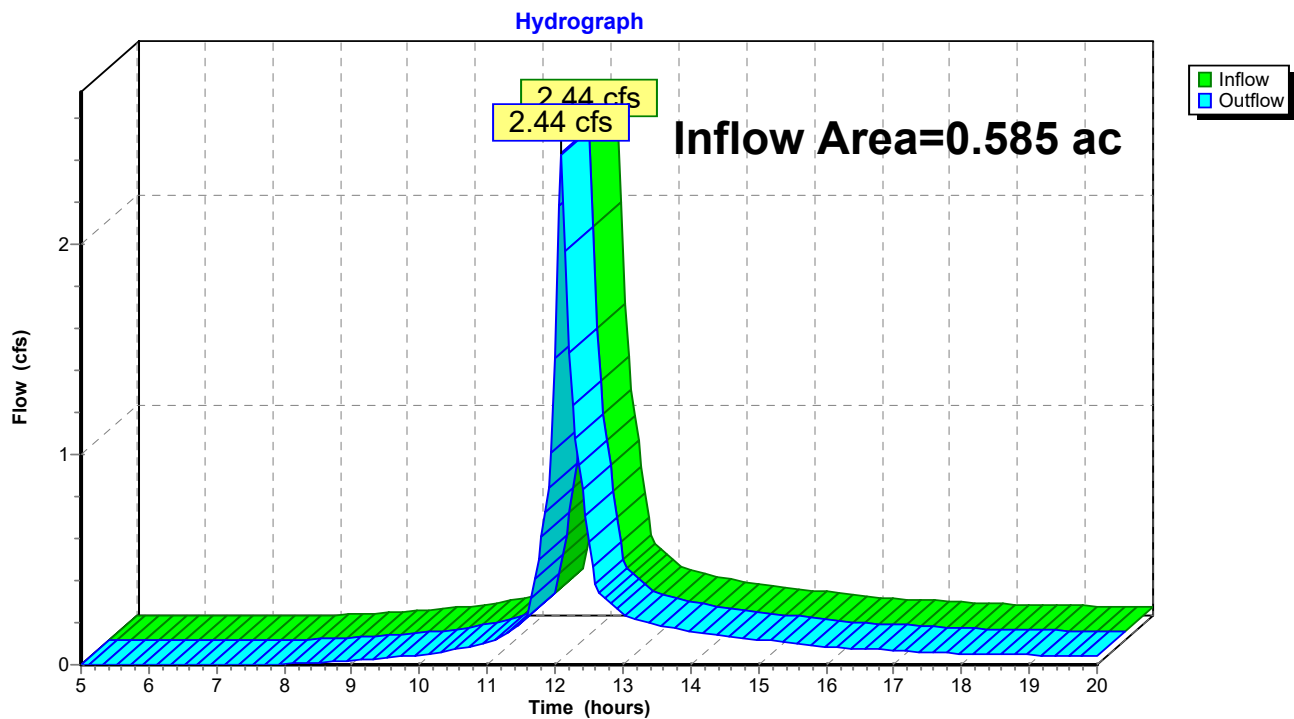
**Subcatchment 3.0: SUB 3.0**

### Summary for Reach 1R: 1.0; WEST COLE ROAD

Inflow Area = 0.585 ac, 54.09% Impervious, Inflow Depth > 3.38" for 25-yr event  
 Inflow = 2.44 cfs @ 12.09 hrs, Volume= 0.165 af  
 Outflow = 2.44 cfs @ 12.09 hrs, Volume= 0.165 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 1R: 1.0; WEST COLE ROAD

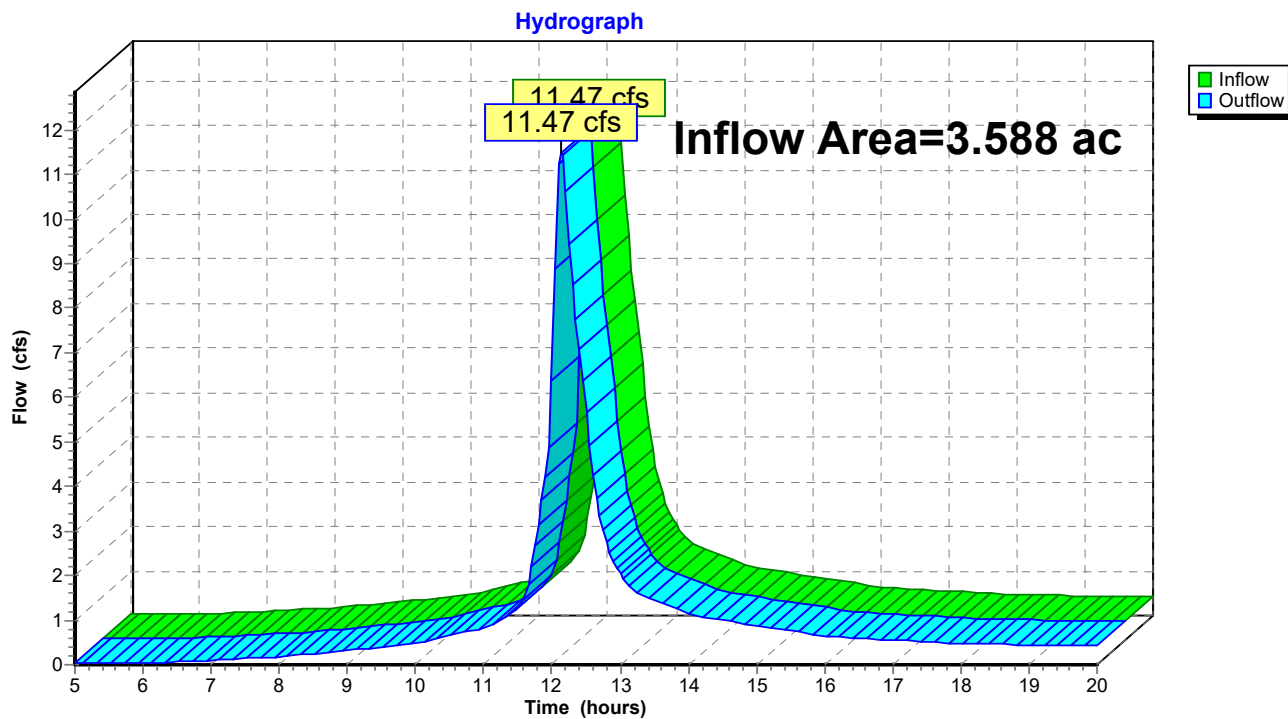


### Summary for Reach 2R: POI 2; CROSS CULVERT

Inflow Area = 3.588 ac, 62.87% Impervious, Inflow Depth > 4.08" for 25-yr event  
 Inflow = 11.47 cfs @ 12.13 hrs, Volume= 1.220 af  
 Outflow = 11.47 cfs @ 12.13 hrs, Volume= 1.220 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Reach 2R: POI 2; CROSS CULVERT



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Type III 24-hr 25-yr Rainfall=6.28"

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### Summary for Reach 3R: POI 3; TRAIN TRACKS

Inflow Area = 0.650 ac, 24.50% Impervious, Inflow Depth > 4.51" for 25-yr event  
Inflow = 2.99 cfs @ 12.15 hrs, Volume= 0.245 af  
Outflow = 2.99 cfs @ 12.15 hrs, Volume= 0.245 af, Atten= 0%, Lag= 0.0 min

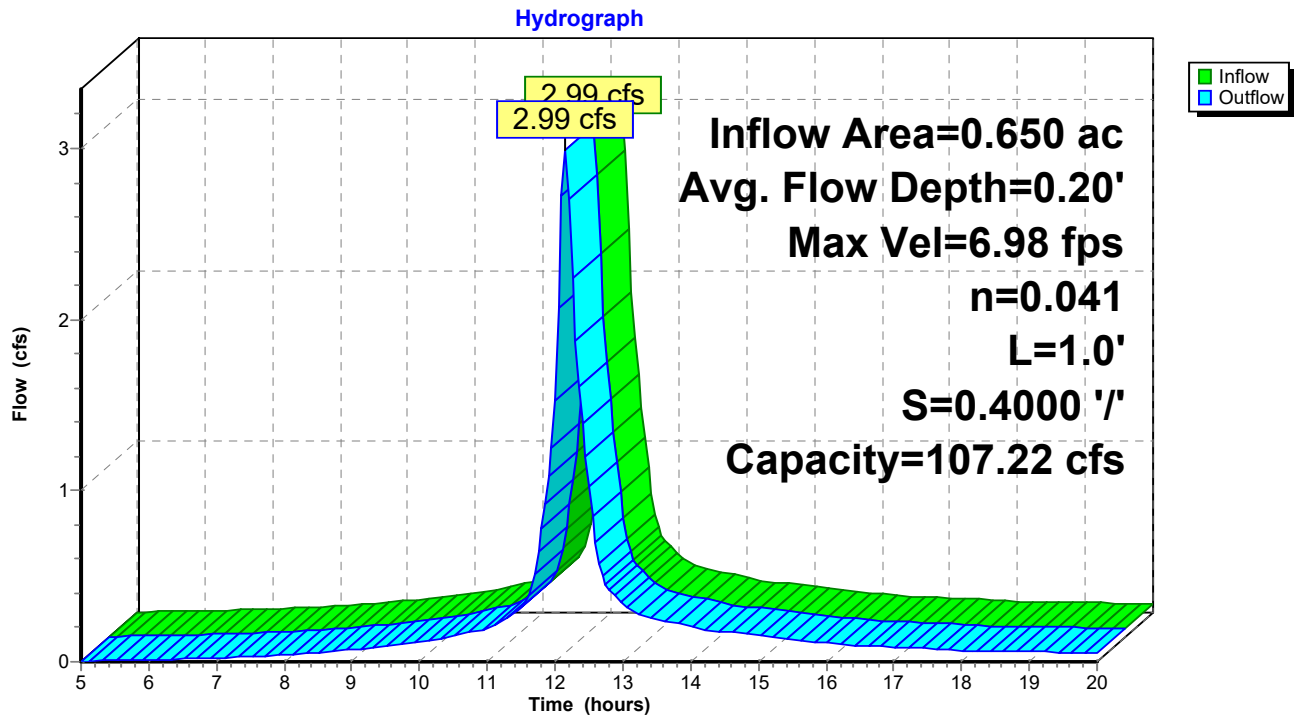
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Max. Velocity= 6.98 fps, Min. Travel Time= 0.0 min  
Avg. Velocity= 2.18 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 12.15 hrs  
Average Depth at Peak Storage= 0.20'  
Bank-Full Depth= 1.50' Flow Area= 5.3 sf, Capacity= 107.22 cfs

2.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch  
Side Slope Z-value= 1.0 '/' Top Width= 5.00'  
Length= 1.0' Slope= 0.4000 '/'  
Inlet Invert= 0.00', Outlet Invert= -0.40'



### Reach 3R: POI 3; TRAIN TRACKS



**Summary for Pond 2.1P: StormTech #1: 25 x 85**

Inflow Area = 0.560 ac, 95.86% Impervious, Inflow Depth > 5.43" for 25-yr event  
 Inflow = 3.33 cfs @ 12.09 hrs, Volume= 0.253 af  
 Outflow = 1.47 cfs @ 12.27 hrs, Volume= 0.173 af, Atten= 56%, Lag= 11.2 min  
 Primary = 1.47 cfs @ 12.27 hrs, Volume= 0.173 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 121.85' @ 12.27 hrs Surf.Area= 6,823 sf Storage= 5,008 cf  
 Flood Elev= 123.00' Surf.Area= 6,823 sf Storage= 5,244 cf

Plug-Flow detention time= 156.3 min calculated for 0.173 af (68% of inflow)  
 Center-of-Mass det. time= 86.2 min ( 825.2 - 739.0 )

| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.60' | 2,935 cf      | <b>27.00'W x 87.00'L x 3.50'H Stone</b><br>8,222 cf Overall - 885 cf Embedded = 7,337 cf x 40.0% Voids                                                                                                 |
| #2     | 119.10' | 885 cf        | <b>ADS_StormTech SC-310 +Cap x 60 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>60 Chambers in 4 Rows |
| #3     | 117.10' | 638 cf        | <b>25.00'W x 85.00'L x 1.50'H Sand</b><br>3,188 cf Overall x 20.0% Voids                                                                                                                               |
| #4     | 116.25' | 773 cf        | <b>27.00'W x 87.00'L x 0.83'H Crushed Stone</b><br>1,950 cf Overall - 17 cf Embedded = 1,933 cf x 40.0% Voids                                                                                          |
| #5     | 116.50' | 14 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 80.0' S= 0.0010 '/'<br>17 cf Overall - 0.2" Wall Thickness = 14 cf                                                                            |
|        |         | 5,244 cf      | Total Available Storage                                                                                                                                                                                |

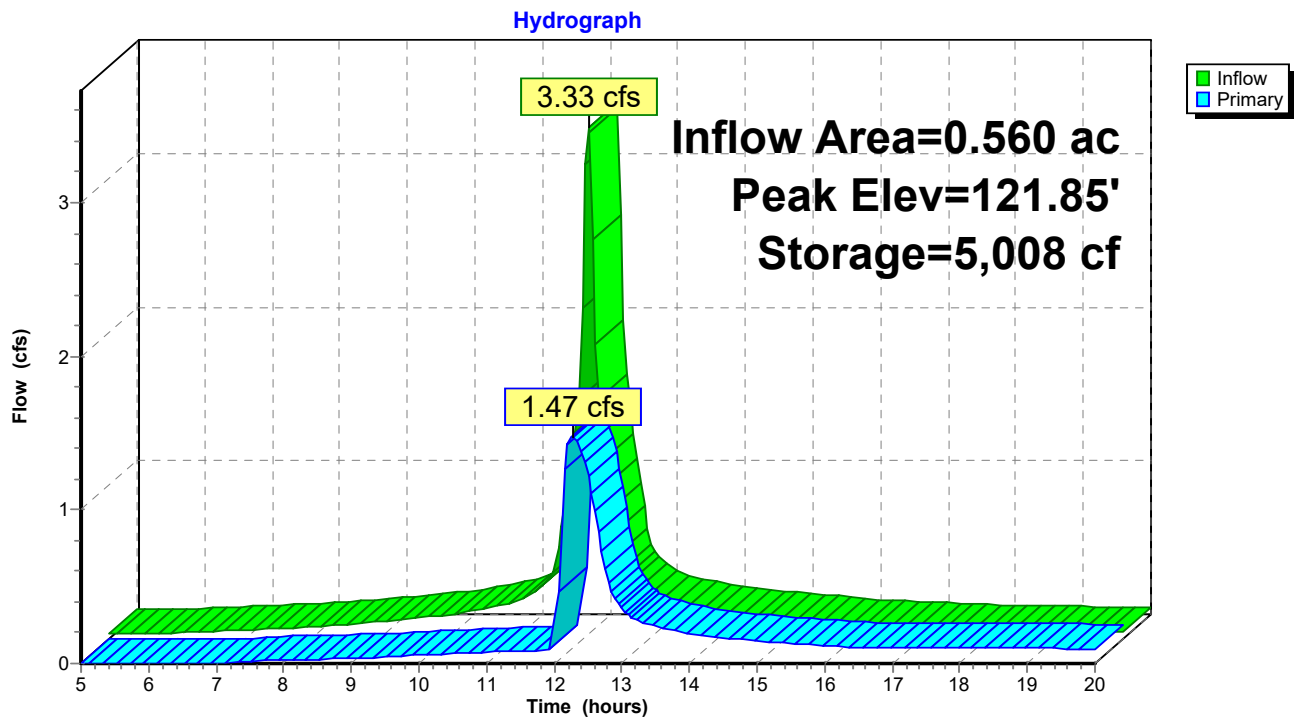
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                        |
|--------|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.40' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0017 '/' Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                               |
| #2     | Device 1 | 120.77' | <b>6.0" Round 6" overflows to header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.77' / 120.25' S= 0.1040 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.55' | <b>1.8" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.55' / 116.45' S= 0.0011 '/' Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.02 sf |

**Primary OutFlow** Max=1.47 cfs @ 12.27 hrs HW=121.84' (Free Discharge)

- 1=18" SD to OCS (Passes 1.47 cfs of 17.28 cfs potential flow)
- 2=6" overflows to header (Inlet Controls 1.35 cfs @ 2.30 fps)
- 3=Underdrains w orifice (Barrel Controls 0.11 cfs @ 3.24 fps)



**Pond 2.1P: StormTech #1: 25 x 85**



**Summary for Pond 2.2P: StormTech #2 ; 21x142**

Inflow Area = 0.765 ac, 89.03% Impervious, Inflow Depth > 5.05" for 25-yr event  
 Inflow = 4.38 cfs @ 12.09 hrs, Volume= 0.322 af  
 Outflow = 1.36 cfs @ 12.40 hrs, Volume= 0.215 af, Atten= 69%, Lag= 18.7 min  
 Primary = 1.36 cfs @ 12.40 hrs, Volume= 0.215 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 121.81' @ 12.40 hrs Surf.Area= 9,606 sf Storage= 6,764 cf  
 Flood Elev= 123.00' Surf.Area= 9,606 sf Storage= 7,351 cf

Plug-Flow detention time= 162.1 min calculated for 0.214 af (67% of inflow)  
 Center-of-Mass det. time= 92.5 min ( 842.3 - 749.8 )

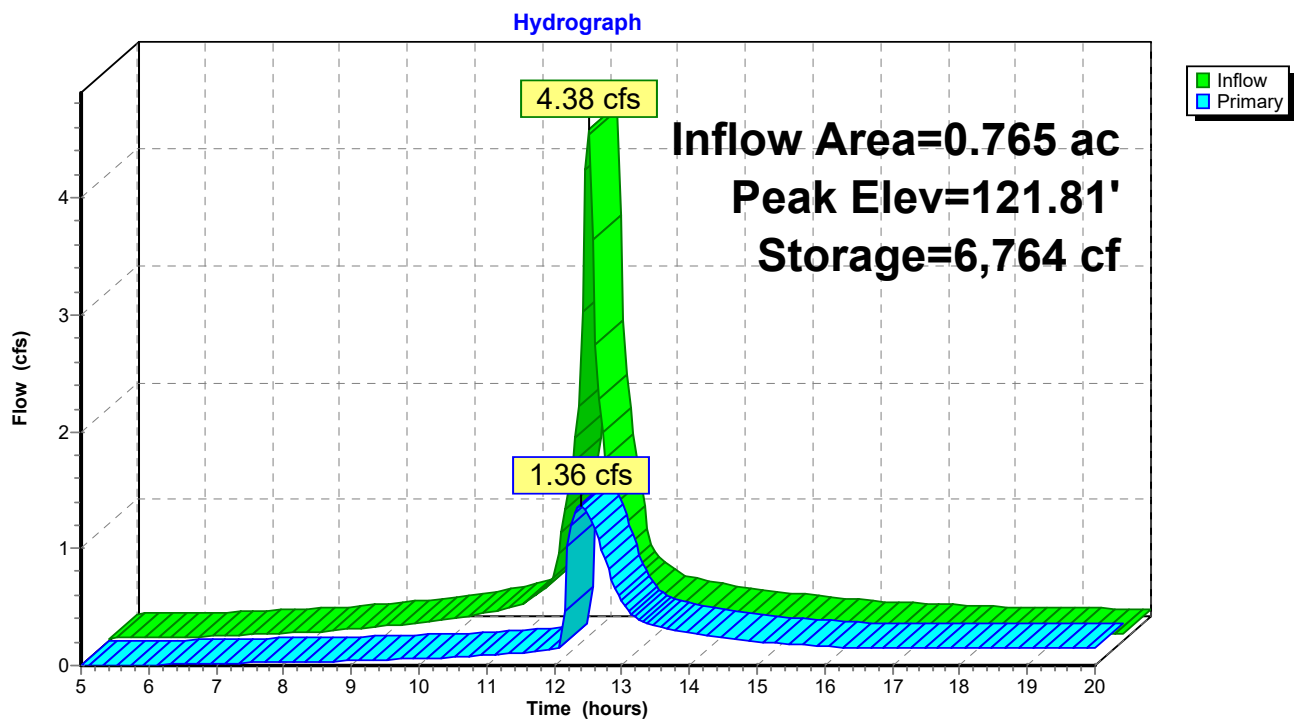
| Volume | Invert  | Avail.Storage | Storage Description                                                                                                                                                                                    |
|--------|---------|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | 118.75' | 4,165 cf      | <b>23.00'W x 144.00'L x 3.50'H Stone</b><br>11,592 cf Overall - 1,179 cf Embedded = 10,413 cf x 40.0% Voids                                                                                            |
| #2     | 119.25' | 1,179 cf      | <b>ADS_StormTech SC-310 +Cap x 80 Inside #1</b><br>Effective Size= 28.9"W x 16.0"H => 2.07 sf x 7.12'L = 14.7 cf<br>Overall Size= 34.0"W x 16.0"H x 7.56'L with 0.44' Overlap<br>80 Chambers in 4 Rows |
| #3     | 117.25' | 895 cf        | <b>21.00'W x 142.00'L x 1.50'H Sand</b><br>4,473 cf Overall x 20.0% Voids                                                                                                                              |
| #4     | 116.40' | 1,088 cf      | <b>23.00'W x 144.00'L x 0.83'H Crushed Stone</b><br>2,749 cf Overall - 30 cf Embedded = 2,719 cf x 40.0% Voids                                                                                         |
| #5     | 116.60' | 24 cf         | <b>4.0" Round Underdrain Storage x 2 Inside #4</b><br>L= 140.0' S= 0.0010 '/'<br>30 cf Overall - 0.2" Wall Thickness = 24 cf                                                                           |
|        |         | 7,351 cf      | Total Available Storage                                                                                                                                                                                |

| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                                         |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.10' | <b>18.0" Round 18" SD to OCS</b> L= 30.0' Ke= 0.600<br>Inlet / Outlet Invert= 116.10' / 116.00' S= 0.0033 '/ Cc= 0.900<br>n= 0.012, Flow Area= 1.77 sf                                                                                 |
| #2     | Device 1 | 120.92' | <b>6.0" Round 6" overflows into header X 3.00</b><br>L= 5.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 120.92' / 120.31' S= 0.1220 '/ Cc= 0.600<br>n= 0.012 Corrugated PP, smooth interior, Flow Area= 0.20 sf |
| #3     | Device 1 | 116.40' | <b>2.1" Round Underdrains w orifice X 2.00</b><br>L= 90.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.40' / 116.35' S= 0.0006 '/ Cc= 0.600<br>n= 0.012, Flow Area= 0.02 sf                                  |

**Primary OutFlow** Max=1.36 cfs @ 12.40 hrs HW=121.81' (Free Discharge)

- 1=18" SD to OCS (Passes 1.36 cfs of 17.76 cfs potential flow)
- 2=6" overflows into header (Inlet Controls 1.19 cfs @ 2.02 fps)
- 3=Underdrains w orifice (Barrel Controls 0.17 cfs @ 3.58 fps)

**Pond 2.2P: StormTech #2 ; 21x142**



### Summary for Pond OCS: OCS

Inflow Area = 1.325 ac, 91.91% Impervious, Inflow Depth > 3.51" for 25-yr event  
 Inflow = 2.79 cfs @ 12.34 hrs, Volume= 0.388 af  
 Outflow = 2.79 cfs @ 12.34 hrs, Volume= 0.388 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.79 cfs @ 12.34 hrs, Volume= 0.388 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 121.14' @ 12.34 hrs

Flood Elev= 122.33'

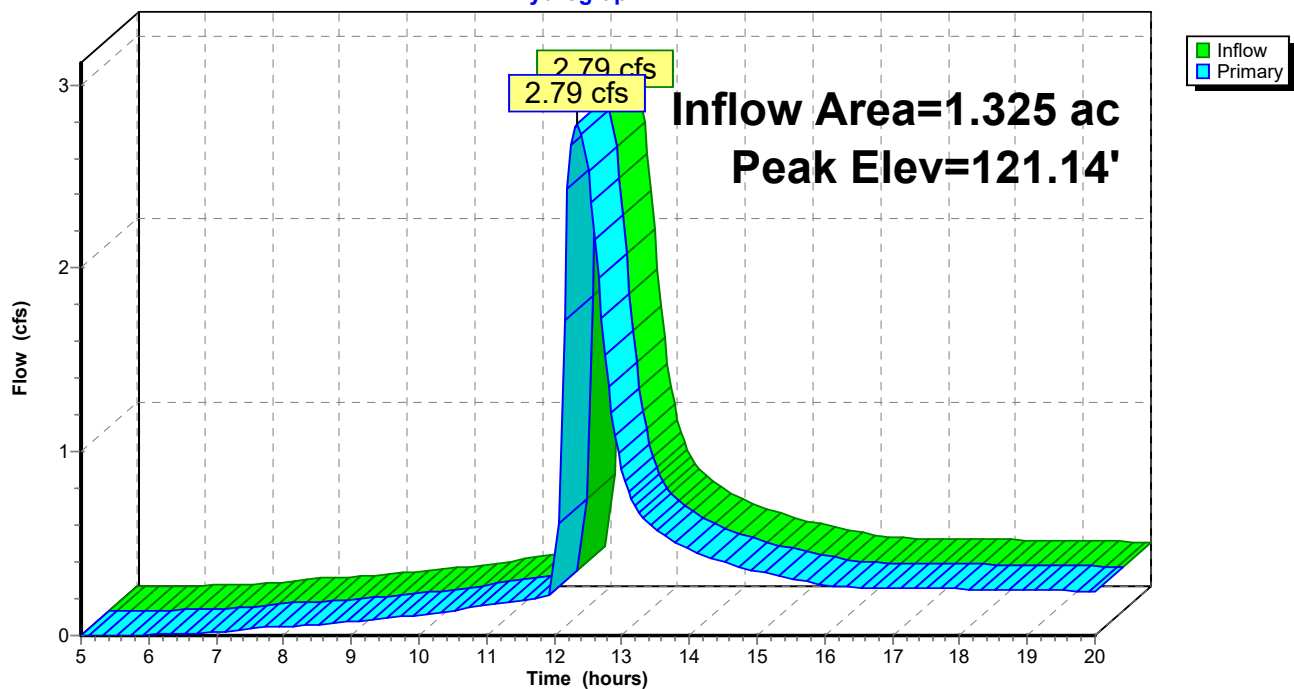
| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                                                       |
|--------|----------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary  | 116.35' | <b>18.0" Round 18" Outlet</b><br>L= 50.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 116.35' / 116.28' S= 0.0014 '/' Cc= 0.600<br>n= 0.010, Flow Area= 1.77 sf                                |
| #2     | Device 1 | 116.40' | <b>2.6" Vert. Quality Orifice</b> C= 0.600                                                                                                                                                                           |
| #3     | Device 1 | 118.25' | <b>6.0" Vert. Quantity Orifice</b> C= 0.600                                                                                                                                                                          |
| #4     | Device 1 | 121.00' | <b>6.0' long x 0.7' breadth Broad-Crested Rectangular Weir</b><br>Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00<br>2.50<br>Coef. (English) 2.76 2.82 2.93 3.09 3.18 3.22 3.27 3.30 3.32<br>3.31 3.32 |

**Primary OutFlow** Max=2.78 cfs @ 12.34 hrs HW=121.14' (Free Discharge)

- 1=18" Outlet (Passes 2.78 cfs of 9.00 cfs potential flow)
- 2=Quality Orifice (Orifice Controls 0.38 cfs @ 10.36 fps)
- 3=Quantity Orifice (Orifice Controls 1.54 cfs @ 7.82 fps)
- 4=Broad-Crested Rectangular Weir (Weir Controls 0.86 cfs @ 1.03 fps)

# Pond OCS: OCS

## Hydrograph

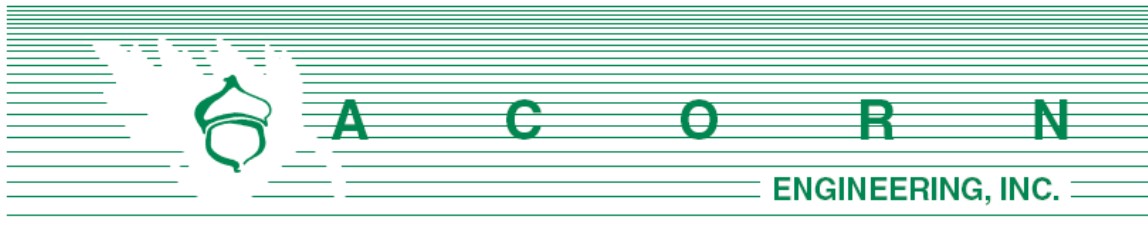


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# SECTION 5

## EROSION & SEDIMENTATION CONTROL REPORT





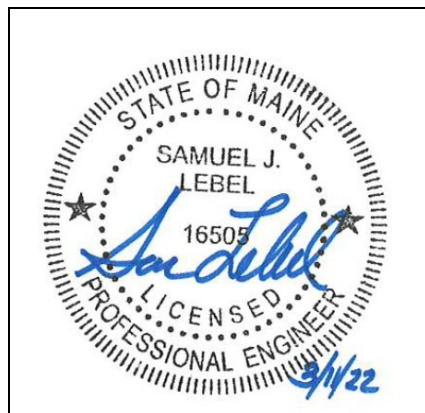
## **EROSION & SEDIMENTATION CONTROL REPORT**

**Prepared For:**

**SteelClad Biddeford, LLC  
25 Penrith Road,  
Portland, ME 04101**

**Prepared By:**

**Acorn Engineering, Inc.  
65 Hanover Street  
Portland, Maine 04101**



**March 2022**

## **INTRODUCTION**

Acorn Engineering, Inc. has been retained by SteelClad Biddeford LLC., to provide civil engineering services for the proposed redevelopment of 451 Alfred Street in Biddeford. The proposed project includes the redevelopment of a vacant lot which currently consists of grassed and wooded land with an existing half-acre road and un-connected impervious parking lot. The proposed redevelopment intends to provide approximately 60,000 square feet of conditioned storage space. Access to these units will be provided by drive aisles around all 4 walls of the building. The driveway will connect to West Cole Road and provide access to the site.

The following Erosion and Sedimentation Control Report was developed in accordance with the City of Biddeford Land Development Regulations, Article VI: Performance Standards, Section 26: Erosion Control and the Maine DEP Chapter 500 Stormwater Management Appendix A and B (1), Amended August 12, 2015. This narrative also meets the standards required in the Maine DEP's Erosion & Sediment Control BMP's Manual, revised in 2016.

### **1.0 EXISTING CONDITIONS**

The proposed project is located between West Cole Road and Alfred Street (RTE. 111) in Biddeford, Maine. A Boundary Survey has been prepared by NORSE Northern Survey Engineering of Brunswick Maine dated August 17<sup>th</sup>, 2021.

Abutting Uses:

- |             |                                    |
|-------------|------------------------------------|
| ➤ North I-3 | Alfred Street (RTE.111)            |
| ➤ East I-3  | Boston-Maine Railroad              |
| ➤ South I-3 | Day Care                           |
| ➤ West I-3  | Existing building & Five Star Auto |

The site has an existing 0.5 acre gravel easement drive and paved parking area connecting to Five Star Auto. This connection road is proposed to be closed to maximize the parking on the parcel of interest. The site is mostly grassed and vegetated area with slopes from 0-50%. The current topography on site directs stormwater to three points of interest which are analyzed in the stormwater management report. The two points of interest include a swale along the existing easement road, an 18" culvert located on Five Star Auto Property. It is our intention to continue to utilize and direct flow to the existing points of interest and reaches through enhanced stormwater management controls. A wetland delineation was conducted in July 2021 by a certified soil scientist verifying that the site does not currently contain any wetlands.

#### **1.1 Existing Soils**

Onsite soil information includes the following:

- Soil Conservation Service Medium Intensity Soil Survey for York County

No onsite wastewater is proposed, and therefore the applicant does not intend to perform a more intense hydric soil boundary delineation. Furthermore, infiltration has not been





designed or modeled in the project and the loads being transferred to the native soils are minimal.

The area within and surrounding the project includes soil types listed in the table below. The susceptibility of soils to erosion is indicated on a relative “K” scale of values over a range of 0.02 to 0.69. Higher “K” values indicate more erodible soils.

| Table 1 - “K” Value           |               |               |
|-------------------------------|---------------|---------------|
| Soils Type                    | Subsurface    | Substratum    |
| Croghan Loamy Fine Sand (CrB) | .17           | .17           |
| Scantic Silt Loam (Sc)        | .39 (average) | .39 (average) |

The soil “K” values for the soils, listed above, show a low to moderate susceptibility to erosion. The site’s susceptibility to erosion is from the Soil Conservation Service Medium Intensity Soil Survey for York County. Although soil “K” values for the soils show a low susceptibility to erosion, implementation of the proposed Erosion & Sedimentation Measures by the contractor will be of the utmost importance given the proximity of the site being within the Thatcher Brook Watershed.

#### 1.2 Existing Erosion Problems

There are no notable signs of erosion on site.

#### 1.3 Critical Areas

There are no critical areas on site.

#### 1.4 Protected Natural Resource

The site is located within the Thatcher Brook Watershed which is classified as an Urban Impaired Stream by the Maine DEP. The project proposed improvements are to include erosion and sedimentation control measures to provide water quality treatment for portions of the surface runoff. It is our understanding that a compensation fee be paid towards the City of Biddeford to comply with the City Thatcher Brook Watershed Management Plan.

#### 1.5 Previous Construction Activity (5 years)

Acorn is unaware of any construction activity in the last 5 years with the exception of minor parking lot alterations.

#### 1.6 Timber Harvesting

Acorn Engineering, Inc. is not aware of any timber harvesting within the past five years.

## 2.0 EROSION CONTROL MEASURES AND SITE STABILIZATION



As part of the site development, the following temporary and permanent erosion and sedimentation control devices shall be implemented. Devices shall be installed as described in this report or within the plan set. See the Maine Erosion and Sediment Control Handbook for Construction: Best Management Practices for further reference.

## 2.1 Temporary Erosion Control Measures

The following temporary erosion and sedimentation control measures are planned for the project's construction period:

2.1.1 Crushed stone stabilized construction entrances shall be placed at all access points to the project site where there are disturbed areas. The following specifications shall be followed at a minimum:

- Stone size shall be 2-3 inches or reclaimed or recycled concrete equivalent.
- The thickness of the entrance stone layer shall be no less than 6 inches.
- The entrance shall not be less than 20 feet wide, however not less than the full width of points where ingress or egress occurs. The length shall not be less than 50 feet in length.
- Geotextile fabric (woven or non-woven) shall be placed over the entire entrance area.
- The entrance/exit shall be maintained to the extent that it will prevent the tracking of sediment onto public roadways.

2.1.2 Erosion control berm mix with hay bale reinforcement or siltation fence shall be installed down gradient of any disturbed areas to trap runoff borne sediments until permanent stabilization is achieved. The silt fence or erosion control berm shall be installed per the details provided in the plan set and inspected before and immediately after each rainfall and at least daily during prolonged rainfall. Repairs shall be made if there are any signs of erosion or sedimentation below the fence line or berm. 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.

2.1.3 Hay mulch including hydro seeding is intended to provide cover for denuded or seeded areas until revegetation is established. Mulch placed between April 15<sup>th</sup> and November 1<sup>st</sup> on slopes of less than 15 percent shall be covered by fabric netting and anchored with staples in accordance with the manufacturer's recommendation. Mulch placed between November 1<sup>st</sup> and April 15<sup>th</sup> on slopes equal to or steeper than 8 percent and equal to or flatter than 2:1 shall use mats or fabric netting and anchored with staples in accordance with the manufacturer's recommendation.

2.1.4 At any time of the year, all slopes greater than 3:1 shall be stabilized with Double Net Erosion Control Blanket Bionet SC150BN by North American



Green or Approved Equal, or Erosion Control Mix Slope Protection as detailed within the plans.

- 2.1.5 West Cole Road shall be swept to control mud and dust from the construction site as necessary. Add additional stone to the stabilized construction entrance to minimize the tracking of material off the site and onto the surrounding roadways.
- 2.1.6 During demolition, clearing and grubbing operations, stone check dams shall be installed at any areas of concentrated flow. The maximum height of the check dam shall not exceed 2 feet. The center of the check dam shall be 6 inches below the outer edges of the dam. The contractor shall mulch the side slopes and install stone check dams for all newly excavated ditch lines within 24 hours of their creation.
- 2.1.7 Silt fence stake spacing shall not exceed 6 feet unless the fence is supported with 14-gauge wire in which case the maximum spacing shall not exceed 10 feet. The silt fence shall be “toed” into the ground.
- 2.1.8 Storm drain inlet protection shall be provided to storm drains using any of the following: hay bale drop inlet structures, silt fence drop inlet sediment filter, gravel and wire mesh drop inlet sediment filter, or curb inlet sediment filter. Barriers shall be inspected after every rainfall event and repaired as necessary. Sediments shall be removed when accumulation has reached  $\frac{1}{2}$  the design height.
- 2.1.9 Dust control shall be accomplished using any of the following: water, calcium chloride, stone, or an approved MDEP product. Dust control shall be applied as needed to accomplish dust control.
- 2.1.10 Temporary loam, seed, and mulching shall be used in areas where no other erosion control measure is used. Application rates for seeding are provided at the end of this report.
- 2.1.11 Stockpiles shall be stabilized within 7 days of formation unless a scheduled rain event occurs prior to the 7-day window, in which case the stockpile shall be stabilized prior to the rain event. Methods of stabilization shall be mulch, erosion control mix, or erosion control blankets/mats. Silt fence or a wood waste compost filter berm shall be placed downhill of any soil stockpile location.
- 2.1.12 For disturbance between November 1 and April 15, please refer to winter stabilization plan in this report and the Maine Erosion and Sediment Control BMP manual for further information.
- 2.1.13 It is of the utmost importance that stormwater runoff and potential sediment from the construction site be diverted around the proposed underdrains until the trench is backfilled.



## 2.2 Permanent Erosion Control Measures

The following permanent erosion control measures are intended for post disturbance areas of the project Permanent Erosion Control Measures shall also be in accordance with York or Cumberland County Soil and Water Conservation District and the Maine Soil and Water Conservation Commission.

2.2.1 All disturbed areas during construction, not subject to other proposed conditions, shall receive a minimum 4" of loam, limed, and mulched. Erosion control blankets or mats shall be placed over the mulch in areas noted in paragraph 4.1 of this report.

2.2.2 All stormwater devices shall be installed, and tributary areas stabilized prior receiving stormwater.

2.2.3 Refer to the Maine Erosion and Sediment Control BMP manual for additional information.

## 3.0 EROSION AND SEDIMENTATION CONTROL PLAN

3.1 The Erosion and Sedimentation Control Plan is included within the plan set.

## 4.0 DETAILS AND SPECIFICATIONS

4.1 Erosion Control Details and Specifications are included in the plan set.

## 5.0 STABILIZATION PLAN FOR WINTER CONSTRUCTION

Winter Construction consists of earthwork disturbance between the dates of November 1 and April 15. If a construction site is not stabilized with pavement, a road gravel base, 75% mature vegetation cover or riprap by November 15, then the site shall be protected with over-winter stabilization. Any area not stabilized with pavement, vegetation, mulching, erosion control mix, erosion control mats, riprap, or gravel base on a road shall be considered open.

The contractor shall limit the work area to areas that work will occur in during the subsequent 15 days and so that it can be mulched one day prior to a snow event. The contractor shall stabilize work areas prior to opening additional work areas to minimize areas without erosion control measures.

The following measures shall be implemented during winter construction periods:

### 5.1 Sediment Barriers

During frozen conditions, sediment barriers may consist of erosion control mix berms or any other recognized sediment barriers as frozen soil prevents the proper installation of hay bales or silt fences.



## 5.2 Mulching

All areas shall be considered to be denuded until 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. Erosion control mix must be applied with a minimum 4-inch thickness. 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 or adequately anchored so that ground surface is not visible through the mulch. Between the dates of November 1 and April 15, all mulch shall be anchored by either mulch netting, tracking or wood cellulose fiber. The cover will be considered sufficient when the ground surface is not visible through the mulch. After November 1<sup>st</sup>, mulch and anchoring of all exposed soil shall occur at the end of each final grading workday.

## 5.3 Soil Stockpiling

Stockpiles of soil or subsoil shall be mulched for over winter protection with hay or straw at twice the normal rate or with a four-inch layer of erosion control mix. This shall be done within 24 hours of stocking and re-established prior to any rainfall or snowfall.

## 5.4 Seeding

Between the dates of October 15<sup>th</sup> and April 1<sup>st</sup>, loam or seed shall 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 the final treatment can be applied. If the date is after November 1<sup>st</sup> and if the exposed area has not been loamed, final grading 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 placed prior to the placement of mulch or erosion control blankets. 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 75% 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.

## 5.5 Over winter stabilization of disturbed soils

By September 15<sup>th</sup>, all disturbed soils on areas having a slope less than 15% shall be seeded and mulched. If the disturbed areas are not stabilized by this date, then one of the following actions shall be taken to stabilize the soil for late fall and winter:



- Stabilize the soil with temporary vegetation – By October 1<sup>st</sup>, seed the disturbed soil with winter rye at a seeding rate of 3lbs per 1,000 s.f., lightly mulch the seeded soil with hay or straw at 75 lbs per 1,000 s.f., and anchor the mulch with plastic netting. Monitor growth of the rye over the next 30 days. If the rye fails to grow at least three inches or fails to cover at least 75% of the disturbed soil before November 1<sup>st</sup>, then mulch the area for over-winter protection.
- Stabilize the soil with sod – Stabilize the disturbed soil with properly installed sod by October 1<sup>st</sup>. Proper installation includes 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<sup>th</sup>, mulch the disturbed soil by spreading hay or straw at a rate of at least 150 lbs per 1,000 s.f. on the area so that no soil is visible through the mulch. Immediately after applying the mulch, anchor the mulch with plastic netting to prevent wind from moving the mulch off the disturbed soil.

#### 5.6 Over winter stabilization of disturbed slopes

All stone-covered slopes shall be constructed and stabilized by November 15<sup>th</sup>. All slopes to be vegetated shall be seeded and mulched by September 1<sup>st</sup>. A slope is considered a grade greater than 15%. If a slope to be vegetated is not stabilized by September 1<sup>st</sup>, then one of the following action shall be taken to stabilize the slope for late fall and winter:

- Stabilize the soil with temporary vegetation and erosion control mats – By October 1<sup>st</sup> the disturbed slope shall be seeded with winter rye at a seeding rate of 3 lbs per 1,000 s.f. and then install erosion control mats or anchored mulch over the seeding. If the rye fails to grow at least three inches or fails to cover at least 75% of the slope by November 1<sup>st</sup>, then the contractor shall cover the slope with a layer of erosion control mix or with stone riprap.
- Stabilize the soil with sod – The disturbed slope shall be stabilized with properly installed sod by October 1<sup>st</sup>. Proper installation includes the contractor 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 contractor shall not use late-season sod installation to stabilize slopes having a grade greater than 3H:1V or having groundwater seeps on the slope face.
- Stabilize the soil with erosion control mix – Erosion control mix shall be properly installed by November 15<sup>th</sup>. The contractor shall not use erosion control mix to stabilize slopes having grades greater than 2H:1V or having groundwater seeps on the slope face.
- Stabilize the soil with stone riprap – Place a layer of stone riprap on the slope by November 15<sup>th</sup>. A registered professional engineer shall be hired to determine the

stone size needed for stability on the slope and to design a filter layer for underneath the riprap.

## 6.0 INSPECTION AND MAINTENANCE

A person with knowledge of erosion and stormwater control, including the standards and conditions in the permit, shall conduct periodic visual inspections of installed erosion control measures. The frequency of inspection shall occur at least once every two weeks, as well as after a “storm event”. A “storm event” shall consist 0.5 inches of rain within a 24-hour period. The following Erosion and Sediment Control - Best Management Practices (BMP's) shall inspected in the manner as described.

### 6.1 Sediment Barriers

Hay bale barriers and filter berms shall be inspected and repaired for the following if there are any signs of erosion or sedimentation below them. If there are signs of undercutting at the center or the edges of the barrier, or impounding of large volumes of water behind them, sediment barriers shall be replaced with a temporary check dam. Should the fabric on a silt fence or filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier is still necessary, the fabric shall be replaced promptly. Sediment deposits should be removed when deposits reach approximately one-half the height of the barrier. Filter berms should be reshaped as needed. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required should be dressed to conform to the existing grade, prepared and seeded.

### 6.2 Stabilized Stone Construction Entrances

The exit shall be maintained in a condition that will prevent tracking of sediment onto public rights-of-way. When the control pad becomes ineffective, the stone shall be removed along with the collected soil material and redistributed on site in a stable manner. The entrance should then be reconstructed. The contractor shall sweep or wash pavement at exits, which have experienced mud-tracking on to the pavement or traveled way. When washing is required, it shall be done on an area stabilized with aggregate, which drains into an approved sediment trapping device. All sediment shall be prevented from entering storm drains, ditches, or waterways.

### 6.3 Mulched Areas

All mulches must be inspected periodically, in particular after rainstorms, to check for rill erosion. If less than 90% of the soil surface is covered by mulch, additional mulch shall be immediately applied. Nets must be inspected after rain events for dislocation or failure. If washouts or breakage occur, re-install the nets as necessary after repairing damage to the slope. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface. Repair as needed.





#### 6.4 Dust Control

When temporary dust control measures are used, repetitive treatment shall be applied as needed to accomplish control.

#### 6.5 Stormwater Appurtenances

All underdrains, storm drains, and catch basins need to be operating effectively and free of debris.

#### 6.6 Erosion and Sedimentation Control Inspections:

Acorn Engineering has personnel qualified to conduct Erosion and Sedimentation Control Inspections. For further information, contact:

Contact: Will Savage, PE  
Telephone: (207) 775-2655

Qualifications:

- Maine Professional Engineering License #11419
- Maine DEP - Certified in Maintenance & Inspection of Stormwater BMP's Cert #14
- Certified Erosion, Sediment and Storm Water Inspector (CESSWI) Cert #0293
- Certified Professional in Erosion and Sediment Control (CPESC) Cert. #4620

**The Contractor has sole responsibility for complying with the Erosion and Sedimentation Report/Plan, including control of fugitive dust. The Contractor shall be responsible for any monetary penalties resulting from failure to comply with these standards.**





## 7.0 IMPLEMENTATION SCHEDULE

The following implementation sequence is intended to maximize the effectiveness of the above described erosion control measures. Contractors should avoid overexposing disturbed areas and limit the amount of stabilization area.

1. Install a stabilized construction entrance in all locations where construction traffic will enter and exit the site.
2. Install perimeter erosion control berm with hay bale reinforcement
3. Install all other erosion control devices as necessary throughout the remainder of this schedule.
4. Commence earthwork operations, associated with the roadway construction.
5. Commence installation of any utility work.
6. Continue earthwork and grading to subgrade as necessary for construction.
7. Complete installation of utilities.
8. Complete remaining earthwork operations.
9. Install sub-base and base gravels in paved areas.
10. Install paving and curbing.
11. Loam, lime, fertilize, seed and mulch disturbed areas and complete all landscaping.
12. Once the site is stabilized, 90% catch of grass has been obtained, or mulching of landscape areas is complete, remove all temporary erosion control measures.
13. Touch up areas without a vigorous catch of grass with loam and seed.
14. Complete site signage and striping.

The above implementation sequence should be generally followed by the site contractor. However, the contractor may construct several items simultaneously. The contractor shall submit to the owner a schedule of the completion of the work. If the contractor is to commence the construction of more than one item above, they shall limit the amount of exposed areas to those areas in which work is expected to be undertaken during the following 30 days.

The contractor shall re-vegetate disturbed areas as rapidly as possible. All areas shall be permanently stabilized within 7 days of final grading or before a storm event. The contractor shall incorporate planned inlets and drainage systems as early as possible into the construction phase.

## 8.0 CONCLUSION

The above erosion control narrative is intended to minimize the development impact by implementing temporary and permanent erosion control measures. The contractor shall also refer to the Maine Erosion and Sediment Control BMP manual for additional information.

## 9.0 ATTACHMENTS

- Temporary Seeding Plan
- Permanent Seeding Plan



## TEMPORARY SEEDING PLAN

### Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

### Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

### Seeding

The composition and amount of temporary seed applied to a site shall be determined by the following table:

| Seed            | Pounds / 1,000 S.F. | Recommended Seeding Dates          |
|-----------------|---------------------|------------------------------------|
| Winter Rye      | 2.57                | Aug-15 to Oct-1                    |
| Oats            | 1.84                | Apr-1 to Jul-1<br>Aug-15 to Sep-15 |
| Annual Ryegrass | 0.92                | Apr-1 to Jul-1                     |
| Sudangrass      | 0.92                | May-15 to Aug-15                   |
| Perennial       | 0.92                | Aug-15 to Sep-15                   |

### Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a minimum depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

### Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to temporary seeding and mulching.

## PERMANENT SEEDING PLAN

### Site Preparation

The seeded areas shall be feasibly graded out to provide the use of equipment for seedbed preparation, seeding, mulch application, and mulch anchoring. If necessary, the site may require additional temporary erosion control measures outlined in the Erosion Control report.

### Seedbed Preparation

Fertilizer shall be applied to the site at a rate of 13.8 pounds per 1,000 square feet. The composition of the fertilizer shall be 10-10-10 (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O) or equivalent.

Limestone shall be applied to the site at a rate of 138 pounds per 1,000 square feet.

### Seeding

The composition and amount of permanent seed applied to a site shall be determined by the following table:

| Seed                | Pounds / 1,000 S.F. |
|---------------------|---------------------|
| Kentucky Bluegrass  | 0.46                |
| Creeping Red Fescue | 0.46                |
| Perennial Ryegrass  | 0.11                |
| Total               | 1.03                |

### Mulching

Mulch shall be applied at a rate of 70 lbs – 90 lbs per 1,000 square feet. The mulch shall be installed at a minimum depth of 4 inches. The seeded area shall be mulched immediately after seed is applied. Mulching during the winter season shall be double the normal amount.

### Recommendations

Permanent seeding is recommended to be completed in the spring. Later summer seeding is allowed if completed prior to September 1<sup>st</sup>. If seeding cannot be accomplished during the periods recommended for permanent seeding, then the contractor shall perform temporary seeding per the temporary seeding plan.

### Conclusion

Please refer to the Maine Erosion and Sediment Control BMP manual for additional information pertaining to permanent seeding and mulching.



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# SECTION 6

## TRAFFIC OVERVIEW



## Section 6: Traffic Overview

The proposed development is located at Enterprise Drive in Biddeford and features a three-story conditioned self-storage facility providing 465 storage units. The facility will be partially gated and provides 22 parking spaces for tenants within the gate, and three parking spaces to allow guests to access the facility office. The development will provide a paved two-way access road from West Cole Road to the facilities office and a formal one-way paved drive aisle within the gate for travel surrounding the facility. The preliminary trip generation for the proposed project has been estimated using the Institute of Transportation Engineers (ITE) “Trip Generation” 10<sup>th</sup> Edition publication. The land use utilized in the calculation is Mini-Warehouse (LUC 151) to estimate the trip generation and is defined as *“A mini-warehouse is a building in which a number of storage units or vaults are rented for the storage of goods. They are typically referred to as “self-storage” facilities. Each unit is physically separated from other units, and access is usually provided through an overhead door or other common access point.”*

In accordance with the City’s Land Development Regulations, Performance Standards for off-street parking and loading, Parking space requirements, the project parking demand requires 1 space for every 50 units of self-storage resulting in a total of 9.3 spaces required (1 space/50 units x 465 self-storage units). The project proposes to construct surface parking with 25 parking spaces to serve the development.

### **Trip Generation**

Trip generation is based upon tables presented in the tenth edition of the Institute of Transportation’s Engineers “TRIP GENERATION” manual. The following trip rates represent the weighted average number of vehicle trips entering or existing a development site. The following rates were applied to calculate the Peak Hour Trip Generation provided in Table 1. Please note that the peak trip generation is highlighted.

#### Land-Use #151: Mini-Warehouse

|                                  |                              |
|----------------------------------|------------------------------|
| Weekday AM Peak Hour (Street)    | = 0.10 trips/100 Sq. Ft GFA  |
| Weekday PM Peak Hour (Street)    | = 0.17 trips/100 Sq. Ft GFA  |
| Weekday AM Peak Hour (Generator) | = 0. 20 trips/100 Sq. Ft GFA |
| Weekday PM Peak Hour (Generator) | = 0.20 trips/100 Sq. Ft GFA  |
| Saturday Peak Hour (Generator)   | = 0.31 trips/100 Sq. Ft GFA  |
| Sunday Peak Hour (Generator)     | = 0.16 trips/100 Sq. Ft GFA  |

The average trip generation rates are based on the gross floor area of the building, based on the architectural plans prepared for this submission the gross floor area used for the calculation was 44,290 SF. Table 1 below provides a summary of the trip generation for the development. As the project is not expected to generate over 100 peak hour trips, a Traffic Movement Permit (TMP)



from the Maine Department of Transportation (MDOT) is not required.

| <b>Table 1 – Peak Hour Trip Generation</b> |                                  |
|--------------------------------------------|----------------------------------|
|                                            | <b>Peak Hour Trip Generation</b> |
| AM Peak Hour (Street)                      | 4 trips                          |
| PM Peak Hour (Street)                      | 8 trips                          |
| AM Peak Hour (Generator)                   | 9 trips                          |
| PM Peak Hour (Generator)                   | 9 trips                          |
| Saturday Peak Hour (Generator)             | 14 trips                         |
| Sunday Peak Hour (Generator)               | 7 trips                          |

As seen, the project represents a low-impact development from a traffic generation perspective.

---

# SECTION 7

## UTILITY SUMMARY



## **Section 7: Utilities Summary**

The project proposes to utilize existing infrastructure in the area and provides utility upgrades for various utility lines. Summaries of each utility are as follows:

### *Water:*

There is an existing 12" main within Alfred Street. The proposed development proposes a 12" by 8" tapping sleeve and 8" gate valve from the existing main to provide a sprinkler service for the development. A 2" water line is proposed to branch off the 8" line to serve as a domestic line with a curb stop at the property line. These lines will run through a proposed 25' Utility easement and connect to the proposed facility. The project will also reroute an existing 1" water line that feeds the Daycare. It should be noted that the adjacent landowner owns both Five Star Auto and the Daycare facility and recently sold the subject parcel to the Applicant, and has considered and verbally agreed to these easements which will be formally drafted as the project progresses.

### *Sewer:*

There is an existing 4" sewer line that runs through the property connecting from the abutting Daycare facility. This line is proposed to be relocated as part of this development. The line will remain a 4" sewer line and be directed through two manholes within the property. It is proposed to route a 4" sewer line from the proposed building to the second manhole on the property. This manhole will intercept both 4" sewer lines and provide a 6" line to connect to the existing SMH #3 within the City's sewer easement.

### *Stormwater:*

It is proposed to add a series of catch basins and drainage manholes throughout the development to collect stormwater. These catch basins will be connected through a storm drain network which will be routed to two underdrained subsurface sand filters providing cooling, attenuation, and treatment. These chambers will then be routed on an outlet control structure, slowly metering the discharge, and then daylight into an existing riprap channel and cross culvert through a proposed drainage easement.

### *Electric/Cable/Telephone:*

The existing overhead electric transmission lines on site are to remain untouched. It is proposed to extend the overhead 3-phase power from utility pole 503 on West Cole Road to a new proposed pole along West Cole Road. The proposed utility pole will drop 3-phase electric service underground to serve the proposed development along with telecom. These conduits will then be split at junction boxes and routed the building. The electric may be routed to a padmount transformer unless the final electric loads only necessitate a pole-mounted transformer to transfer the "primary" electric to usable "secondary" services.

### *Natural Gas:*

There is currently no natural gas connection proposed as part of this project. There is an existing 15' Gas Easement that runs throughout the site. This easement contains an existing 6" gas main that runs throughout the site. It is our understanding that a new proposed 8" gas main will be installed within the 15' easement and run through the site, to be built this

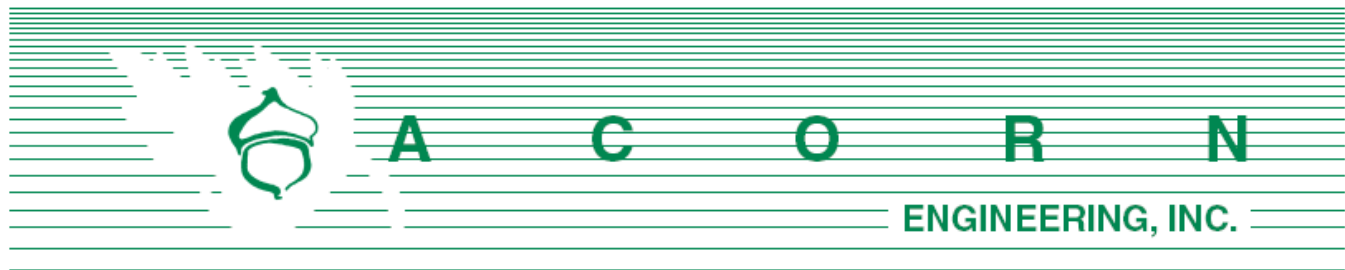




Spring. The approximate location of these is provided on the Utility Plan, Sheet C-20 and ongoing coordination continues with Unitil and their design engineer.

In addition to the summaries above, Ability to serve letters and/or correspondence has been sent out to the respective utility companies. Responses will be submitted to the Planning Department upon receipt. Included with this document is the request to the Department of Public Works.





City of Biddeford Department of Public Works  
 Attn: Mr. Tom Milligan, P.E.  
 205 Main Street  
 Biddeford, Maine 04005

March 22, 2022

Subject: 451 Alfred Street Self- Storage Redevelopment  
 Re: Sanitary Sewer - Ability to Serve

Mr. Milligan:

On behalf of SteelClad Biddeford, LLC, we are pleased to submit the following request for the City of Biddeford Department of Public Works ability to serve the proposed development. The project is located at 451 Alfred Street and is located between West Cole Road and Alfred Street (Map: 17 Lot: 7-2) in the I-3 Industrial Zone in Biddeford, Maine. The project proposes to repurpose the existing .5 acre gravel parking lot & 2.75 acre vacant land into a three-story 20,000 SF conditioned self-storage facility. The facility will be gated in and accessible through a one-way travel lane that varies in size surrounding the building. The facility proposes one office and two restrooms.

The existing sewer line runs along the North-West edge of the property of the site and has a 20' wide sewer easement. This line has an existing 4" connection to the abutting Daycare property at 1 Enterprise Drive. The development proposes to relocate this 4" line as well as provide an additional manhole and connection to the proposed building. A 6" proposed line is to connect into the existing manhole SMH #3 on the survey which shall then connect to the manhole as shown on the utility plan.

Based upon Section 4 of the *Maine Subsurface Wastewater Disposal Rules*, the table below outlines the proposed flow. Please note that flow calculated from the Day care facility is an estimate and is provided to show the net flow leading into the existing Sewer lateral.

| Estimate of Anticipated Daily Flows                                                                |                                      |                           |                          |                       |
|----------------------------------------------------------------------------------------------------|--------------------------------------|---------------------------|--------------------------|-----------------------|
| Development                                                                                        | Unit Size                            | Number of Units           | Gallons per Day per Unit | Total Gallons per Day |
| <b>Existing</b>                                                                                    |                                      |                           |                          |                       |
| Day care* (serving meals)                                                                          | 15 gpd per child<br>12 gpd per adult | 10- children<br>2- adults | 174                      | 174                   |
| <b>Proposed</b>                                                                                    |                                      |                           |                          |                       |
| Office (Employee at place of employment with no showers: 12 GPD per employee)                      | 2-Employee Max                       | 1                         | 24                       | 24                    |
| Total Gallons per Day (Proposed)                                                                   |                                      |                           |                          | 198                   |
| <b>Net Change</b>                                                                                  |                                      |                           |                          | <b>+ 24 GPD</b>       |
| <b>* The number of children and adults within the day care has been assumed for this analysis.</b> |                                      |                           |                          |                       |

Based on the assumptions in the above table, the proposed project is anticipated to increase the net water and

wastewater demand by approximately 24 gallons per day (GPD). It should be noted that these values were developed using conservative estimates from the State of Maine Subsurface Wastewater Disposal Rules.

On behalf of the client, we are requesting the following information:

1. Any additional information, such as utility mapping within West Cole Road and within the abutting stretch of Alfred Street, and/or existing service connections abutting the property.
2. Any proposed infrastructure improvements within the project vicinity.
3. Flow date for the hydrants in the vicinity.
4. DPW's ability to serve the project.

Attached is an Existing Conditions and Lot Division plan prepared by Northern Survey Engineering dated 8/17/21, last revised 1/31/22, and a proposed preliminary Utility Plan from our office to facilitate your review. Please do not hesitate to contact me or the office for any questions or clarifications.

Sincerely,



Sam Lebel, P.E.  
Project Manager  
Acorn Engineering, Inc.



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# SECTION 8

## PUBLIC SAFETY

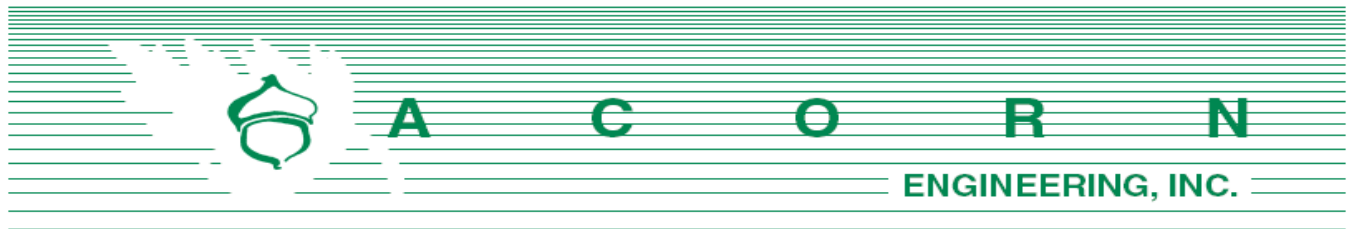


## **Section 8: Public Safety Letter of Approvals**

Please refer to the attached letters that were recently sent to the Fire and Police Departments. Responses from the Fire and Police Departments will be provided to the Planning Department upon receipt.

The project has been designed to provide safe illumination levels and can facilitate a 47' fire truck maneuvering the entire site, providing access to all four sides of the building.





Biddeford Police Dept.  
Attn: Roger P. Beaupre, Chief of Police  
39 Alfred St  
Biddeford, ME 04005

March 21<sup>st</sup>, 2022

Subject: 451 Alfred Street Self- Storage Development – Biddeford, ME  
Re: Letter of Approval

Mr. Beaupre:

On behalf of SteelClad Biddeford, LLC we are pleased to submit the following request for a letter of approval as required by the City of Biddeford Site Plan application. The proposed project is located on Enterprise Drive, between West Cole Road and Alfred Street (Map: 17 Lot: 7-2-1) in the I-3 Industrial Zone in Biddeford, Maine. The project proposes a three-story 20,000 SF conditioned self-storage facility. The facility will be gated and will provide 23 parking spaces for tenants within the gate, and 3 parking spaces to allow guests to access the facility office. The development will provide a paved two-way access road from West Cole Road to the facilities office and a formal one-way paved drive aisle within the gate for travel surrounding the facility.

The facility will provide a knox box for emergency vehicles to access the site. Once within the gate the facility can be accessed from all sides of the building and was designed to accommodate a circulation of a 47' fire truck.

The lighting plan has been designed to provide consistent and appropriate lighting throughout the site. Overall, the project proposes multiple wall pack lighting fixtures along the facility and four new light poles along the paved roadway. Accessways for emergency vehicles will be maintained and generally provide ample opportunity to access the site. Overall, we feel the proposed plan will improve public safety by increasing the lighting and increasing the occupancy of the buildings.

We would also request your input on the desired addressing for this new lot. It currently fronts Alfred St and West Cole Rd with access of West Cole and a proposed private driveway name of Enterprise Drive.

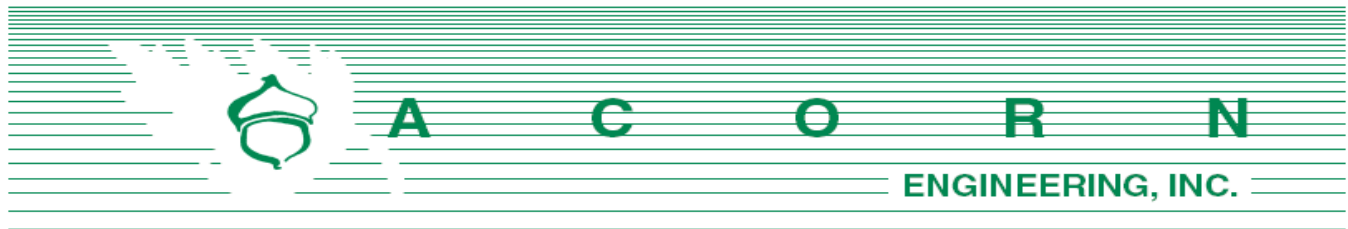
Please do not hesitate to contact me for any questions or clarifications.

Sincerely,

Samuel J. Lebel, P.E.  
Project Manager  
Acorn Engineering, Inc.



A C O R N Engineering, Inc. • [www.acorn-engineering.com](http://www.acorn-engineering.com)  
207-775-2655 • PO Box 3372 • Portland • Maine • 04104



Biddeford Fire Dept.  
Attn: Mr. Scott Gagne, Chief of Fire Department  
152 Alfred St  
Biddeford, ME 04005

March 21<sup>st</sup>, 2022

Subject: 451 Alfred Street Self- Storage Development – Biddeford, ME  
Re: Letter of Approval

Mr. Gagne:

On behalf of SteelClad Biddeford, LLC we are pleased to submit the following request for a letter of approval as required by the City of Biddeford Site Plan application. The proposed project is located on Enterprise Drive, between West Cole Road and Alfred Street (Map: 17 Lot: 7-2-1) in the I-3 Industrial Zone in Biddeford, Maine. The project proposes a three-story 20,000 SF conditioned self-storage facility. The facility will be gated in providing 23 parking spaces for tenants within the gate, and 3 parking spaces to allow guests to access the facility office. The development will provide a paved two-way access road from West Cole Road to the facilities office and a formal one-way paved drive aisle within the gate for travel surrounding the facility. The building will be sprinkled, tapping off the main in Alfred Street.

The facility will provide a knox box for emergency vehicles to access the site. Once within the gate the facility can be accessed from all sides of the building and was designed to accommodate a circulation of a 47' fire truck.

Please let me know if you have any questions or if you would like additional information from the sprinkler designer or code summaries from the architect.

Sincerely,

Samuel J. Lebel, P.E.  
Project Manager  
Acorn Engineering, Inc.

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# SECTION 9

## LIGHTING





## **9. Lighting**

Please see attached for the photometric plan and cut sheets. At this time, the lighting program is simple in nature with sidewalk lighting and typical modest downlit 3000k LED wall packs at the entrances.



Swaney Lighting  
PO Box 1597  
Scarborough ME 04070  
Phone: (207) 883-7100  
Fax: (207) 885-9606

Job Name  
CONDITIONED SELF STORAGE  
BIDDEFORD, ME

Submittal Date  
March 23rd, 2022



# Transmittal

Swaney Lighting

PO Box 1597

Scarborough ME 04070

Phone: (207) 883-7100

From: Therese "TC" Freeman X-103

Project **CONDITIONED SELF-STORAGE BIDDEFORD**

Location BIDDEFORD, ME

Contact:

ATTACHED WE ARE SENDING YOU 1 COPY OF THE FOLLOWING ITEM:

- |                                   |                                                |        |
|-----------------------------------|------------------------------------------------|--------|
| <input type="checkbox"/> Drawings | <input type="checkbox"/> Specifications        | Other: |
| <input type="checkbox"/> Prints   | <input type="checkbox"/> Information           |        |
| <input type="checkbox"/> Plans    | <input checked="" type="checkbox"/> Submittals |        |

THESE ARE TRANSMITTED FOR:

- |                                                |                                                   |                                 |
|------------------------------------------------|---------------------------------------------------|---------------------------------|
| <input type="checkbox"/> Prior Approval        | <input type="checkbox"/> Resubmittal for Approval | <input type="checkbox"/> Record |
| <input checked="" type="checkbox"/> Approval   | <input type="checkbox"/> Corrections              | Bids due on:                    |
| <input type="checkbox"/> Approval as Submitted | <input type="checkbox"/> Your Use                 | Other:                          |
| <input type="checkbox"/> Approval as Noted     | <input type="checkbox"/> Review and Comment       |                                 |

| Type | MFG                                              | Part                                            |
|------|--------------------------------------------------|-------------------------------------------------|
| A2   | BEACON PRODUCTS                                  | <a href="#">VP-S/24L-55/3K7/2/UNV/A/BC/***</a>  |
| A2   | BEACON PRODUCTS                                  | <a href="#">SSSB15-40A-1-B3-***</a>             |
|      | <b>Item Note:</b> 15FT POLE ON FLUSH ANCHOR BASE |                                                 |
| A4   | BEACON PRODUCTS                                  | <a href="#">VP-S/24L-55/3K7/4W/UNV/A/BC/***</a> |
| A4   | BEACON PRODUCTS                                  | <a href="#">SSSB15-40A-1-B3-***</a>             |
|      | <b>Item Note:</b> 15FT POLE ON FLUSH ANCHOR BASE |                                                 |
| W4   | Hubbell Outdoor                                  | <a href="#">LNC2-9L-3K-070-4-U-***</a>          |

|                                                                                  |                                                        |                                                          |                           |
|----------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|---------------------------|
| Submitted by Swaney Lighting                                                     | <b>Job Name:</b><br>CONDITIONED SELF-STORAGE BIDDEFORD | <b>Catalog Number:</b><br>VP-S/24L-55/3K7/2/UNV/A/BC/*** | <b>Type:</b><br><b>A2</b> |
|  |                                                        | <b>Notes:</b>                                            | SLA21-50001               |



## VIPER S

SMALL VIPER LUMINAIRE

### FEATURES

- Small size companion to Viper Large
- Wide choice of different LED wattage configurations
- Nine optical distributions
- Designed to replace HID lighting up to 400W MH or HPS
- Suitable for wet locations



See Certification Specifications

### CONTROL TECHNOLOGY



### SPECIFICATIONS

#### CONSTRUCTION

- Corrosion resistant, die-cast aluminum housing with powder coat paint finish rated for 1000 hour salt spray.
- External hardware is corrosion resistant

#### OPTICS

- Cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one-piece optical system
- One-piece silicone gasket ensures a weatherproof seal around each individual optic
- One-piece optical cartridge system consisting of an LED engine, optics, gasket and stainless steel bezel

#### INSTALLATION

- Mounting options for horizontal arm, vertical tenon or traditional arm mounting available. Mounting hardware included

#### ELECTRICAL

- Luminaire accepts 100V through 277V, 347V or 480V input 50 Hz to 60 Hz (UNV)
- Ambient operating temperature -40°C to 25°C
- Power factor is  $\geq .90$  at full load
- Dimming Drivers are standard and dimming leads are extended out of the luminaire unless control options require connection to the dimming leads. Must specify if wiring leads are to be greater than the 6" standard.

#### ELECTRICAL (CONTINUED)

- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is certified by UL for use at 600VAC at 90°C or higher
- Plug disconnects are certified by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only
- Fixture electrical compartment contains all LED driver components
- Optional 7-pin ANSI C136.41-2013 Twist-Lock® photo control receptacle available. Compatible with ANSI C136.41 external wireless control devices
- Surge protection: 20kA
- Lifeshield™ Circuit ([see Electrical Data](#))

#### CONTROLS

- Available with an optional passive infrared (PIR) motion sensor capable of detecting motion 360° around the luminaire. When no motion is detected for the specified time, the motion response system reduces the wattage to factory preset level, reducing the light level accordingly. When motion is detected by the PIR sensor, the luminaire returns to full wattage and full light output. Please contact Beacon Products if project requirements vary from standard configuration
- Available with [Energeni](#) for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night

## STRIKE



### RELATED PRODUCTS

Ø [Viper Large](#)

#### CONTROLS (CONTINUED)

- In addition, Viper can be specified with [SiteSync™ wireless control system](#) for reduction in energy and maintenance costs while optimizing light quality 24/7
- Please consult brand or sales representative when combining control and electrical options as some combinations may not operate as anticipated depending on your application

#### CERTIFICATIONS

- DLC® (DesignLights Consortium) Qualified. Please refer to the DLC website for specific product qualifications at [www.designlights.org](http://www.designlights.org)
- Certified to UL 1598 and UL 8750
- 3G rated for ANSI C136.31 high vibration applications with MAF mounting
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 04/23/2020. See [Buy American Solutions](#).

#### WARRANTY

- 5 year warranty
- See [HLI Commercial and Industrial Outdoor Lighting Warranty](#) for additional information

| KEY DATA                   |              |
|----------------------------|--------------|
| Lumen Range                | 4,045–16,216 |
| Wattage Range              | 39–136       |
| Efficacy Range (LPW)       | 100–124      |
| Reported Life (Hours)      | L70>60,000   |
| Input Current Range (Amps) | 0.1–1.1      |

|                              |                                                 |                                                   |                    |
|------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------|
| Submitted by Swaney Lighting | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/2/UNV/A/BC/*** | Type:<br><b>A2</b> |
|                              |                                                 | Notes:                                            | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ORDERING GUIDE

Example: VPS-24L-55-4K7-4W-UNV-A-DBT-TL-GENI-04-BC

CATALOG #

| VPS                    | LED Engine                     | CCT/CRI <sup>7</sup>     | Distribution                    | Rotation                                   | Voltage             |
|------------------------|--------------------------------|--------------------------|---------------------------------|--------------------------------------------|---------------------|
| <b>Series</b>          |                                |                          |                                 |                                            |                     |
| <b>VPS</b> Viper Small | <b>24L-39</b> 39W, LED array   | <b>3K7</b> 3000K, 70 CRI | <b>FR</b> Type 1/Front Row      | <b>Blank</b> No rotation                   | <b>UNV</b> 120-277V |
|                        | <b>24L-55</b> 55W, LED array   | <b>4K7</b> 4000K, 70 CRI | <b>2</b> Type 2                 | <b>L</b> Optic rotation left <sup>5</sup>  | <b>347</b> 347V     |
|                        | <b>36L-65</b> 65W, LED array   | <b>5K7</b> 5000K, 70 CRI | <b>3</b> Type 3                 | <b>R</b> Optic rotation right <sup>5</sup> | <b>480</b> 480V     |
|                        | <b>36L-80</b> 80W, LED array   |                          | <b>4F (formerly 4)</b> Type 4   |                                            |                     |
|                        | <b>48L-110</b> 110W, LED array |                          | <b>4W</b> Type 4 Wide           |                                            |                     |
|                        | <b>60L-136</b> 136W, LED array |                          | <b>5QM</b> Type 5QM             |                                            |                     |
|                        |                                |                          | <b>5R</b> Type 5R (rectangular) |                                            |                     |
|                        |                                |                          | <b>5W</b> Type 5W (round wide)  |                                            |                     |
|                        |                                |                          | <b>TC</b> Tennis Court          |                                            |                     |
|                        |                                |                          | <b>CR</b> Corner Right          |                                            |                     |
|                        |                                |                          | <b>CL</b> Corner Left           |                                            |                     |

| Mounting                                                                                        | Specify Std. finish                   | Network Control Options                                                                                                | Options                                                     |
|-------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>A</b> Rectangular Arm (formerly RA) for square or round pole                                 | <b>Color</b>                          | <b>NXWE</b> NX Wireless Enabled (module + radio)                                                                       | <b>BC</b> Backshield (available for FR, 2, 3, 4, 4W Optics) |
| <b>A3</b> Arm for round pole 3.5" - 4.13" OD                                                    | <b>BLT</b> Black Matte Textured       | <b>NXSPW_F</b> Nx Wireless, PIR Occ. Sensor, Daylight Harvesting <sup>7</sup>                                          | <b>CD</b> Continuous Dimming                                |
| <b>A4</b> Arm for round pole 4.18" - 5.25" OD                                                   | <b>BLS</b> Black Gloss Smooth         | <b>WIR</b> Wireless Controls, wiSCAPE                                                                                  | <b>F</b> Fusing                                             |
| <b>A5</b> Arm for round pole 5.5" - 6.5" OD                                                     | <b>DBT</b> Dark Bronze Matte Textured | <b>SWP</b> SiteSync Pre-Commission <sup>1,4</sup>                                                                      | <b>TB</b> Terminal Block                                    |
| <b>MAF</b> Mast Arm Fitter (formerly SF2) for 2 3/8" OD horizontal arm                          | <b>DBS</b> Dark Bronze Gloss Smooth   | <b>SWPM_F</b> SiteSync Pre-Commission w/ Sensor <sup>1,2,4</sup>                                                       |                                                             |
| <b>K</b> Knuckle (formerly PK2) limit to 30° tilt or 2 3/8" OD horizontal arm or vertical tenon | <b>GTT</b> Graphite Matte Textured    | <b>Control Options</b>                                                                                                 |                                                             |
| <b>WB</b> Wall Bracket                                                                          | <b>LGS</b> Light Grey Gloss Smooth    | <b>GENI-XX</b> ENERGENI <sup>3</sup>                                                                                   |                                                             |
| <b>AD</b> Universal Arm for square pole                                                         | <b>PSS</b> Platinum Silver Smooth     | <b>7PR</b> 7-Pin Receptacle only (shorting cap, photo control, or wireless control provided by others)                 |                                                             |
| <b>AD3</b> Adapter for 2.4"-4.1" round pole                                                     | <b>WHT</b> White Matte Textured       | <b>7PR-SC</b> 7-Pin Receptacle w/Shorting Cap                                                                          |                                                             |
| <b>AD4</b> Adapter for 4.2"-5.3" round pole                                                     | <b>WHS</b> White Gloss Smooth         | <b>7PR-TL</b> 7-Pin Receptacle w/Twist-Lock <sup>8</sup> photo control                                                 |                                                             |
| <b>AD5</b> Adapter for 5.5"-5.9" round pole                                                     | <b>VGT</b> Verde Green Textured       | <b>Sensors</b>                                                                                                         |                                                             |
| <b>AD6</b> Adapter for 6.0"-6.5" round pole                                                     | <b>Color Option</b>                   | <b>BTS_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens <sup>7</sup>                             |                                                             |
|                                                                                                 | <b>CC</b> Custom Color                | <b>BTSO_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens, up to 12' mounting height <sup>8</sup> |                                                             |
|                                                                                                 |                                       | <b>NXSP_F</b> NX, PIR Occ. Sensor, Daylight Harvesting <sup>7</sup>                                                    |                                                             |
|                                                                                                 |                                       | <b>SCP/_F</b> Programmable Occupancy Sensor w/ daylight control <sup>1,2,6</sup>                                       |                                                             |

| House Side Shield Accessories                |                           |
|----------------------------------------------|---------------------------|
| <input type="checkbox"/> HSS/VP-S/90-FB/XXX  | 90° shield front or back  |
| <input type="checkbox"/> HSS/VP-S/90-LR/XXX  | 90° shield left or right  |
| <input type="checkbox"/> HSS/VP-S/270-FB/XXX | 270° shield front or back |
| <input type="checkbox"/> HSS/VP-S/270-LR/XXX | 270° shield left or right |
| <input type="checkbox"/> HSS/VP-S/360/XXX    | Full shield               |

Replace XXX with notation for desired finish color. Refer to page 8 for shield images.

| Mounting Accessories                 |                                         |
|--------------------------------------|-----------------------------------------|
| <input type="checkbox"/> VPL-AD-RPA3 | 2.4"-4.1" Round Pole Adapter for AD arm |
| <input type="checkbox"/> VPL-AD-RPA4 | 4.2"-5.3" Round Pole Adapter for AD arm |
| <input type="checkbox"/> VPL-AD-RPA5 | 5.5"-5.9" Round Pole Adapter for AD arm |
| <input type="checkbox"/> VPL-AD-RPA6 | 6.0"-6.5" Round Pole Adapter for AD arm |

#### Notes:

- Not available with other wireless control or sensor options
- Specify mounting height; 8 = 8' or less, 40 = 14' to 30'
- Specify routine setting code (example GENI-04). See [ENERGENI brochure and instructions](#) for setting table and options. Not available with sensor or SiteSync options
- Specify group and zone at time of order. See [www.hubbelllighting.com/sitesync](#) for further details. Order at least one SiteSync interface accessory SWUSB or SWTAB. Each option contains SiteSync License, GUI, and Bridge Node
- Only available with FR, 2, 3, 4, 4W and 5R distributions
- Specify mounting height; 8=8'; 30=30'
- Replace ".\_" with "14" for up to 14' mounting height, "40F" for 15-40' mounting height
- Replace ".\_" with "12" for up to 12' mounting height

|                                                                                  |                                                 |                                                   |                    |
|----------------------------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------|
| Submitted by Swaney Lighting                                                     | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/2/UNV/A/BC/*** | Type:<br><b>A2</b> |
|  |                                                 | Notes:                                            | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ORDERING GUIDE (CONTINUED)

#### Accessories and Services (Ordered Separately)

- ☐ **SCP-REMOTE** Remote Control for SCP/\_F option. Order at least one per project to program and control the occupancy sensor
- ☐ **SWUSB\*** SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node
- ☐ **SWTAB\*** Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node
- ☐ **SWBRG** SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested
- ☐ **SW7PR+** SiteSync 7-Pin on fixture module On/Off/Dim, Daylight Sensor 120-480VAC
- ☐ **BIRD-SPIKE-3** Bird Spikes

\* When ordering SiteSync at least one of these two interface options must be ordered per project.  
+ Available as a SiteSync retrofit solution for fixtures with an existing 7-pin receptacle.

#### Hubbell Control Solutions — Accessories (Sold Separately)

##### NX Distributed Intelligence™

- ☐ **NXOFM-1R1D-UNV** On-fixture Module (7-pin), On / Off / Dim, Daylight Sensor with HubbellNET Radio and Bluetooth® Radio, 120-480VAC

##### wiSCAPE® Lighting Control

- ☐ **WIR-RME-L** On-fixture Module (7-pin or 5-pin), On / Off / Dim, Daylight Sensor with wiSCAPE Radio, 110-480VAC

For additional information related to these accessories please visit [www.hubbellcontrolsolutions.com](http://www.hubbellcontrolsolutions.com). Options provided for use with integrated sensor, please view specification sheet ordering information table for details.

### CONTROLS

#### SiteSync — Precommissioned Ordering Information:

When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project location, Group information, and Operating schedules. For more detailed information please visit [the SiteSync family page on our website](http://the SiteSync family page on our website) or contact Hubbell Lighting tech support at 864-678-1000.



SiteSync fixtures with Motion control (SWPM) require the mounting height of the fixture for selection of the lens.

Examples: VP-L/80L-235/4K7/3/UNV/A/DB/SWP/      SiteSync only  
VP-L/80L-235/4K7/3/UNV/A/DB/SWPM-40F/      SiteSync with Motion Control

#### SiteSync 7-Pin Module:

- SiteSync features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)
- Does not interface with occupancy sensors



SW7PR

#### NX Distributed Intelligence™ Lighting Controls:

Supports both indoor and outdoor applications in a variety of deployment options: wired, wireless and hybrid. Integrates with and enables a wide array of luminaires including those with SpectraSync Color Tuning Technology.



| NX Integrated Controls Reference |        |             |            |           |                     |               |                |                            |
|----------------------------------|--------|-------------|------------|-----------|---------------------|---------------|----------------|----------------------------|
| NX Option                        | Sensor | Networkable | Scheduling | Occupancy | Daylight Harvesting | 0-10V Dimming | On/off Control | Bluetooth® App Programming |
| <b>NX Networked – Wireless</b>   |        |             |            |           |                     |               |                |                            |
| <a href="#">NXOFM-1R1D-UNV</a>   | SCLNX  | Yes         | Yes        | Yes       | Yes                 | Yes           | Yes            | Yes, Bluetooth App         |

#### wiSCAPE™:

Supports remote management, monitoring and metering of outdoor wireless lighting applications such as smart campuses, smart cities, parking lots and roadways.



| wiSCAPE Reference           |           |             |            |           |                     |               |                |                            |
|-----------------------------|-----------|-------------|------------|-----------|---------------------|---------------|----------------|----------------------------|
| wiSCAPE Option              | Sensor    | Networkable | Scheduling | Occupancy | Daylight Harvesting | 0-10V Dimming | On/off Control | Bluetooth® App Programming |
| <b>Networked – Wireless</b> |           |             |            |           |                     |               |                |                            |
| <a href="#">WIR-RME-L</a>   | WIR-RME-L | Yes         | Yes        | No        | Yes                 | Yes           | Yes            | wiSCAPE Gateway            |



|                              |                                                 |                                                   |                    |
|------------------------------|-------------------------------------------------|---------------------------------------------------|--------------------|
| Submitted by Swaney Lighting | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/2/UNV/A/BC/*** | Type:<br><b>A2</b> |
|                              |                                                 | Notes:                                            | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### DELIVERED LUMENS

| # of LEDs | DRIVE CURRENT (mA) | SYSTEM WATTS | DISTRIBUTION TYPE | 5K<br>(5000K nominal, 70 CRI) |     |   |   |   | 4K<br>(4000K nominal, 70 CRI) |     |   |   |   | 3K<br>(3000K nominal, 70 CRI) |     |   |   |   |
|-----------|--------------------|--------------|-------------------|-------------------------------|-----|---|---|---|-------------------------------|-----|---|---|---|-------------------------------|-----|---|---|---|
|           |                    |              |                   | LUMENS                        | LPW | B | U | G | LUMENS                        | LPW | B | U | G | LUMENS                        | LPW | B | U | G |
| 24        | 500mA              | 39W          | FR                | 4689                          | 120 | 1 | 0 | 0 | 4665                          | 120 | 1 | 0 | 0 | 4432                          | 114 | 1 | 0 | 0 |
|           |                    |              | 2                 | 4523                          | 116 | 1 | 0 | 1 | 4500                          | 115 | 1 | 0 | 1 | 4275                          | 110 | 1 | 0 | 1 |
|           |                    |              | 3                 | 4436                          | 114 | 1 | 0 | 1 | 4414                          | 113 | 1 | 0 | 1 | 4194                          | 108 | 1 | 0 | 1 |
|           |                    |              | 4F                | 4362                          | 112 | 1 | 0 | 2 | 4340                          | 111 | 1 | 0 | 2 | 4123                          | 106 | 0 | 0 | 2 |
|           |                    |              | 4W                | 4280                          | 110 | 1 | 0 | 2 | 4258                          | 109 | 1 | 0 | 2 | 4045                          | 104 | 1 | 0 | 2 |
|           |                    |              | 5QM               | 4442                          | 114 | 2 | 0 | 1 | 4420                          | 113 | 2 | 0 | 1 | 4199                          | 108 | 2 | 0 | 0 |
|           |                    |              | 5R                | 4472                          | 115 | 2 | 0 | 2 | 4450                          | 114 | 2 | 0 | 2 | 4227                          | 108 | 2 | 0 | 2 |
|           |                    |              | 5W                | 4335                          | 112 | 3 | 0 | 1 | 4336                          | 111 | 3 | 0 | 1 | 4114                          | 105 | 3 | 0 | 1 |
|           |                    |              | TC                | 4561                          | 117 | 1 | 0 | 1 | 4538                          | 116 | 1 | 0 | 1 | 4311                          | 111 | 1 | 0 | 1 |
|           |                    |              | CL                | 4758                          | 122 | 1 | 0 | 2 | 4758                          | 122 | 1 | 0 | 2 | 4329                          | 111 | 1 | 0 | 1 |
|           |                    |              | CR                | 4773                          | 122 | 1 | 0 | 2 | 4773                          | 122 | 1 | 0 | 2 | 4361                          | 112 | 1 | 0 | 1 |
|           |                    |              | FR                | 6357                          | 118 | 1 | 0 | 1 | 6486                          | 120 | 1 | 0 | 1 | 5804                          | 107 | 1 | 0 | 1 |
| 24        | 700 mA             | 55W          | 2                 | 6132                          | 114 | 1 | 0 | 1 | 6257                          | 116 | 1 | 0 | 2 | 5599                          | 104 | 1 | 0 | 1 |
|           |                    |              | 3                 | 6015                          | 111 | 1 | 0 | 2 | 6137                          | 114 | 1 | 0 | 2 | 5492                          | 102 | 1 | 0 | 2 |
|           |                    |              | 4F                | 5921                          | 110 | 1 | 0 | 2 | 6034                          | 112 | 1 | 0 | 2 | 5400                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 5793                          | 108 | 1 | 0 | 2 | 5909                          | 110 | 1 | 0 | 2 | 5272                          | 98  | 1 | 0 | 2 |
|           |                    |              | 5QM               | 6022                          | 112 | 2 | 0 | 1 | 6145                          | 114 | 2 | 0 | 1 | 5499                          | 102 | 2 | 0 | 1 |
|           |                    |              | 5R                | 6063                          | 112 | 3 | 0 | 3 | 6187                          | 115 | 3 | 0 | 3 | 5536                          | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 5908                          | 109 | 3 | 0 | 1 | 6028                          | 112 | 3 | 0 | 1 | 5908                          | 102 | 3 | 0 | 1 |
|           |                    |              | TC                | 6183                          | 113 | 1 | 0 | 1 | 6309                          | 118 | 1 | 0 | 1 | 5645                          | 105 | 1 | 0 | 1 |
|           |                    |              | CL                | 6707                          | 122 | 1 | 0 | 2 | 6707                          | 122 | 1 | 0 | 2 | 6117                          | 111 | 1 | 0 | 2 |
|           |                    |              | CR                | 6729                          | 122 | 1 | 0 | 2 | 6729                          | 122 | 1 | 0 | 2 | 6143                          | 112 | 1 | 0 | 2 |
|           |                    |              | FR                | 7864                          | 121 | 1 | 0 | 1 | 8041                          | 124 | 1 | 0 | 1 | 7189                          | 111 | 1 | 0 | 1 |
|           |                    |              | 2                 | 7586                          | 117 | 1 | 0 | 2 | 7757                          | 119 | 1 | 0 | 2 | 6934                          | 107 | 1 | 0 | 2 |
| 36        | 560 mA             | 65W          | 3                 | 7441                          | 114 | 1 | 0 | 2 | 7609                          | 117 | 1 | 0 | 2 | 6802                          | 105 | 1 | 0 | 2 |
|           |                    |              | 4F                | 7317                          | 110 | 1 | 0 | 2 | 7482                          | 112 | 1 | 0 | 2 | 6688                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 8690                          | 108 | 1 | 0 | 2 | 8864                          | 110 | 1 | 0 | 2 | 7908                          | 98  | 1 | 0 | 2 |
|           |                    |              | 5QM               | 7450                          | 115 | 3 | 0 | 1 | 7618                          | 117 | 3 | 0 | 1 | 6810                          | 105 | 3 | 0 | 1 |
|           |                    |              | 5R                | 7501                          | 115 | 3 | 0 | 3 | 7670                          | 118 | 3 | 0 | 3 | 6857                          | 105 | 3 | 0 | 3 |
|           |                    |              | 5W                | 7309                          | 112 | 3 | 0 | 2 | 7473                          | 115 | 3 | 0 | 2 | 6681                          | 103 | 3 | 0 | 1 |
|           |                    |              | TC                | 7540                          | 116 | 1 | 0 | 1 | 7694                          | 118 | 1 | 0 | 1 | 7694                          | 122 | 1 | 0 | 2 |
|           |                    |              | CL                | 8179                          | 126 | 2 | 0 | 2 | 8179                          | 126 | 2 | 0 | 2 | 7467                          | 115 | 1 | 0 | 2 |
|           |                    |              | CR                | 8205                          | 126 | 2 | 0 | 2 | 8205                          | 126 | 2 | 0 | 2 | 7492                          | 115 | 1 | 0 | 2 |
|           |                    |              | FR                | 9535                          | 118 | 1 | 0 | 1 | 9730                          | 120 | 1 | 0 | 1 | 8706                          | 107 | 1 | 0 | 1 |
|           |                    |              | 2                 | 9197                          | 114 | 1 | 0 | 2 | 9385                          | 116 | 1 | 0 | 2 | 8398                          | 104 | 1 | 0 | 2 |
|           |                    |              | 3                 | 9022                          | 111 | 1 | 0 | 2 | 9206                          | 114 | 1 | 0 | 2 | 8238                          | 102 | 1 | 0 | 2 |
| 36        | 700 mA             | 80W          | 4F                | 8871                          | 110 | 1 | 0 | 2 | 9052                          | 112 | 1 | 0 | 2 | 8100                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 11587                         | 108 | 1 | 0 | 3 | 11819                         | 110 | 1 | 0 | 3 | 10544                         | 98  | 1 | 0 | 3 |
|           |                    |              | 5QM               | 9033                          | 112 | 3 | 0 | 1 | 9217                          | 114 | 3 | 0 | 1 | 8248                          | 102 | 3 | 0 | 1 |
|           |                    |              | 5R                | 9095                          | 112 | 3 | 0 | 3 | 9280                          | 115 | 3 | 0 | 3 | 8304                          | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 8861                          | 109 | 3 | 0 | 2 | 9043                          | 112 | 3 | 0 | 2 | 8092                          | 100 | 3 | 0 | 2 |
|           |                    |              | TC                | 9275                          | 115 | 1 | 0 | 1 | 9464                          | 118 | 1 | 0 | 1 | 8468                          | 105 | 1 | 0 | 1 |
|           |                    |              | CL                | 10060                         | 126 | 2 | 0 | 2 | 10060                         | 126 | 2 | 0 | 2 | 9184                          | 115 | 2 | 0 | 2 |
|           |                    |              | CR                | 10093                         | 126 | 2 | 0 | 2 | 10093                         | 126 | 2 | 0 | 2 | 9215                          | 115 | 2 | 0 | 2 |
|           |                    |              | FR                | 12713                         | 118 | 1 | 0 | 1 | 12973                         | 120 | 2 | 0 | 1 | 11608                         | 107 | 1 | 0 | 1 |
|           |                    |              | 2                 | 12263                         | 114 | 2 | 0 | 2 | 12513                         | 116 | 2 | 0 | 2 | 11197                         | 104 | 2 | 0 | 2 |
|           |                    |              | 3                 | 12029                         | 111 | 2 | 0 | 2 | 12275                         | 114 | 2 | 0 | 2 | 10984                         | 102 | 1 | 0 | 2 |
|           |                    |              | 4F                | 11828                         | 110 | 1 | 0 | 3 | 12069                         | 112 | 1 | 0 | 3 | 10800                         | 100 | 1 | 0 | 2 |
| 48        | 700 mA             | 110W         | 4W                | 11609                         | 108 | 1 | 0 | 3 | 11841                         | 110 | 1 | 0 | 3 | 10564                         | 98  | 1 | 0 | 3 |
|           |                    |              | 5QM               | 12044                         | 112 | 3 | 0 | 2 | 12290                         | 114 | 3 | 0 | 2 | 10997                         | 102 | 3 | 0 | 1 |
|           |                    |              | 5R                | 12126                         | 112 | 3 | 0 | 3 | 12374                         | 115 | 3 | 0 | 3 | 11072                         | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 12126                         | 109 | 4 | 0 | 2 | 12057                         | 112 | 4 | 0 | 2 | 10789                         | 100 | 4 | 0 | 2 |
|           |                    |              | RC                | 12366                         | 115 | 1 | 0 | 2 | 12619                         | 118 | 1 | 0 | 1 | 11290                         | 105 | 1 | 0 | 2 |
|           |                    |              | CL                | 13414                         | 122 | 2 | 0 | 3 | 13414                         | 122 | 2 | 0 | 3 | 12246                         | 111 | 2 | 0 | 2 |
|           |                    |              | CR                | 13458                         | 122 | 2 | 0 | 3 | 13458                         | 122 | 2 | 0 | 3 | 12287                         | 112 | 2 | 0 | 2 |
|           |                    |              | FR                | 15891                         | 117 | 2 | 0 | 2 | 16216                         | 120 | 2 | 0 | 2 | 14511                         | 107 | 2 | 0 | 1 |
|           |                    |              | 2                 | 15329                         | 113 | 2 | 0 | 2 | 15642                         | 116 | 2 | 0 | 2 | 13997                         | 103 | 2 | 0 | 2 |
|           |                    |              | 3                 | 15037                         | 111 | 2 | 0 | 3 | 15344                         | 113 | 2 | 0 | 3 | 13730                         | 101 | 2 | 0 | 3 |
|           |                    |              | 4F                | 14784                         | 109 | 1 | 0 | 3 | 15086                         | 111 | 1 | 0 | 3 | 13500                         | 100 | 1 | 0 | 3 |
|           |                    |              | 4W                | 14802                         | 109 | 2 | 0 | 3 | 15104                         | 112 | 2 | 0 | 3 | 13515                         | 100 | 2 | 0 | 3 |
| 60        | 700 mA             | 136W         | 5QM               | 15055                         | 111 | 3 | 0 | 2 | 15362                         | 114 | 3 | 0 | 2 | 13747                         | 102 | 3 | 0 | 2 |
|           |                    |              | 5R                | 15158                         | 112 | 4 | 0 | 4 | 15469                         | 114 | 4 | 0 | 4 | 13841                         | 102 | 4 | 0 | 4 |
|           |                    |              | 5W                | 14781                         | 109 | 4 | 0 | 2 | 15083                         | 111 | 4 | 0 | 2 | 13495                         | 100 | 4 | 0 | 2 |
|           |                    |              | TC                | 15458                         | 115 | 1 | 0 | 2 | 15834                         | 118 | 1 | 0 | 2 | 14113                         | 105 | 1 | 0 | 2 |
|           |                    |              | CL                | 16768                         | 123 | 3 | 0 | 3 | 16768                         | 123 | 3 | 0 | 3 | 15309                         | 113 | 2 | 0 | 3 |
|           |                    |              | CR                | 16823                         | 124 | 3 | 0 | 3 | 16823                         | 124 | 3 | 0 | 3 | 15359                         | 113 | 2 | 0 | 3 |

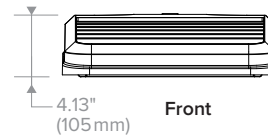
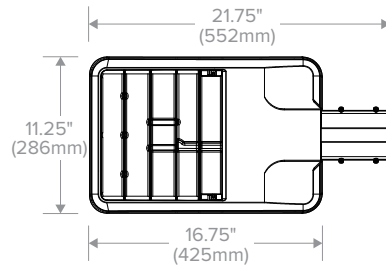
**VIPER S**

SMALL VIPER LUMINAIRE

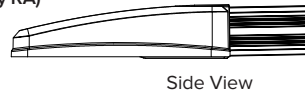
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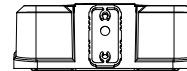
CATALOG #: \_\_\_\_\_

**DIMENSIONS**

|               |                      |
|---------------|----------------------|
| <b>Weight</b> | 15.0 lbs<br>(6.8 kg) |
| <b>EPA</b>    | .67 ft <sup>2</sup>  |

**A Arm (formerly RA)**

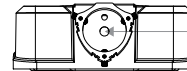
Side View



Back View

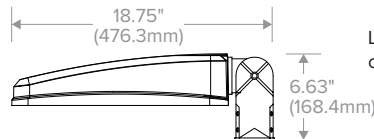
**MAF (formerly SF2)**

Side View

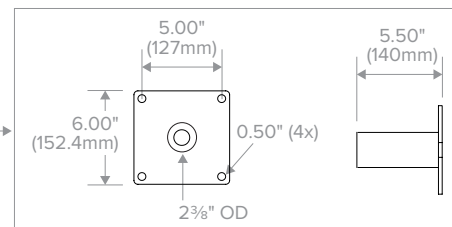
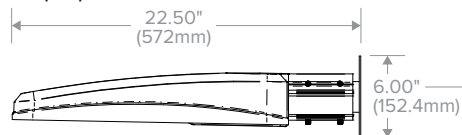
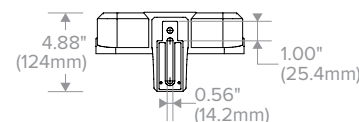
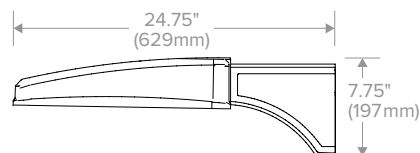


Back View

Accepts 2 3/8" OD tenon, min 5" long.

**2 3/8" Adjustable Knuckle (K) (formerly PK2)**

Limit to 30° tilt. Sensor, photocell and wireless controls should not be tilted above horizontal.

**Wall Bracket (WB)****AD Decorative Arm**See [page 9](#) for mounting details.



**VIPER S**

SMALL VIPER LUMINAIRE

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

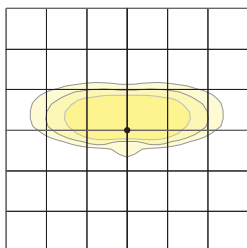
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CATALOG #: \_\_\_\_\_

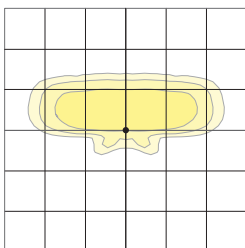
**PHOTOMETRY**

The following diagrams represent the general distribution options offered for this product. For detailed information on specific product configurations, see [website photometric test reports](#).

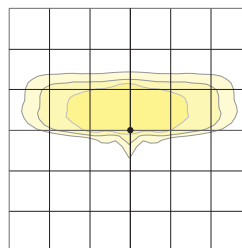
Type FR – Front Row/Auto Optic



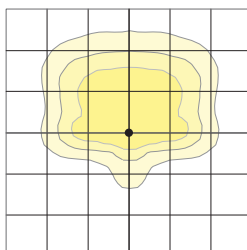
Type 2



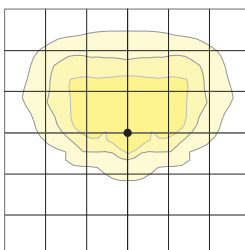
Type 3



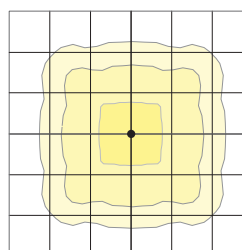
Type 4



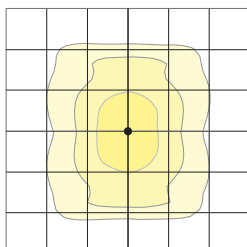
Type 4 Wide



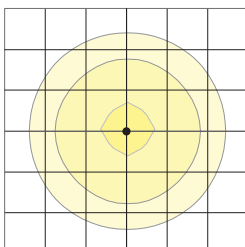
Type 5QM



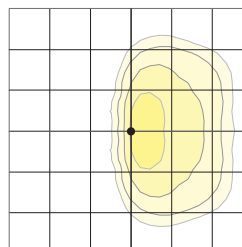
Type 5R (rectangular)



Type 5W (round wide)



Type TC



|                                                                                  |                                                        |                                                          |                               |
|----------------------------------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------|-------------------------------|
| Submitted by Swaney Lighting                                                     |                                                        | <b>Catalog Number:</b><br>VP-S/24L-55/3K7/2/UNV/A/BC/*** | <b>Type:</b><br><br><b>A2</b> |
|  | <b>Job Name:</b><br>CONDITIONED SELF-STORAGE BIDDEFORD | <b>Notes:</b>                                            | SLA21-50001                   |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ELECTRICAL DATA

| # OF LEDS | NUMBER OF DRIVERS | DRIVE CURRENT (mA) | INPUT VOLTAGE (V) | SYSTEM POWER (w) | CURRENT (Amps) |
|-----------|-------------------|--------------------|-------------------|------------------|----------------|
| 24        | 1                 | 500 mA             | 120               | 39               | 0.33           |
|           |                   |                    | 277               |                  | 0.14           |
|           |                   |                    | 347               |                  | 0.11           |
|           |                   |                    | 480               |                  | 0.08           |
|           |                   |                    | 120               |                  | 0.5            |
| 24        | 1                 | 700 mA             | 277               | 55               | 0.2            |
|           |                   |                    | 347               |                  | 0.2            |
|           |                   |                    | 480               |                  | 0.1            |
|           |                   |                    | 120               |                  | 0.65           |
|           |                   |                    | 277               |                  | 0.28           |
| 36        | 1                 | 525 mA             | 347               | 65               | 0.22           |
|           |                   |                    | 480               |                  | 0.16           |
|           |                   |                    | 120               |                  | 0.7            |
|           |                   |                    | 277               |                  | 0.3            |
|           |                   | 700 mA             | 347               | 80               | 0.2            |
|           |                   |                    | 480               |                  | 0.2            |
|           |                   |                    | 120               |                  | 0.9            |
|           |                   |                    | 277               |                  | 0.4            |
| 48        | 1                 | 700 mA             | 347               | 110              | 0.3            |
|           |                   |                    | 480               |                  | 0.2            |
|           |                   |                    | 120               |                  | 1.1            |
|           |                   |                    | 277               |                  | 0.5            |
| 60        | 1                 | 700 mA             | 347               | 136              | 0.4            |
|           |                   |                    | 480               |                  | 0.3            |
|           |                   |                    | 120               |                  | 1.1            |
|           |                   |                    | 277               |                  | 0.5            |

| PROJECTED LUMEN MAINTENANCE |   |        |        |                              |         |                        |
|-----------------------------|---|--------|--------|------------------------------|---------|------------------------|
| Ambient Temp.               | 0 | 25,000 | 50,000 | TM-21-11 60,000 <sup>1</sup> | 100,000 | Calculated L70 (HOURS) |
| 25°C / 77°C                 | 1 | 0.97   | 0.95   | 0.95                         | 0.92    | >377,000               |

<sup>1</sup> Projected per IESNA TM-21-11.

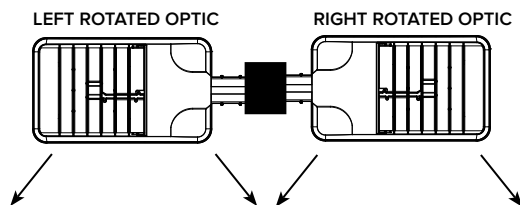
Data references the extrapolated performance projections for the 60 LED base model in a 25°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

### LIFESHIELD™ CIRCUIT

Protects luminaire from excessive temperature. The device activates at a specific, factory-preset temperature and progressively reduces power over a finite temperature range. Operation is smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply or faulty wiring connection to the drivers. The device can co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.)

### ADDITIONAL INFORMATION

#### ROTATION OPTIONS





## VIPER S

SMALL VIPER LUMINAIRE

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_

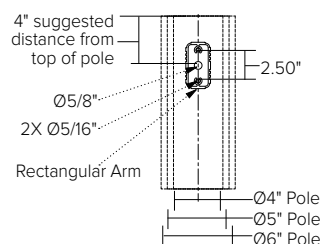
CATALOG #: \_\_\_\_\_

## ADDITIONAL INFORMATION (CONTINUED)

## DRILL PATTERN

## RECTANGULAR ARM (A)

Compatible with Pole drill pattern B3



## EPA

| Config.  | EPA  |
|----------|------|
| 1        | .67  |
| 2 @ 90°  | 1.06 |
| 2 @ 180° | 1.34 |

| Config.  | EPA  |
|----------|------|
| 3 @ 120° | 1.68 |
| 3 @ 90°  | 1.73 |
| 4 @ 90°  | 2.12 |

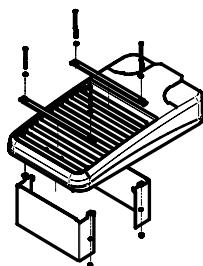
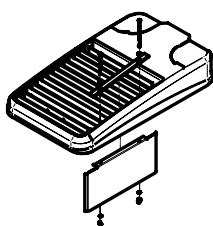
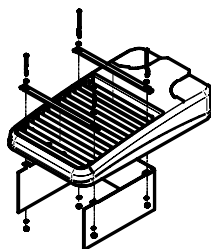
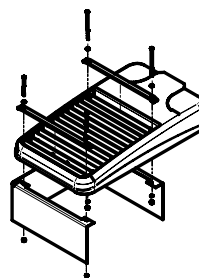
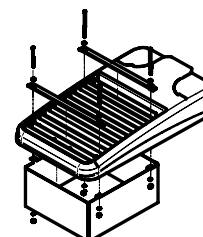
## TENON TOP POLE BRACKET ACCESSORIES (ORDER SEPARATELY)

(2 3/8" OD tenon)

## TENON TOP POLE BRACKET ACCESSORIES (Order Separately)

- ☐ SETAVP-XX Square tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
- ☐ RETAVP-XX Round tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
- ☐ SETA2XX Square tenon adapter (4 at 90°) for AD - Universal Arm mounting option only
- ☐ RETA2XX Round tenon adapter (4 at 90°) for AD3 - Universal Arm mounting option only

## HOUSE SIDE SHIELD FIELD INSTALL ACCESSORIES

HSS/VP-S/90-FB/XXX  
90° shield front or back  
(2 shields shown)HSS/VP-S/90-LR/XXX  
90° shield left or right  
(1 shield shown in left orientation)HSS/VP-S/270-FB/XXX  
270° shield front or back  
(1 shield shown in back orientation)HSS/VP-S/270-LR/XXX  
270° shield left or right  
(1 shield shown in right orientation)HSS/VP-S/360/XXX  
Full shield  
(1 shield shown)

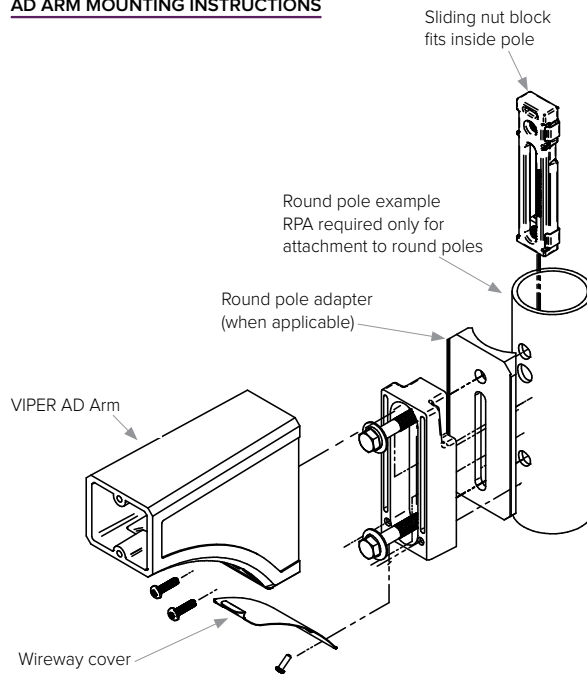
**VIPER S**

SMALL VIPER LUMINAIRE

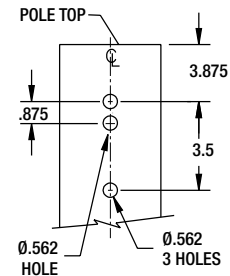
DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_

CATALOG #: \_\_\_\_\_

**ADDITIONAL INFORMATION (CONTINUED)****AD ARM MOUNTING INSTRUCTIONS****DECORATIVE ARM (AD)**

Compatible with pole drill pattern S2





Job Name:  
CONDITIONED SELF-  
STORAGE BIDDEFORD

Catalog Number:  
SSSB15-40A-1-B3-\*\*\*

Notes: 15FT POLE ON FLUSH ANCHOR  
BASE

Type:

A2

SLA21-50001

## SSS-B SERIES POLES

SQUARE STRAIGHT STEEL

Cat.#

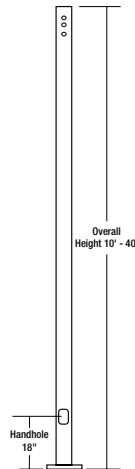
Job

Type



**BEACON**  
design · performance · technology

Approvals



### APPLICATIONS

- Lighting installations for side and top mounting of luminaires with effective projected area (EPA) not exceeding maximum allowable loading of the specified pole in its installed geographic location

### CONSTRUCTION

- SHAFT:** One-piece straight steel with square cross section, flat sides and minimum 0.23" radius on all corners; Minimum yield of 46,000 psi (ASTM-A500, Grade B); Longitudinal weld seam to appear flush with shaft side wall; Steel base plate with axial bolt circle slots welded flush to pole shaft having minimum yield of 36,000 psi (ASTM A36)
- BASE COVER:** Two-piece square aluminum base cover included standard
- POLE CAP:** Pole shaft supplied with removable cover when applicable; Tenon and post-top configurations also available
- HAND HOLE:** Rectangular 3x5 steel hand hole frame (2.38" x 4.38" opening); Mounting provisions for grounding lug located behind gasketed cover
- ANCHOR BOLTS:** Four galvanized anchor bolts provided per pole with minimum yield of 55,000 psi (ASTM F1554). Galvanized hardware with two washers and two nuts per bolt for leveling

Anchor bolt part numbers: 3/4 x 30 x 3 — TAB-30-M38

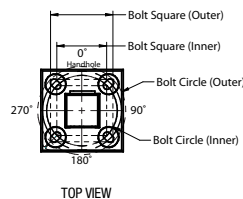
1 x 36 x 4 — TAB-36-M38

### FINISH

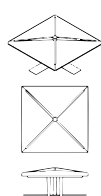
- Durable thermoset polyester powder coat paint finish with nominal 3.0 mil thickness
- Powder paint prime applied over "white metal" steel substrate cleaned via mechanical shot blast method
- Decorative finish coat available in multiple standard colors; Custom colors available; RAL number preferable

### WAREHOUSE 'STOCKED' POLES:

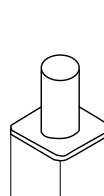
- SSSH20-40A-4-HV-DB-RDC, SSSH25-40A-4-HV-DB-RDC and SSSH30-50B-4-HV-DB-RDC
- The HV designation in the above catalog numbers is a combination drill pattern of the Hubbell Outdoor S2 pattern and the Beacon B3/B4 Viper pattern (rectangular arm mounting)



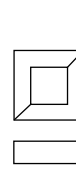
### POLE CAP



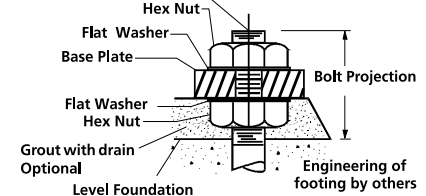
### TENON



### BASE COVER



### BASE DETAIL



### ORDERING INFORMATION

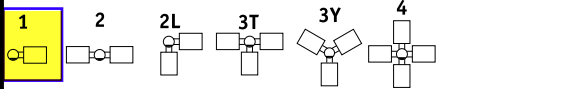
ORDERING EXAMPLE:

Reference page 2 for available configurations

SSS - B - 25 - 40 - A/B/C - 2L - B3 - BLT - UL

| SERIES                                         | HEIGHT                                           | SHAFT                                            | THICKNESS                                       | MOUNTING                                                                                                                                                                                                                                                                                                                                                                     | Specify Std. finish                                                                                                                                                                                                                                                                                                                                                                                                      | OPTIONS                                                                                                                                                                                                                                                                                              |
|------------------------------------------------|--------------------------------------------------|--------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>SSS-B</b> Square Straight Steel Pole Beacon | Reference page 2<br>Ordering matrix<br><b>15</b> | Reference page 2<br>Ordering matrix<br><b>40</b> | Reference page 2<br>Ordering matrix<br><b>A</b> | <b>1</b> Single arm mount<br><b>2</b> Two fixtures at 180°<br><b>2L</b> Two fixtures at 90°<br><b>3T</b> Three fixtures at 90°<br><b>4</b> Four fixtures at 90°<br><b>TA</b> Tenon (2.38" OD x 4" Tall)<br><b>TB</b> Tenon (2.88" OD x 4" Tall)<br><b>TC</b> Tenon (3.5" OD x 6" Tall)<br><b>TR</b> Removable Tenon (2.375 x 4.25)<br><b>OT</b> Open Top (includes pole cap) | <b>BLT</b> Black Matte Textured<br><b>BLS</b> Black Gloss Smooth<br><b>DBT</b> Dark Bronze Matte Textured<br><b>DBS</b> Dark Bronze Gloss Smooth<br><b>GTT</b> Graphite Matte Textured<br><b>LGS</b> Light Grey Gloss Smooth<br><b>PSS</b> Platinum Silver Smooth<br><b>WHT</b> White Matte Textured<br><b>WHS</b> White Gloss Smooth<br><b>VG</b> Verde Green Textured<br><b>Color Option</b><br><b>CC</b> Custom Color | <b>GFF</b> 20 Amp GFCI Receptacle and Cover<br><b>EHH</b> Extra Handhole<br><b>C05</b> .5" Coupling<br><b>C07</b> .75" Coupling<br><b>C20</b> 2" Coupling<br><b>MPB</b> Mid-pole Luminaire Bracket<br><b>VM2</b> 2nd mode vibration damper<br><b>LAB</b> Less Anchor Bolts<br><b>UL</b> UL Certified |

### MOUNTING ORIENTATION



- Removable tenon used in conjunction with side arm mounting. First specify desired arm configuration followed by the "TR" notation. Example: SSS-B-25-40-A-1-B1-TR-BBT
- Specify option location using logic found on page 2 (Option Orientation)
- VM1 recommended on poles 20' and taller with EPA of less than 1.

### ACCESSORIES - Order Separately

| Catalog Number   | Description               |
|------------------|---------------------------|
| VM1 <sup>3</sup> | 1st mode vibration damper |
| VM2SXX           | 2nd mode vibration damper |

### DRILL PATTERN

- B1** Cruiser, "AM" arm  
**B3** 2 bolt (2-1/2" spacing), Viper "A" arm  
**S2** 2 bolt (3-1/2" spacing), Viper "AD" arm



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Due to our continued efforts to improve our products, product specifications are subject to change without notice.

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SSS-B POLES-SPEC

JULY 28, 2020 8:45 AM



**HUBBELL**  
Lighting

223



Job Name:  
CONDITIONED SELF-  
STORAGE BIDDEFORD

Catalog Number:  
SSSB15-40A-1-B3-\*\*\*

Notes: 15FT POLE ON FLUSH ANCHOR  
BASE

Type:

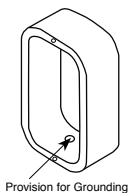
A2

SLA21-50001

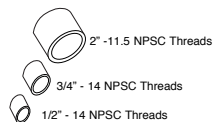
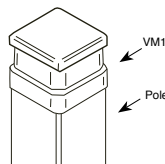
## ORDERING INFORMATION Cont.

| Catalog Number      | Height |        | Nominal<br>Shaft Dimensions | Wall<br>Thickness | Bolt Circle<br>(suggested) | Bolt Circle<br>(range) | Bolt Square<br>(range) | Base Plate<br>Square | Anchor bolt size | Bolt Projection | Pole weight |
|---------------------|--------|--------|-----------------------------|-------------------|----------------------------|------------------------|------------------------|----------------------|------------------|-----------------|-------------|
|                     | Feet   | Meters |                             |                   |                            |                        |                        |                      |                  |                 |             |
| SSS-B-10-40-A-XX-XX | 10     | 3.0    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 77          |
| SSS-B-12-40-A-XX-XX | 12     | 3.7    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 90          |
| SSS-B-14-40-A-XX-XX | 14     | 4.3    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 103         |
| SSS-B-16-40-A-XX-XX | 16     | 4.9    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 116         |
| SSS-B-18-40-A-XX-XX | 18     | 5.5    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 129         |
| SSS-B-20-40-A-XX-XX | 20     | 6.1    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 142         |
| SSS-B-25-40-A-XX-XX | 25     | 7.6    | 4" square                   | 0.125"            | 9"                         | 8" - 10"               | 5.66" - 7.07"          | 9"                   | 3/4" x 30" x 3"  | 3.5             | 175         |
| SSS-B-14-40-B-XX-XX | 14     | 4.3    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 152         |
| SSS-B-16-40-B-XX-XX | 16     | 4.9    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 171         |
| SSS-B-18-40-B-XX-XX | 18     | 5.5    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 190         |
| SSS-B-20-40-B-XX-XX | 20     | 6.1    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 209         |
| SSS-B-25-40-B-XX-XX | 25     | 7.6    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 257         |
| SSS-B-30-40-B-XX-XX | 30     | 9.1    | 4" square                   | .188"             | 11"                        | 10" - 12"              | 7.07" - 8.48"          | 10.50"               | 3/4" x 30" x 3"  | 3.5             | 304         |
| SSS-B-16-50-B-XX-XX | 16     | 4.9    | 5" square                   | .188"             | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 219         |
| SSS-B-18-50-B-XX-XX | 18     | 5.5    | 5" square                   | .188"             | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 243         |
| SSS-B-20-50-B-XX-XX | 20     | 6.1    | 5" square                   | .188"             | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 267         |
| SSS-B-25-50-B-XX-XX | 25     | 7.6    | 5" square                   | .188"             | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 327         |
| SSS-B-30-50-B-XX-XX | 30     | 9.1    | 5" square                   | .188"             | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 387         |
| SSS-B-25-50-C-XX-XX | 25     | 7.6    | 5" square                   | .25"              | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 427         |
| SSS-B-30-50-C-XX-XX | 30     | 9.1    | 5" square                   | .25"              | 11"                        | 10.25" - 13.25"        | 7.25" - 9.37"          | 11.50"               | 1" x 36" x 4"    | 4.5             | 507         |
| SSS-B-20-60-B-XX-XX | 20     | 6.1    | 6" square                   | .188"             | 12"                        | 11.00" - 13.25"        | 7.81" - 9.37"          | 12.25"               | 1" x 36" x 6"    | 4.5             | 329         |
| SSS-B-25-60-B-XX-XX | 25     | 7.6    | 6" square                   | .188"             | 12"                        | 11.00" - 13.25"        | 7.81" - 9.37"          | 12.25"               | 1" x 36" x 6"    | 4.5             | 404         |
| SSS-B-30-60-B-XX-XX | 30     | 9.1    | 6" square                   | .188"             | 12"                        | 11.00" - 13.25"        | 7.81" - 9.37"          | 12.25"               | 1" x 36" x 6"    | 4.5             | 479         |
| SSS-B-35-60-B-XX-XX | 35     | 10.7   | 6" square                   | .188"             | 12"                        | 11.00" - 13.25"        | 7.81" - 9.37"          | 12.25"               | 1" x 36" x 6"    | 4.5             | 554         |
| SSS-B-40-60-B-XX-XX | 40     | 12.2   | 6" square                   | .188"             | 12"                        | 11.00" - 13.25"        | 7.81" - 9.37"          | 12.25"               | 1" x 36" x 6"    | 4.5             | 629         |

NOTE: Factory supplied template must be used when setting anchor bolts. Beacon Products will deny any claim for incorrect anchorage placement resulting from failure to use factory supplied template and anchor bolts.

EHH - EXTRA  
HANDHOLE

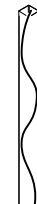
Provision for Grounding

C05 - C07 - C20 -  
COUPLINGVM1 - VIBRATION DAMPER  
1ST MODE

Field Installed Pole Top damper designed to reduce pole top deflection or sway. VM1 is recommended for pole systems 25' and taller with a total EPA of 1.0 or less.

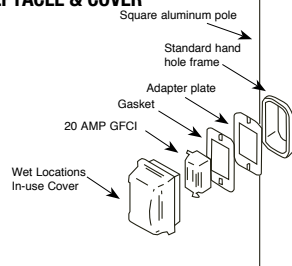
VM2 - VIBRATION DAMPER  
2ND MODE

Factory installed, internal damper designed to alter pole resonance to reduce movement and material fatigue caused by 2nd mode vibration.

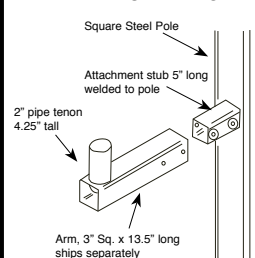
VM2SXX - VIBRATION DAMPER  
2ND MODE

VM2S08 - 8'  
VM2S12 - 12'  
VM2S16 - 16'  
VM2S20 - 20'  
VM2S24 - 24'

Field installed, internal damper designed to alter pole resonance to reduce movement and material fatigue caused by 2nd mode vibration.

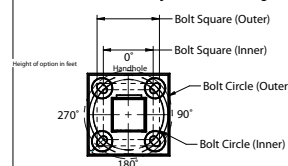
GFI - 20 AMP GFCI  
RECEPTACLE & COVERWet Locations  
In-use Cover

## MPB - MID POLE BRACKET



## OPTION ORIENTATION

Follow the logic below when ordering location specific options. For each option, include its orientation (in degrees) and its height (in feet). Example: Option C07 should be ordered as: SSS-B-20-40-A-TA-DB-C05-0-15 (.5" coupling on the handhole/arm side of pole, 15 feet up from the pole base) 1' spacing required between option. Consult factory for other configurations.



For more information about pole vibration and vibration dampers, please consult [https://hubbellcdn.com/ohwassets/HLL/outdoor/resources/literature/files/Pole\\_Wind\\_Induced\\_Flyer\\_HL010022.pdf](https://hubbellcdn.com/ohwassets/HLL/outdoor/resources/literature/files/Pole_Wind_Induced_Flyer_HL010022.pdf)  
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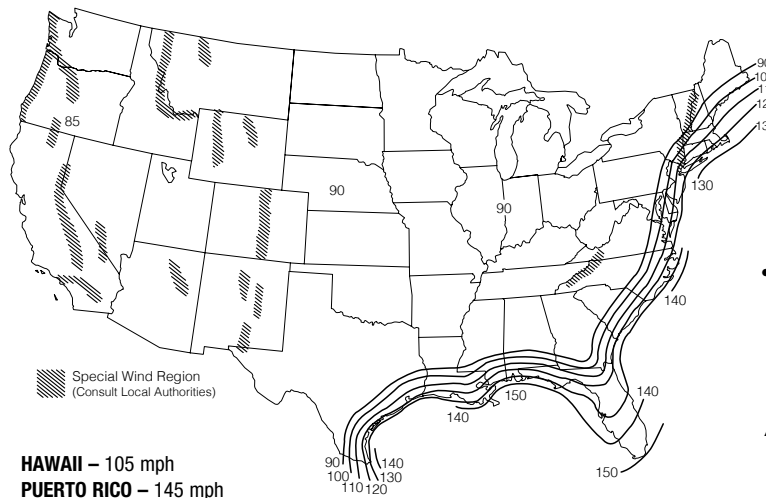
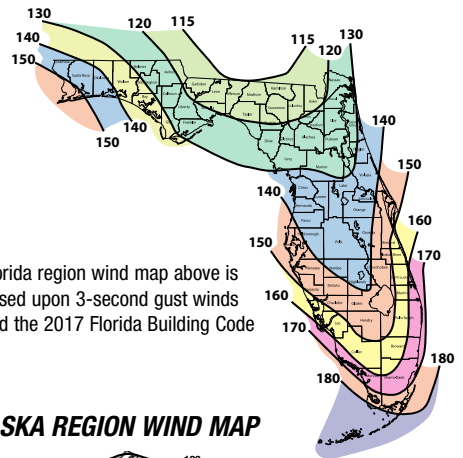
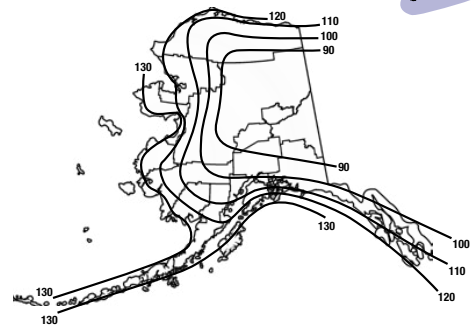
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HUBBELL  
Lighting

SSS-B POLES-SPEC

JULY 28, 2020 8:45 AM

**ASCE7-05 WIND MAP**
**HAWAII – 105 mph**  
**PUERTO RICO – 145 mph**
**FLORIDA REGION WIND MAP****ALASKA REGION WIND MAP**

| ASCE 7-05 wind map EPA Load Rating - 3 second gust wind speeds<br>(Use for all locations except Florida) |      |      |      |      |      |      |      |      |      |      |
|----------------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|------|------|
| Catalog Number                                                                                           | 85   | 90   | 100  | 105  | 110  | 120  | 130  | 140  | 145  | 150  |
| SSS-B-10-40-A                                                                                            | 25.0 | 25.0 | 25.0 | 22.8 | 20.6 | 17.0 | 14.2 | 11.9 | 11.0 | 10.1 |
| SSS-B-12-40-A                                                                                            | 25.0 | 25.0 | 20.0 | 18.0 | 16.1 | 13.2 | 10.8 | 8.9  | 8.1  | 7.4  |
| SSS-B-14-40-A                                                                                            | 23.1 | 20.4 | 16.1 | 14.3 | 12.8 | 10.2 | 8.2  | 6.6  | 5.9  | 5.3  |
| SSS-B-16-40-A                                                                                            | 19.0 | 16.7 | 13.0 | 11.5 | 10.1 | 7.9  | 6.2  | 4.7  | 4.1  | 3.6  |
| SSS-B-18-40-A                                                                                            | 15.6 | 13.6 | 10.0 | 9.0  | 7.8  | 5.9  | 4.4  | 3.1  | 2.6  | 2.1  |
| SSS-B-20-40-A                                                                                            | 12.7 | 10.9 | 7.9  | 6.9  | 5.9  | 4.2  | 2.8  | 1.7  | 1.3  | 0.9  |
| SSS-B-25-40-A                                                                                            | 7.3  | 5.9  | 3.8  | 2.9  | 2.1  | 0.8  | NR   | NR   | NR   | NR   |
| SSS-B-14-40-B                                                                                            | 25.0 | 25.0 | 23.3 | 20.8 | 18.6 | 15.1 | 12.3 | 10.2 | 9.2  | 8.4  |
| SSS-B-16-40-B                                                                                            | 25.0 | 24.9 | 19.4 | 17.3 | 15.4 | 12.3 | 9.9  | 8.0  | 7.2  | 6.4  |
| SSS-B-18-40-B                                                                                            | 24.0 | 20.8 | 16.1 | 14.2 | 12.5 | 9.8  | 7.7  | 6.1  | 5.3  | 4.7  |
| SSS-B-20-40-B                                                                                            | 20.2 | 17.5 | 13.2 | 11.6 | 10.1 | 7.7  | 5.9  | 4.4  | 3.8  | 3.2  |
| SSS-B-25-40-B                                                                                            | 12.8 | 11.0 | 7.9  | 6.7  | 5.5  | 3.7  | 2.3  | 1.2  | 0.7  | NR   |
| SSS-B-30-40-B                                                                                            | 8.0  | 6.6  | 4.1  | 3.1  | 2.2  | 0.8  | NR   | NR   | NR   | NR   |
| SSS-B-16-50-B                                                                                            | 25.0 | 25.0 | 25.0 | 25.0 | 24.8 | 20.1 | 16.5 | 13.6 | 12.3 | 11.2 |
| SSS-B-18-50-B                                                                                            | 25.0 | 25.0 | 25.0 | 22.9 | 20.4 | 16.4 | 13.2 | 10.7 | 9.6  | 8.6  |
| SSS-B-20-50-B                                                                                            | 25.0 | 25.0 | 21.3 | 18.9 | 16.7 | 13.2 | 10.4 | 8.1  | 7.2  | 6.3  |
| SSS-B-25-50-B                                                                                            | 20.7 | 17.8 | 13.3 | 11.5 | 9.8  | 7.2  | 5.0  | 3.3  | 2.6  | 1.9  |
| SSS-B-30-50-B                                                                                            | 13.5 | 11.3 | 7.7  | 6.2  | 4.9  | 2.8  | 1.1  | NR   | NR   | NR   |
| SSS-B-25-50-C                                                                                            | 25.0 | 25.0 | 19.4 | 17.1 | 15.1 | 11.7 | 9.0  | 6.9  | 6.0  | 5.1  |
| SSS-B-30-50-C                                                                                            | 20.1 | 17.3 | 12.7 | 10.9 | 9.3  | 6.6  | 4.5  | 2.8  | 2.1  | 1.4  |
| SSS-B-20-60-B                                                                                            | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 20.2 | 16.1 | 12.9 | 11.5 | 10.3 |
| SSS-B-25-60-B                                                                                            | 25.0 | 25.0 | 20.6 | 18.0 | 15.6 | 11.8 | 8.7  | 6.2  | 5.2  | 4.2  |
| SSS-B-30-60-B                                                                                            | 21.4 | 18.1 | 12.9 | 10.7 | 8.8  | 5.7  | 3.3  | 1.3  | NR   | NR   |
| SSS-B-35-60-B                                                                                            | 14.0 | 11.3 | 6.9  | 5.2  | 3.6  | 1.0  | NR   | NR   | NR   | NR   |
| SSS-B-40-60-B                                                                                            | 8.1  | 5.8  | 2.2  | nr   | NR   | NR   | NR   | NR   | NR   | NR   |

| Florida Building Code 2017 EPA Load Rating - 3 second gust wind speeds<br>(Use for Florida only) |      |      |      |      |      |      |      |      |
|--------------------------------------------------------------------------------------------------|------|------|------|------|------|------|------|------|
| Catalog Number                                                                                   | 115  | 120  | 130  | 140  | 150  | 160  | 170  | 180  |
| SSS-B-10-40-A                                                                                    | 25.0 | 25.0 | 25.0 | 25.0 | 21.4 | 18.4 | 15.9 | 13.9 |
| SSS-B-12-40-A                                                                                    | 25.0 | 25.0 | 23.6 | 19.8 | 16.7 | 14.2 | 12.1 | 10.4 |
| SSS-B-14-40-A                                                                                    | 25.0 | 23.1 | 19.0 | 15.7 | 13.1 | 10.9 | 9.1  | 7.6  |
| SSS-B-16-40-A                                                                                    | 20.8 | 18.7 | 15.2 | 12.3 | 10.1 | 8.2  | 6.7  | 5.4  |
| SSS-B-18-40-A                                                                                    | 16.8 | 15.0 | 11.9 | 9.4  | 7.5  | 5.9  | 4.5  | 3.4  |
| SSS-B-20-40-A                                                                                    | 13.6 | 11.9 | 9.2  | 7.1  | 5.3  | 3.9  | 2.7  | 1.7  |
| SSS-B-25-40-A                                                                                    | 7.4  | 6.2  | 4.1  | 2.5  | 1.1  | NR   | NR   | NR   |
| SSS-B-14-40-B                                                                                    | 25.0 | 23.6 | 19.4 | 16.1 | 13.4 | 11.2 | 9.4  | 7.8  |
| SSS-B-16-40-B                                                                                    | 21.4 | 19.2 | 15.6 | 12.7 | 10.4 | 8.5  | 6.9  | 5.6  |
| SSS-B-18-40-B                                                                                    | 17.2 | 15.4 | 12.2 | 9.7  | 7.7  | 6.1  | 4.7  | 3.6  |
| SSS-B-20-40-B                                                                                    | 13.9 | 12.3 | 9.5  | 7.3  | 5.5  | 4.1  | 2.9  | 1.9  |
| SSS-B-25-40-B                                                                                    | 7.7  | 6.4  | 4.3  | 2.6  | 1.3  | NR   | NR   | NR   |
| SSS-B-30-40-B                                                                                    | 3.2  | 2.1  | NR   | NR   | NR   | NR   | NR   | NR   |
| SSS-B-16-50-B                                                                                    | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 21.4 | 18.2 | 15.5 |
| SSS-B-18-50-B                                                                                    | 25.0 | 25.0 | 25.0 | 24.4 | 20.4 | 17.0 | 14.2 | 11.9 |
| SSS-B-20-50-B                                                                                    | 25.0 | 25.0 | 24.4 | 19.9 | 16.3 | 13.4 | 11.0 | 8.9  |
| SSS-B-25-50-B                                                                                    | 21.8 | 19.3 | 15.0 | 11.5 | 8.8  | 6.5  | 4.7  | 3.1  |
| SSS-B-30-50-B                                                                                    | 13.7 | 11.7 | 8.2  | 5.5  | 3.3  | 1.5  | NR   | NR   |
| SSS-B-25-50-C                                                                                    | 21.8 | 19.3 | 15.0 | 11.5 | 8.8  | 6.5  | 4.7  | 3.1  |
| SSS-B-30-50-C                                                                                    | 13.7 | 11.7 | 8.2  | 5.5  | 3.3  | 1.5  | NR   | NR   |
| SSS-B-20-60-B                                                                                    | 25.0 | 25.0 | 25.0 | 21.9 | 17.8 | 14.5 | 11.7 | 9.4  |
| SSS-B-25-60-B                                                                                    | 23.8 | 20.9 | 16.1 | 12.3 | 9.2  | 6.6  | 4.5  | 2.8  |
| SSS-B-30-60-B                                                                                    | 14.6 | 12.3 | 8.4  | 5.3  | 2.8  | 0.8  | NR   | NR   |
| SSS-B-35-60-B                                                                                    | 7.5  | 5.6  | 2.4  | NR   | NR   | NR   | NR   | NR   |
| SSS-B-40-60-B                                                                                    | 1.8  | NR   | NR   | NR   | NR   | NR   | NR   | NR   |

|                              |                                                                                                                                     |                                                                                               |                                                  |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------|
| Submitted by Swaney Lighting |  Job Name:<br>CONDITIONED SELF-<br>STORAGE BIDDEFORD | <b>Catalog Number:</b><br>SSSB15-40A-1-B3-***<br><br>Notes: 15FT POLE ON FLUSH ANCHOR<br>BASE | <b>Type:</b><br><br><b>A2</b><br><br>SLA21-50001 |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|--------------------------------------------------|

## NOTES

### Wind-speed Website disclaimer:

Hubbell Lighting has no connection to the linked website and makes no representations as to its accuracy. While the information presented on this third-party website provides a useful starting point for analyzing wind conditions, Hubbell Lighting has not verified any of the information on this third party website and assumes no responsibility or liability for its accuracy. The material presented in the windspeed website should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. Hubbell Lighting Inc. does not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the windspeed report provided by this website. Users of the information from this third party website assume all liability arising from such use. Use of the output of these referenced websites do not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the windspeed report. <http://windspeed.atcouncil.org>

### NOTES

- Allowable EPA, to determine max pole loading weight, multiply allowable EPA by 30 lbs.
- The tables for allowable pole EPA are based on the ASCE 7-05 Wind Map or the Florida Region Wind Map for the 2010 Florida Building Code. The Wind Maps are intended only as a general guide and cannot be used in conjunction with other maps. Always consult local authorities to determine maximum wind velocities, gusting and unique wind conditions for each specific application
- Allowable pole EPA for jobsite wind conditions must be equal to or greater than the total EPA for fixtures, arms, and accessories to be assembled to the pole. Responsibility lies with the specifier for correct pole selection. Installation of poles without luminaires or attachment of any unauthorized accessories to poles is discouraged and shall void the manufacturer's warranty
- Wind speeds and listed EPAs are for ground mounted installations. Poles mounted on structures (such as bridges and buildings) must consider vibration and coefficient of height factors beyond this general guide; Consult local and federal standards
- Wind Induced Vibration brought on by steady, unidirectional winds and other unpredictable aerodynamic forces are not included in wind velocity ratings. Consult Hubbell Lighting's Pole Vibration Application Guide for environmental risk factors and design considerations. [https://hubbellcdn.com/ohwassets/HLJ/outdoor/resources/literature/files/Pole\\_Wind\\_Induced\\_Flyer\\_HLQ10022.pdf](https://hubbellcdn.com/ohwassets/HLJ/outdoor/resources/literature/files/Pole_Wind_Induced_Flyer_HLQ10022.pdf)
- Extreme Wind Events like, Hurricanes, Typhoons, Cyclones, or Tornadoes may expose poles to flying debris, wind shear or other detrimental effects not included in wind velocity ratings

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**HUBBELL**  
Lighting

SSS-B POLES-SPEC

JULY 28, 2020 8:45 AM





# VIPER S

SMALL VIPER LUMINAIRE

## FEATURES

- Small size companion to Viper Large
- Wide choice of different LED wattage configurations
- Nine optical distributions
- Designed to replace HID lighting up to 400W MH or HPS
- Suitable for wet locations



See Certification Specifications

## CONTROL TECHNOLOGY



## SPECIFICATIONS

### CONSTRUCTION

- Corrosion resistant, die-cast aluminum housing with powder coat paint finish rated for 1000 hour salt spray.
- External hardware is corrosion resistant

### OPTICS

- Cartridge is held together with internal brass standoffs soldered to the board so that it can be field replaced as a one-piece optical system
- One-piece silicone gasket ensures a weatherproof seal around each individual optic
- One-piece optical cartridge system consisting of an LED engine, optics, gasket and stainless steel bezel

### INSTALLATION

- Mounting options for horizontal arm, vertical tenon or traditional arm mounting available. Mounting hardware included

### ELECTRICAL

- Luminaire accepts 100V through 277V, 347V or 480V input 50 Hz to 60 Hz (UNV)
- Ambient operating temperature -40°C to 25°C
- Power factor is  $\geq .90$  at full load
- Dimming Drivers are standard and dimming leads are extended out of the luminaire unless control options require connection to the dimming leads. Must specify if wiring leads are to be greater than the 6" standard.

### ELECTRICAL (CONTINUED)

- Component-to-component wiring within the luminaire may carry no more than 80% of rated load and is certified by UL for use at 600VAC at 90°C or higher
- Plug disconnects are certified by UL for use at 600 VAC, 13A or higher. 13A rating applies to primary (AC) side only
- Fixture electrical compartment contains all LED driver components
- Optional 7-pin ANSI C136.41-2013 Twist-Lock® photo control receptacle available. Compatible with ANSI C136.41 external wireless control devices
- Surge protection: 20kA
- Lifeshield™ Circuit ([see Electrical Data](#))

### CONTROLS

- Available with an optional passive infrared (PIR) motion sensor capable of detecting motion 360° around the luminaire. When no motion is detected for the specified time, the motion response system reduces the wattage to factory preset level, reducing the light level accordingly. When motion is detected by the PIR sensor, the luminaire returns to full wattage and full light output. Please contact Beacon Products if project requirements vary from standard configuration
- Available with [Energeni](#) for optional set dimming, timed dimming with simple delay, or timed dimming based on time of night

## OPTICS STRIKE



## RELATED PRODUCTS

Ø [Viper Large](#)

### CONTROLS (CONTINUED)

- In addition, Viper can be specified with [SiteSync™ wireless control system](#) for reduction in energy and maintenance costs while optimizing light quality 24/7
- Please consult brand or sales representative when combining control and electrical options as some combinations may not operate as anticipated depending on your application

### CERTIFICATIONS

- DLC® (DesignLights Consortium) Qualified. Please refer to the DLC website for specific product qualifications at [www.designlights.org](http://www.designlights.org)
- Certified to UL 1598 and UL 8750
- 3G rated for ANSI C136.31 high vibration applications with MAF mounting
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 04/23/2020. See [Buy American Solutions](#).

### WARRANTY

- 5 year warranty
- See [HLI Commercial and Industrial Outdoor Lighting Warranty](#) for additional information

| KEY DATA                   |              |
|----------------------------|--------------|
| Lumen Range                | 4,045–16,216 |
| Wattage Range              | 39–136       |
| Efficacy Range (LPW)       | 100–124      |
| Reported Life (Hours)      | L70>60,000   |
| Input Current Range (Amps) | 0.1–1.1      |

|                              |                                                 |                                                    |                    |
|------------------------------|-------------------------------------------------|----------------------------------------------------|--------------------|
| Submitted by Swaney Lighting | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/4W/UNV/A/BC/*** | Type:<br><b>A4</b> |
|                              |                                                 | Notes:                                             | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ORDERING GUIDE

Example: VPS-24L-55-4K7-4W-UNV-A-DBT-TL-GENI-04-BC

CATALOG #

| VPS                    | LED Engine                     | CCT/CRI <sup>7</sup>     | Distribution                    | Rotation                                   | Voltage             |
|------------------------|--------------------------------|--------------------------|---------------------------------|--------------------------------------------|---------------------|
| <b>Series</b>          |                                |                          |                                 |                                            |                     |
| <b>VPS</b> Viper Small | <b>24L-39</b> 39W, LED array   | <b>3K7</b> 3000K, 70 CRI | <b>FR</b> Type 1/Front Row      | <b>Blank</b> No rotation                   | <b>UNV</b> 120-277V |
|                        | <b>24L-55</b> 55W, LED array   | <b>4K7</b> 4000K, 70 CRI | <b>2</b> Type 2                 | <b>L</b> Optic rotation left <sup>5</sup>  | <b>347</b> 347V     |
|                        | <b>36L-65</b> 65W, LED array   | <b>5K7</b> 5000K, 70 CRI | <b>3</b> Type 3                 | <b>R</b> Optic rotation right <sup>5</sup> | <b>480</b> 480V     |
|                        | <b>36L-80</b> 80W, LED array   |                          | <b>4F (formerly 4)</b> Type 4   |                                            |                     |
|                        | <b>48L-110</b> 110W, LED array |                          | <b>4W</b> Type 4 Wide           |                                            |                     |
|                        | <b>60L-136</b> 136W, LED array |                          | <b>5QM</b> Type 5QM             |                                            |                     |
|                        |                                |                          | <b>5R</b> Type 5R (rectangular) |                                            |                     |
|                        |                                |                          | <b>5W</b> Type 5W (round wide)  |                                            |                     |
|                        |                                |                          | <b>TC</b> Tennis Court          |                                            |                     |
|                        |                                |                          | <b>CR</b> Corner Right          |                                            |                     |
|                        |                                |                          | <b>CL</b> Corner Left           |                                            |                     |

| Mounting                                                                                        | Specify Std. finish                   | Network Control Options                                                                                                | Options                                                     |
|-------------------------------------------------------------------------------------------------|---------------------------------------|------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <b>A</b> Rectangular Arm (formerly RA) for square or round pole                                 | <b>Color</b>                          | <b>NXWE</b> NX Wireless Enabled (module + radio)                                                                       | <b>BC</b> Backshield (available for FR, 2, 3, 4, 4W Optics) |
| <b>A3</b> Arm for round pole 3.5" - 4.13" OD                                                    | <b>BLT</b> Black Matte Textured       | <b>NXSPW_F</b> Nx Wireless, PIR Occ. Sensor, Daylight Harvesting <sup>7</sup>                                          | <b>CD</b> Continuous Dimming                                |
| <b>A4</b> Arm for round pole 4.18" - 5.25" OD                                                   | <b>BLS</b> Black Gloss Smooth         | <b>WIR</b> Wireless Controls, w/SCAPE                                                                                  | <b>F</b> Fusing                                             |
| <b>A5</b> Arm for round pole 5.5" - 6.5" OD                                                     | <b>DBT</b> Dark Bronze Matte Textured | <b>SWP</b> SiteSync Pre-Commission <sup>1,4</sup>                                                                      | <b>TB</b> Terminal Block                                    |
| <b>MAF</b> Mast Arm Fitter (formerly SF2) for 2 3/8" OD horizontal arm                          | <b>DBS</b> Dark Bronze Gloss Smooth   | <b>SWPM_F</b> SiteSync Pre-Commission w/ Sensor <sup>1,2,4</sup>                                                       |                                                             |
| <b>K</b> Knuckle (formerly PK2) limit to 30° tilt or 2 3/8" OD horizontal arm or vertical tenon | <b>GTT</b> Graphite Matte Textured    | <b>Control Options</b>                                                                                                 |                                                             |
| <b>WB</b> Wall Bracket                                                                          | <b>LGS</b> Light Grey Gloss Smooth    | <b>GENI-XX</b> ENERGENI <sup>3</sup>                                                                                   |                                                             |
| <b>AD</b> Universal Arm for square pole                                                         | <b>PSS</b> Platinum Silver Smooth     | <b>7PR</b> 7-Pin Receptacle only (shorting cap, photo control, or wireless control provided by others)                 |                                                             |
| <b>AD3</b> Adapter for 2.4"-4.1" round pole                                                     | <b>WHT</b> White Matte Textured       | <b>7PR-SC</b> 7-Pin Receptacle w/Shorting Cap                                                                          |                                                             |
| <b>AD4</b> Adapter for 4.2"-5.3" round pole                                                     | <b>WHS</b> White Gloss Smooth         | <b>7PR-TL</b> 7-Pin Receptacle w/Twist-Lock <sup>8</sup> photo control                                                 |                                                             |
| <b>AD5</b> Adapter for 5.5"-5.9" round pole                                                     | <b>VGT</b> Verde Green Textured       | <b>Sensors</b>                                                                                                         |                                                             |
| <b>AD6</b> Adapter for 6.0"-6.5" round pole                                                     | <b>Color Option</b>                   | <b>BTS_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens <sup>7</sup>                             |                                                             |
|                                                                                                 | <b>CC</b> Custom Color                | <b>BTSO_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens, up to 12' mounting height <sup>8</sup> |                                                             |
|                                                                                                 |                                       | <b>NXSP_F</b> NX, PIR Occ. Sensor, Daylight Harvesting <sup>7</sup>                                                    |                                                             |
|                                                                                                 |                                       | <b>SCP/_F</b> Programmable Occupancy Sensor w/ daylight control <sup>1,2,6</sup>                                       |                                                             |

#### House Side Shield Accessories

- ☐ HSS/VP-S/90-FB/XXX 90° shield front or back
- ☐ HSS/VP-S/90-LR/XXX 90° shield left or right
- ☐ HSS/VP-S/270-FB/XXX 270° shield front or back
- ☐ HSS/VP-S/270-LR/XXX 270° shield left or right
- ☐ HSS/VP-S/360/XXX Full shield

Replace XXX with notation for desired finish color. Refer to page 8 for shield images.

#### Mounting Accessories

- ☐ VPL-AD-RPA3 2.4"-4.1" Round Pole Adapter for AD arm
- ☐ VPL-AD-RPA4 4.2"-5.3" Round Pole Adapter for AD arm
- ☐ VPL-AD-RPA5 5.5"-5.9" Round Pole Adapter for AD arm
- ☐ VPL-AD-RPA6 6.0"-6.5" Round Pole Adapter for AD arm

#### Notes:

- 1 Not available with other wireless control or sensor options
- 2 Specify mounting height; 8 = 8' or less, 40 = 14' to 30'
- 3 Specify routine setting code (example GENI-04). See [ENERGENI brochure and instructions](#) for setting table and options. Not available with sensor or SiteSync options
- 4 Specify group and zone at time of order. See [www.hubbelllighting.com/sitesync](#) for further details. Order at least one SiteSync interface accessory SWUSB or SWTAB. Each option contains SiteSync License, GUI, and Bridge Node
- 5 Only available with FR, 2, 3, 4, 4W and 5R distributions
- 6 Specify mounting height; 8=8'; 30=30'
- 7 Replace "\_" with "14" for up to 14' mounting height, "40F" for 15-40' mounting height
- 8 Replace "\_" with "12" for up to 12' mounting height

|                                                                                  |                                                 |                                                    |                    |
|----------------------------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------|--------------------|
| Submitted by Swaney Lighting                                                     | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/4W/UNV/A/BC/*** | Type:<br><b>A4</b> |
|  |                                                 | Notes:                                             | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ORDERING GUIDE (CONTINUED)

#### Accessories and Services (Ordered Separately)

- ☐ **SCP-REMOTE** Remote Control for SCP/\_F option. Order at least one per project to program and control the occupancy sensor
- ☐ **SWUSB\*** SiteSync interface software loaded on USB flash drive for use with owner supplied PC (Windows based only). Includes SiteSync license, software and USB radio bridge node
- ☐ **SWTAB\*** Windows tablet and SiteSync interface software. Includes tablet with preloaded software, SiteSync license and USB radio bridge node
- ☐ **SWBRG** SiteSync USB radio bridge node only. Order if a replacement is required or if an extra bridge node is requested
- ☐ **SW7PR+** SiteSync 7-Pin on fixture module On/Off/Dim, Daylight Sensor 120-480VAC
- ☐ **BIRD-SPIKE-3** Bird Spikes

\* When ordering SiteSync at least one of these two interface options must be ordered per project.  
+ Available as a SiteSync retrofit solution for fixtures with an existing 7-pin receptacle.

#### Hubbell Control Solutions — Accessories (Sold Separately)

##### NX Distributed Intelligence™

- ☐ **NXOFM-1R1D-UNV** On-fixture Module (7-pin), On / Off / Dim, Daylight Sensor with HubbellNET Radio and Bluetooth® Radio, 120-480VAC

##### wiSCAPE® Lighting Control

- ☐ **WIR-RME-L** On-fixture Module (7-pin or 5-pin), On / Off / Dim, Daylight Sensor with wiSCAPE Radio, 110-480VAC

For additional information related to these accessories please visit [www.hubbellcontrolsolutions.com](http://www.hubbellcontrolsolutions.com). Options provided for use with integrated sensor, please view specification sheet ordering information table for details.

### CONTROLS

#### SiteSync — Precommissioned Ordering Information:

When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project location, Group information, and Operating schedules. For more detailed information please visit [the SiteSync family page on our website](http://the SiteSync family page on our website) or contact Hubbell Lighting tech support at 864-678-1000.



SiteSync fixtures with Motion control (SWPM) require the mounting height of the fixture for selection of the lens.

Examples: VP-L/80L-235/4K7/3/UNV/A/DB/SWP/      SiteSync only  
VP-L/80L-235/4K7/3/UNV/A/DB/SWPM-40F/      SiteSync with Motion Control

#### SiteSync 7-Pin Module:

- SiteSync features in a new form
- Available as an accessory for new construction or retrofit applications (with existing 7-Pin receptacle)
- Does not interface with occupancy sensors



SW7PR

#### NX Distributed Intelligence™ Lighting Controls:

Supports both indoor and outdoor applications in a variety of deployment options: wired, wireless and hybrid. Integrates with and enables a wide array of luminaires including those with SpectraSync Color Tuning Technology.



| NX Integrated Controls Reference |        |             |            |           |                     |               |                |                            |
|----------------------------------|--------|-------------|------------|-----------|---------------------|---------------|----------------|----------------------------|
| NX Option                        | Sensor | Networkable | Scheduling | Occupancy | Daylight Harvesting | 0-10V Dimming | On/off Control | Bluetooth® App Programming |
| <b>NX Networked – Wireless</b>   |        |             |            |           |                     |               |                |                            |
| <a href="#">NXOFM-1R1D-UNV</a>   | SCLNX  | Yes         | Yes        | Yes       | Yes                 | Yes           | Yes            | Yes, Bluetooth App         |

#### wiSCAPE™:

Supports remote management, monitoring and metering of outdoor wireless lighting applications such as smart campuses, smart cities, parking lots and roadways.



| wiSCAPE Reference           |           |             |            |           |                     |               |                |                            |
|-----------------------------|-----------|-------------|------------|-----------|---------------------|---------------|----------------|----------------------------|
| wiSCAPE Option              | Sensor    | Networkable | Scheduling | Occupancy | Daylight Harvesting | 0-10V Dimming | On/off Control | Bluetooth® App Programming |
| <b>Networked – Wireless</b> |           |             |            |           |                     |               |                |                            |
| <a href="#">WIR-RME-L</a>   | WIR-RME-L | Yes         | Yes        | No        | Yes                 | Yes           | Yes            | wiSCAPE Gateway            |



|                              |                                                 |                                                    |                    |
|------------------------------|-------------------------------------------------|----------------------------------------------------|--------------------|
| Submitted by Swaney Lighting | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>VP-S/24L-55/3K7/4W/UNV/A/BC/*** | Type:<br><b>A4</b> |
|                              |                                                 | Notes:                                             | SLA21-50001        |



## VIPER S

SMALL VIPER LUMINAIRE

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### DELIVERED LUMENS

| # of LEDs | DRIVE CURRENT (mA) | SYSTEM WATTS | DISTRIBUTION TYPE | 5K<br>(5000K nominal, 70 CRI) |     |   |   |   | 4K<br>(4000K nominal, 70 CRI) |     |   |   |   | 3K<br>(3000K nominal, 70 CRI) |     |   |   |   |
|-----------|--------------------|--------------|-------------------|-------------------------------|-----|---|---|---|-------------------------------|-----|---|---|---|-------------------------------|-----|---|---|---|
|           |                    |              |                   | LUMENS                        | LPW | B | U | G | LUMENS                        | LPW | B | U | G | LUMENS                        | LPW | B | U | G |
| 24        | 500mA              | 39W          | FR                | 4689                          | 120 | 1 | 0 | 0 | 4665                          | 120 | 1 | 0 | 0 | 4432                          | 114 | 1 | 0 | 0 |
|           |                    |              | 2                 | 4523                          | 116 | 1 | 0 | 1 | 4500                          | 115 | 1 | 0 | 1 | 4275                          | 110 | 1 | 0 | 1 |
|           |                    |              | 3                 | 4436                          | 114 | 1 | 0 | 1 | 4414                          | 113 | 1 | 0 | 1 | 4194                          | 108 | 1 | 0 | 1 |
|           |                    |              | 4F                | 4362                          | 112 | 1 | 0 | 2 | 4340                          | 111 | 1 | 0 | 2 | 4123                          | 106 | 0 | 0 | 2 |
|           |                    |              | 4W                | 4280                          | 110 | 1 | 0 | 2 | 4258                          | 109 | 1 | 0 | 2 | 4045                          | 104 | 1 | 0 | 2 |
|           |                    |              | 5QM               | 4442                          | 114 | 2 | 0 | 1 | 4420                          | 113 | 2 | 0 | 1 | 4199                          | 108 | 2 | 0 | 0 |
|           |                    |              | 5R                | 4472                          | 115 | 2 | 0 | 2 | 4450                          | 114 | 2 | 0 | 2 | 4227                          | 108 | 2 | 0 | 2 |
|           |                    |              | 5W                | 4335                          | 112 | 3 | 0 | 1 | 4336                          | 111 | 3 | 0 | 1 | 4114                          | 105 | 3 | 0 | 1 |
|           |                    |              | TC                | 4561                          | 117 | 1 | 0 | 1 | 4538                          | 116 | 1 | 0 | 1 | 4311                          | 111 | 1 | 0 | 1 |
|           |                    |              | CL                | 4758                          | 122 | 1 | 0 | 2 | 4758                          | 122 | 1 | 0 | 2 | 4329                          | 111 | 1 | 0 | 1 |
|           |                    |              | CR                | 4773                          | 122 | 1 | 0 | 2 | 4773                          | 122 | 1 | 0 | 2 | 4361                          | 112 | 1 | 0 | 1 |
|           |                    |              | FR                | 6357                          | 118 | 1 | 0 | 1 | 6486                          | 120 | 1 | 0 | 1 | 5804                          | 107 | 1 | 0 | 1 |
| 24        | 700 mA             | 55W          | 2                 | 6132                          | 114 | 1 | 0 | 1 | 6257                          | 116 | 1 | 0 | 2 | 5599                          | 104 | 1 | 0 | 1 |
|           |                    |              | 3                 | 6015                          | 111 | 1 | 0 | 2 | 6137                          | 114 | 1 | 0 | 2 | 5492                          | 102 | 1 | 0 | 2 |
|           |                    |              | 4F                | 5921                          | 110 | 1 | 0 | 2 | 6034                          | 112 | 1 | 0 | 2 | 5400                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 5793                          | 108 | 1 | 0 | 2 | 5909                          | 110 | 1 | 0 | 2 | 5272                          | 98  | 1 | 0 | 2 |
|           |                    |              | 5QM               | 6022                          | 112 | 2 | 0 | 1 | 6145                          | 114 | 2 | 0 | 1 | 5499                          | 102 | 2 | 0 | 1 |
|           |                    |              | 5R                | 6063                          | 112 | 3 | 0 | 3 | 6187                          | 115 | 3 | 0 | 3 | 5536                          | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 5908                          | 109 | 3 | 0 | 1 | 6028                          | 112 | 3 | 0 | 1 | 5908                          | 102 | 3 | 0 | 1 |
|           |                    |              | TC                | 6183                          | 113 | 1 | 0 | 1 | 6309                          | 118 | 1 | 0 | 1 | 5645                          | 105 | 1 | 0 | 1 |
|           |                    |              | CL                | 6707                          | 122 | 1 | 0 | 2 | 6707                          | 122 | 1 | 0 | 2 | 6117                          | 111 | 1 | 0 | 2 |
|           |                    |              | CR                | 6729                          | 122 | 1 | 0 | 2 | 6729                          | 122 | 1 | 0 | 2 | 6143                          | 112 | 1 | 0 | 2 |
|           |                    |              | FR                | 7864                          | 121 | 1 | 0 | 1 | 8041                          | 124 | 1 | 0 | 1 | 7189                          | 111 | 1 | 0 | 1 |
|           |                    |              | 2                 | 7586                          | 117 | 1 | 0 | 2 | 7757                          | 119 | 1 | 0 | 2 | 6934                          | 107 | 1 | 0 | 2 |
| 36        | 560 mA             | 65W          | 3                 | 7441                          | 114 | 1 | 0 | 2 | 7609                          | 117 | 1 | 0 | 2 | 6802                          | 105 | 1 | 0 | 2 |
|           |                    |              | 4F                | 7317                          | 110 | 1 | 0 | 2 | 7482                          | 112 | 1 | 0 | 2 | 6688                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 8690                          | 108 | 1 | 0 | 2 | 8864                          | 110 | 1 | 0 | 2 | 7908                          | 98  | 1 | 0 | 2 |
|           |                    |              | 5QM               | 7450                          | 115 | 3 | 0 | 1 | 7618                          | 117 | 3 | 0 | 1 | 6810                          | 105 | 3 | 0 | 1 |
|           |                    |              | 5R                | 7501                          | 115 | 3 | 0 | 3 | 7670                          | 118 | 3 | 0 | 3 | 6857                          | 105 | 3 | 0 | 3 |
|           |                    |              | 5W                | 7309                          | 112 | 3 | 0 | 2 | 7473                          | 115 | 3 | 0 | 2 | 6681                          | 103 | 3 | 0 | 1 |
|           |                    |              | TC                | 7540                          | 116 | 1 | 0 | 1 | 7694                          | 118 | 1 | 0 | 1 | 7694                          | 122 | 1 | 0 | 2 |
|           |                    |              | CL                | 8179                          | 126 | 2 | 0 | 2 | 8179                          | 126 | 2 | 0 | 2 | 7467                          | 115 | 1 | 0 | 2 |
|           |                    |              | CR                | 8205                          | 126 | 2 | 0 | 2 | 8205                          | 126 | 2 | 0 | 2 | 7492                          | 115 | 1 | 0 | 2 |
|           |                    |              | FR                | 9535                          | 118 | 1 | 0 | 1 | 9730                          | 120 | 1 | 0 | 1 | 8706                          | 107 | 1 | 0 | 1 |
|           |                    |              | 2                 | 9197                          | 114 | 1 | 0 | 2 | 9385                          | 116 | 1 | 0 | 2 | 8398                          | 104 | 1 | 0 | 2 |
|           |                    |              | 3                 | 9022                          | 111 | 1 | 0 | 2 | 9206                          | 114 | 1 | 0 | 2 | 8238                          | 102 | 1 | 0 | 2 |
| 36        | 700 mA             | 80W          | 4F                | 8871                          | 110 | 1 | 0 | 2 | 9052                          | 112 | 1 | 0 | 2 | 8100                          | 100 | 1 | 0 | 2 |
|           |                    |              | 4W                | 11587                         | 108 | 1 | 0 | 3 | 11819                         | 110 | 1 | 0 | 3 | 10544                         | 98  | 1 | 0 | 3 |
|           |                    |              | 5QM               | 9033                          | 112 | 3 | 0 | 1 | 9217                          | 114 | 3 | 0 | 1 | 8248                          | 102 | 3 | 0 | 1 |
|           |                    |              | 5R                | 9095                          | 112 | 3 | 0 | 3 | 9280                          | 115 | 3 | 0 | 3 | 8304                          | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 8861                          | 109 | 3 | 0 | 2 | 9043                          | 112 | 3 | 0 | 2 | 8092                          | 100 | 3 | 0 | 2 |
|           |                    |              | TC                | 9275                          | 115 | 1 | 0 | 1 | 9464                          | 118 | 1 | 0 | 1 | 8468                          | 105 | 1 | 0 | 1 |
|           |                    |              | CL                | 10060                         | 126 | 2 | 0 | 2 | 10060                         | 126 | 2 | 0 | 2 | 9184                          | 115 | 2 | 0 | 2 |
|           |                    |              | CR                | 10093                         | 126 | 2 | 0 | 2 | 10093                         | 126 | 2 | 0 | 2 | 9215                          | 115 | 2 | 0 | 2 |
|           |                    |              | FR                | 12713                         | 118 | 1 | 0 | 1 | 12973                         | 120 | 2 | 0 | 1 | 11608                         | 107 | 1 | 0 | 1 |
|           |                    |              | 2                 | 12263                         | 114 | 2 | 0 | 2 | 12513                         | 116 | 2 | 0 | 2 | 11197                         | 104 | 2 | 0 | 2 |
|           |                    |              | 3                 | 12029                         | 111 | 2 | 0 | 2 | 12275                         | 114 | 2 | 0 | 2 | 10984                         | 102 | 1 | 0 | 2 |
|           |                    |              | 4F                | 11828                         | 110 | 1 | 0 | 3 | 12069                         | 112 | 1 | 0 | 3 | 10800                         | 100 | 1 | 0 | 2 |
| 48        | 700 mA             | 110W         | 4W                | 11609                         | 108 | 1 | 0 | 3 | 11841                         | 110 | 1 | 0 | 3 | 10564                         | 98  | 1 | 0 | 3 |
|           |                    |              | 5QM               | 12044                         | 112 | 3 | 0 | 2 | 12290                         | 114 | 3 | 0 | 2 | 10997                         | 102 | 3 | 0 | 1 |
|           |                    |              | 5R                | 12126                         | 112 | 3 | 0 | 3 | 12374                         | 115 | 3 | 0 | 3 | 11072                         | 103 | 3 | 0 | 3 |
|           |                    |              | 5W                | 12126                         | 109 | 4 | 0 | 2 | 12057                         | 112 | 4 | 0 | 2 | 10789                         | 100 | 4 | 0 | 2 |
|           |                    |              | RC                | 12366                         | 115 | 1 | 0 | 2 | 12619                         | 118 | 1 | 0 | 1 | 11290                         | 105 | 1 | 0 | 2 |
|           |                    |              | CL                | 13414                         | 122 | 2 | 0 | 3 | 13414                         | 122 | 2 | 0 | 3 | 12246                         | 111 | 2 | 0 | 2 |
|           |                    |              | CR                | 13458                         | 122 | 2 | 0 | 3 | 13458                         | 122 | 2 | 0 | 3 | 12287                         | 112 | 2 | 0 | 2 |
|           |                    |              | FR                | 15891                         | 117 | 2 | 0 | 2 | 16216                         | 120 | 2 | 0 | 2 | 14511                         | 107 | 2 | 0 | 1 |
|           |                    |              | 2                 | 15329                         | 113 | 2 | 0 | 2 | 15642                         | 116 | 2 | 0 | 2 | 13997                         | 103 | 2 | 0 | 2 |
|           |                    |              | 3                 | 15037                         | 111 | 2 | 0 | 3 | 15344                         | 113 | 2 | 0 | 3 | 13730                         | 101 | 2 | 0 | 3 |
|           |                    |              | 4F                | 14784                         | 109 | 1 | 0 | 3 | 15086                         | 111 | 1 | 0 | 3 | 13500                         | 100 | 1 | 0 | 3 |
|           |                    |              | 4W                | 14802                         | 109 | 2 | 0 | 3 | 15104                         | 112 | 2 | 0 | 3 | 13515                         | 100 | 2 | 0 | 3 |
| 60        | 700 mA             | 136W         | 5QM               | 15055                         | 111 | 3 | 0 | 2 | 15362                         | 114 | 3 | 0 | 2 | 13747                         | 102 | 3 | 0 | 2 |
|           |                    |              | 5R                | 15158                         | 112 | 4 | 0 | 4 | 15469                         | 114 | 4 | 0 | 4 | 13841                         | 102 | 4 | 0 | 4 |
|           |                    |              | 5W                | 14781                         | 109 | 4 | 0 | 2 | 15083                         | 111 | 4 | 0 | 2 | 13495                         | 100 | 4 | 0 | 2 |
|           |                    |              | TC                | 15458                         | 115 | 1 | 0 | 2 | 15834                         | 118 | 1 | 0 | 2 | 14113                         | 105 | 1 | 0 | 2 |
|           |                    |              | CL                | 16768                         | 123 | 3 | 0 | 3 | 16768                         | 123 | 3 | 0 | 3 | 15309                         | 113 | 2 | 0 | 3 |
|           |                    |              | CR                | 16823                         | 124 | 3 | 0 | 3 | 16823                         | 124 | 3 | 0 | 3 | 15359                         | 113 | 2 | 0 | 3 |



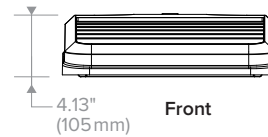
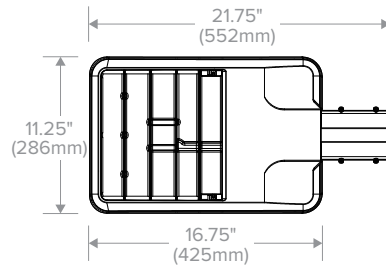
## VIPER S

SMALL VIPER LUMINAIRE

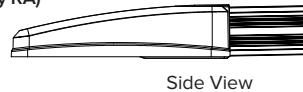
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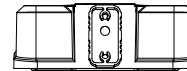
CATALOG #: \_\_\_\_\_

**DIMENSIONS**

|        |                      |
|--------|----------------------|
| Weight | 15.0 lbs<br>(6.8 kg) |
| EPA    | .67 ft <sup>2</sup>  |

**A Arm (formerly RA)**

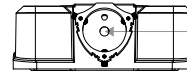
Side View



Back View

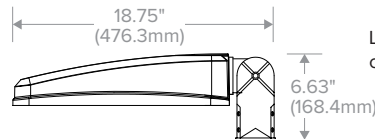
**MAF (formerly SF2)**

Side View

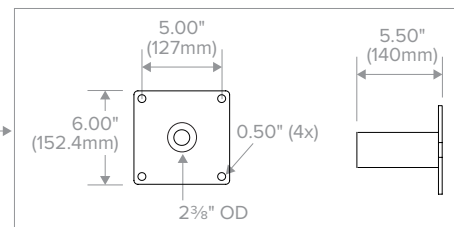
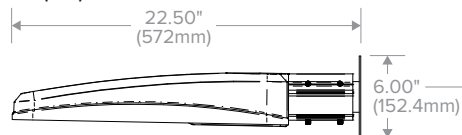
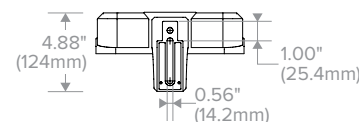
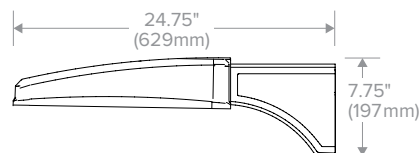


Back View

Accepts 2 3/8" OD tenon, min 5" long.

**2 3/8" Adjustable Knuckle (K) (formerly PK2)**

Limit to 30° tilt. Sensor, photocell and wireless controls should not be tilted above horizontal.

**Wall Bracket (WB)****AD Decorative Arm**See [page 9](#) for mounting details.

**VIPER S**

SMALL VIPER LUMINAIRE

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

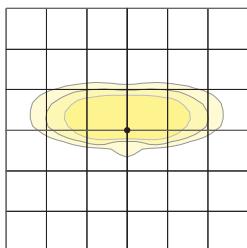
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CATALOG #: \_\_\_\_\_

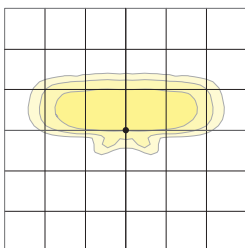
**PHOTOMETRY**

The following diagrams represent the general distribution options offered for this product. For detailed information on specific product configurations, see [website photometric test reports](#).

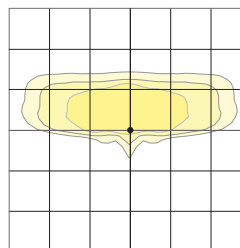
Type FR – Front Row/Auto Optic



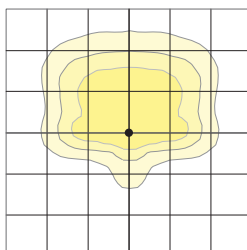
Type 2



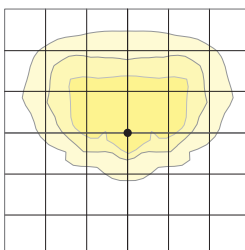
Type 3



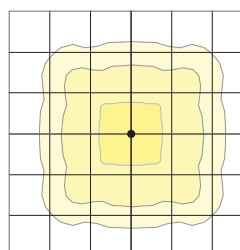
Type 4



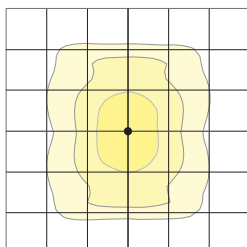
Type 4 Wide



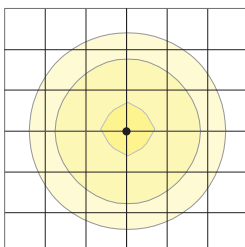
Type 5QM



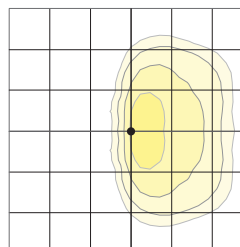
Type 5R (rectangular)



Type 5W (round wide)



Type TC





## VIPER S

SMALL VIPER LUMINAIRE

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_  
CATALOG #: \_\_\_\_\_

### ELECTRICAL DATA

| # OF LEDS | NUMBER OF DRIVERS | DRIVE CURRENT (mA) | INPUT VOLTAGE (V) | SYSTEM POWER (w) | CURRENT (Amps) |
|-----------|-------------------|--------------------|-------------------|------------------|----------------|
| 24        | 1                 | 500 mA             | 120               | 39               | 0.33           |
|           |                   |                    | 277               |                  | 0.14           |
|           |                   |                    | 347               |                  | 0.11           |
|           |                   |                    | 480               |                  | 0.08           |
|           |                   |                    | 120               |                  | 0.5            |
| 24        | 1                 | 700 mA             | 277               | 55               | 0.2            |
|           |                   |                    | 347               |                  | 0.2            |
|           |                   |                    | 480               |                  | 0.1            |
|           |                   |                    | 120               |                  | 0.65           |
|           |                   |                    | 277               |                  | 0.28           |
| 36        | 1                 | 525 mA             | 347               | 65               | 0.22           |
|           |                   |                    | 480               |                  | 0.16           |
|           |                   |                    | 120               |                  | 0.7            |
|           |                   |                    | 277               |                  | 0.3            |
|           |                   | 700 mA             | 347               | 80               | 0.2            |
|           |                   |                    | 480               |                  | 0.2            |
|           |                   |                    | 120               |                  | 0.9            |
|           |                   |                    | 277               |                  | 0.4            |
| 48        | 1                 | 700 mA             | 347               | 110              | 0.3            |
|           |                   |                    | 480               |                  | 0.2            |
|           |                   |                    | 120               |                  | 1.1            |
|           |                   |                    | 277               |                  | 0.5            |
| 60        | 1                 | 700 mA             | 347               | 136              | 0.4            |
|           |                   |                    | 480               |                  | 0.3            |
|           |                   |                    | 120               |                  | 1.1            |
|           |                   |                    | 277               |                  | 0.5            |

| PROJECTED LUMEN MAINTENANCE |   |        |        |                              |         |                        |
|-----------------------------|---|--------|--------|------------------------------|---------|------------------------|
| Ambient Temp.               | 0 | 25,000 | 50,000 | TM-21-11 60,000 <sup>1</sup> | 100,000 | Calculated L70 (HOURS) |
| 25°C / 77°C                 | 1 | 0.97   | 0.95   | 0.95                         | 0.92    | >377,000               |

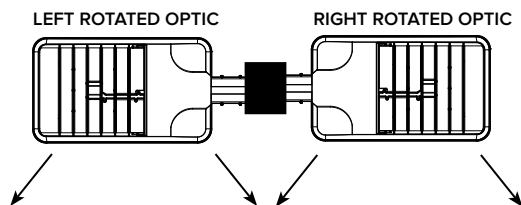
<sup>1</sup> Projected per IESNA TM-21-11.  
Data references the extrapolated performance projections for the 60 LED base model in a 25°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.

### LIFESHIELD™ CIRCUIT

Protects luminaire from excessive temperature. The device activates at a specific, factory-preset temperature and progressively reduces power over a finite temperature range. Operation is smooth and undetectable to the eye. Thermal circuit is designed to "fail on", allowing the luminaire to revert to full power in the event of an interruption of its power supply or faulty wiring connection to the drivers. The device can co-exist with other 0-10V control devices (occupancy sensors, external dimmers, etc.)

### ADDITIONAL INFORMATION

#### ROTATION OPTIONS





## VIPER S

SMALL VIPER LUMINAIRE

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_

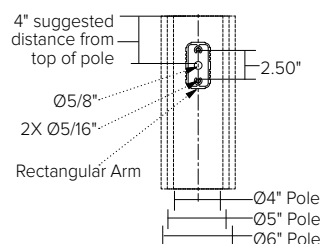
CATALOG #: \_\_\_\_\_

## ADDITIONAL INFORMATION (CONTINUED)

## DRILL PATTERN

## RECTANGULAR ARM (A)

Compatible with Pole drill pattern B3



## EPA

| Config.  | EPA  |
|----------|------|
| 1        | .67  |
| 2 @ 90°  | 1.06 |
| 2 @ 180° | 1.34 |

| Config.  | EPA  |
|----------|------|
| 3 @ 120° | 1.68 |
| 3 @ 90°  | 1.73 |
| 4 @ 90°  | 2.12 |

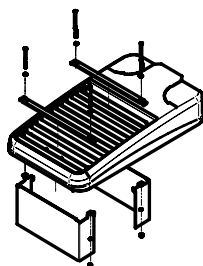
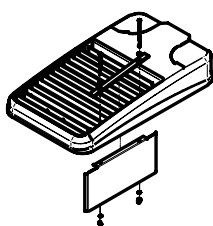
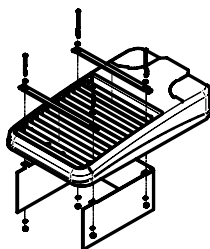
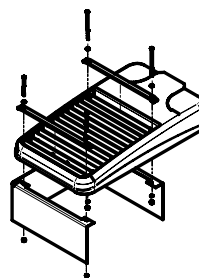
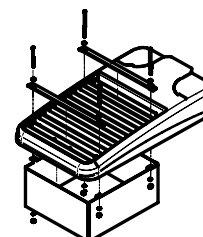
## TENON TOP POLE BRACKET ACCESSORIES (ORDER SEPARATELY)

(2 3/8" OD tenon)

## TENON TOP POLE BRACKET ACCESSORIES (Order Separately)

- ☐ SETAVP-XX Square tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
- ☐ RETAVP-XX Round tenon adapter (4 at 90°) for A - Rectangular Arm mounting option only
- ☐ SETA2XX Square tenon adapter (4 at 90°) for AD - Universal Arm mounting option only
- ☐ RETA2XX Round tenon adapter (4 at 90°) for AD3 - Universal Arm mounting option only

## HOUSE SIDE SHIELD FIELD INSTALL ACCESSORIES

HSS/VP-S/90-FB/XXX  
90° shield front or back  
(2 shields shown)HSS/VP-S/90-LR/XXX  
90° shield left or right  
(1 shield shown in left orientation)HSS/VP-S/270-FB/XXX  
270° shield front or back  
(1 shield shown in back orientation)HSS/VP-S/270-LR/XXX  
270° shield left or right  
(1 shield shown in right orientation)HSS/VP-S/360/XXX  
Full shield  
(1 shield shown)



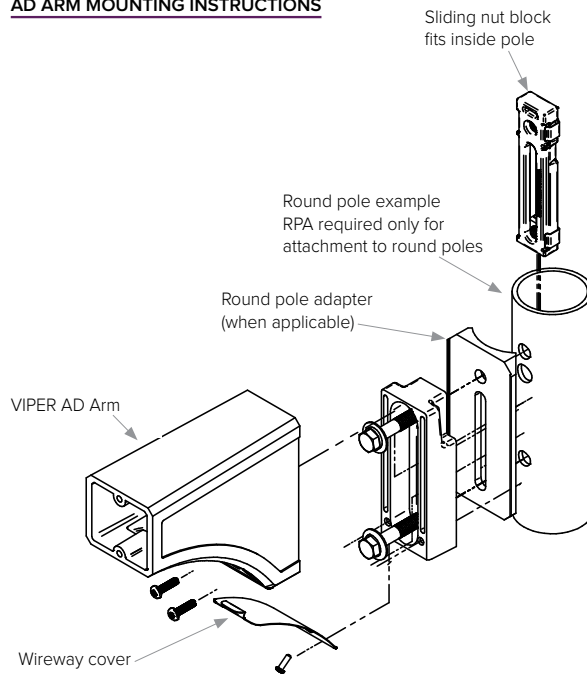
**VIPER S**

SMALL VIPER LUMINAIRE

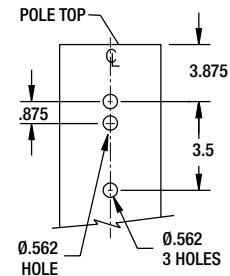
DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_

CATALOG #: \_\_\_\_\_

**ADDITIONAL INFORMATION (CONTINUED)****AD ARM MOUNTING INSTRUCTIONS****DECORATIVE ARM (AD)**

Compatible with pole drill pattern S2



|                                                                                 |                                                     |                                 |              |
|---------------------------------------------------------------------------------|-----------------------------------------------------|---------------------------------|--------------|
| Submitted by Swaney Lighting                                                    |                                                     | <b>Catalog Number:</b>          | <b>Type:</b> |
|  | Job Name:<br>CONDITIONED SELF-<br>STORAGE BIDDEFORD | VP-S/24L-55/3K7/4W/UNV/A/BC/*** | <b>A4</b>    |
|                                                                                 |                                                     | Notes:                          | SLA21-50001  |

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## LNC2

SMALL LED LITEPAK

### FEATURES

- 60% more lumens and increased performance than smaller LNC models
- 3000K, 4000K and 5000K as well as Amber
- Type II, III and IV distributions available for a variety of application needs
- Quick-mount adapter allows easy installation/maintenance
- 347V and 480V versions for industrial applications and Canada
- Stock versions available for fast service
- Full cut-off, neighbor friendly, IDA approved
- Optional photocontrol for additional energy savings



### CONTROL TECHNOLOGY



### SPECIFICATIONS

#### CONSTRUCTION

- Rugged die-cast aluminum housing protects components and provides an architectural appearance
- Casting thermally conducts LED heat to optimize performance and long life
- Powder paint finish provides durability in outdoor environments

#### OPTICS

- Zero uplight distributions using individual acrylic
- LED optics provide IES type II, III and IV distributions. Optional (CS) acrylic diffuser available for reduced glare
- Prismatic refractor lens provides ~10% uplight for increased vertical footcandles and forward light projection ideal for security lighting
- L96 at 60,000hrs (Projected per IESNA TM-21-11), see table on page 3 for all values

#### INSTALLATION

- Quick-mount adapter provides easy installation to wall or to recessed junction boxes (4" square junction box)
- Designed for direct j-box mount.
- Optional 1/2" conduit hubs available (standard for sensor, SiteSync and battery versions)

#### ELECTRICAL

- 120V-277V universal voltage 50/60Hz 0-10V dimming drivers
- 347V and 480V dimmable driver option in 12L-070 configuration
- Minimum operating temperature is -40°C/-40°F (excludes 12L-035 and P15 configurations)
- Drivers have greater than .90 power factor and less than 20% Total Harmonic Distortion
- Driver RoHS and IP66
- 10kA surge protector
- 3000K CCT nominal, 4000K CCT nominal, 5000K CCT nominal (70 CRI)
- 9, 12 and 18 LED configurations available see pages 2 and 3 for electrical and photometric details

#### CONTROLS

- Universal button photocontrol
- Occupancy sensor options available for complete on/off and dimming control
- SiteSync pre-commissioned wireless controls (with or without sensor)
- Integral Battery Backup provides emergency lighting for the required 90 minute path of egress
- Dual Driver and Dual Power Feed option for 18L-070 versions

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_  
TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_  
CATALOG #: \_\_\_\_\_



\*Shown with CS acrylic diffuser

### RELATED PRODUCTS

θ [LNC](#) θ [INC3](#) θ [LNC4](#)

#### CERTIFICATIONS

- DLC® DesignLights Consortium Qualified, with some Premium Qualified configurations. Please refer to the DLC website for specific product qualifications at [www.designlights.org](http://www.designlights.org)
- Listed to UL1598 and CSAC22.2#250.0-24 for wet locations
- Made-to-order versions are IP-65 rated
- This product qualifies as a "designated country construction material" per FAR 52.225-11 Buy American-Construction Materials under Trade Agreements effective 04/23/2020. See [Buy American Solutions](#)

#### WARRANTY

- 5 year limited warranty
- See [HLI Standard Warranty](#) for additional information

| KEY DATA                       |            |
|--------------------------------|------------|
| Lumen Range                    | 2600-4100  |
| Wattage Range                  | 29-42      |
| Efficacy Range (LPW)           | 85-112     |
| Fixture Projected Life (Hours) | L96>60K    |
| Weights lbs. (kg)              | 9.6 (24.5) |

|                                                                                 |                                                 |                                           |                    |
|---------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|--------------------|
| Submitted by Swaney Lighting                                                    | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>LNC2-9L-3K-070-4-U-*** | Type:<br><b>W4</b> |
|  |                                                 | Notes:                                    | SLA21-50001        |



## LNC2

SMALL LED LITEPAK

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

### ORDERING GUIDE

Example: LNC2-9L-3K-2-U-DBT-PCU

CATALOG #

### ORDERING INFORMATION

| Series                         | # LEDs                             | CCT/CRI                         | Drive Current                     | IES Distribution                                   | Voltage                    | Mounting                        |
|--------------------------------|------------------------------------|---------------------------------|-----------------------------------|----------------------------------------------------|----------------------------|---------------------------------|
| <b>LNC2</b> Small LitePak LNC2 | <b>9L</b> 9 LEDs                   | <b>3K</b> 3000K nominal, 70 CRI | <b>070</b> 700mA                  | <b>2</b> Type II <sup>1</sup>                      | <b>U</b> 120-277V          | Leave blank for down position   |
|                                | <b>12L</b> 12 LEDs                 | <b>4K</b> 4000K nominal, 70 CRI | <b>035</b> 350mA (12L & 18L only) | <b>3</b> Type III <sup>1</sup>                     | <b>1</b> 120V              | <b>NV</b> Inverted <sup>2</sup> |
|                                | <b>18L</b> 18 LEDs                 | <b>5K</b> 5000K nominal, 70 CRI |                                   | <b>4</b> Type IV <sup>1</sup>                      | <b>2</b> 208V              |                                 |
|                                | <b>P15</b> 15w Prismatic Refractor | <b>AM</b> Amber <sup>9</sup>    |                                   | <b>FT</b> Forward Throw (Prismatic Refractor only) | <b>3</b> 240V              |                                 |
|                                | <b>P25</b> 25w Prismatic Refractor |                                 |                                   |                                                    | <b>4</b> 277V              |                                 |
|                                | <b>P35</b> 35w Prismatic Refractor |                                 |                                   |                                                    | <b>5</b> 480V <sup>6</sup> |                                 |
|                                |                                    |                                 |                                   |                                                    | <b>F</b> 347V <sup>6</sup> |                                 |

| Specify Std. finish                                                                                                                                                                                                                                                                                                                                                                                                                      | Control Options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Options                                                                                                                                                                                                                                                                                                                                                                                       | Notes:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Finish</b><br><b>BLT</b> Black Matte Textured<br><b>BLS</b> Black Gloss Smooth<br><b>DBT</b> Dark Bronze Matte Textured<br><b>DBS</b> Dark Brone Gloss Smooth<br><b>GTT</b> Graphite Matte Textured<br><b>LGS</b> Light Grey Gloss Smooth<br><b>PSS</b> Platinum Silver Smooth<br><b>WHT</b> White Matte Textured<br><b>WHS</b> White Gloss Smooth<br><b>VG</b> Verde Green Textured<br><b>Color Option</b><br><b>CC</b> Custom Color | <b>SCP</b> Occupancy Sensor Programmable (Dim) <sup>4,5</sup><br><b>PCU</b> Universal Button Photocontrol<br><b>SWP</b> SiteSync Pre-Commission <sup>6</sup><br><b>SWPM</b> SiteSync Pre-commission w/ OCC Sensor <sup>6,7</sup><br><b>Specify SCP Height</b><br><b>8F</b> Up to 8ft mount height<br><b>20F</b> Up to 20ft mount height<br><b>Sensors</b><br><b>BTS_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens <sup>9</sup><br><b>BTSO_F</b> Bluetooth Programmable, PIR Occupancy/Daylight Sensor, 360° lens, up to 12' mounting height <sup>10</sup> | <b>EH</b> Battery Backup Unit with Heater (-30°C) <sup>3</sup><br><b>E</b> Battery Backup Unit (0°C) <sup>3</sup><br><b>F</b> Fuse & Fuse-Holder (not available with Battery Backup) <sup>3</sup><br><b>CS</b> Comfort Shield (N/A with Prismatic Refractor)<br><b>2DR</b> Dual Driver (18L - 700mA only)<br><b>2PF</b> Dual Power Feed (18L - 700mA only)<br><b>CH</b> Surface Conduit Hubs) | <b>1</b> IES distributions only available with 9L, 12L, and 18L versions<br><b>2</b> Not available with occupancy sensor, battery backup or prismatic refractor options<br><b>3</b> Must specify voltage (120 or 277 only for E & EH)<br><b>4</b> Must order minimum of one remote control to program dimming settings, 0-10V fully adjustable dimming with automatic daylight calibration and different time delay settings, 120-277V only<br><b>5</b> PCU option not applicable, included in sensor<br><b>6</b> 18L - 700mA versions only. Not available with 2DR or 2PF options. Must specify group and zone information at time of order<br><b>7</b> Specify time delay; dimming level and mounting height<br><b>8</b> 12L - 700mA version only<br><b>9</b> For 350 mA only<br><b>10</b> Replace " " with "12" for up to 12' mounting height |

### STOCK ORDERING INFORMATION

| Catalog Number         | Lumens | Wattage | Distribution | CCT/CRI     | Voltage  | Distribution | Weight lbs. (kg) | Finish | Options     |
|------------------------|--------|---------|--------------|-------------|----------|--------------|------------------|--------|-------------|
| LNC2-12LU-4K-3-DB      | 2,662  | 29W     | 3            | 4000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | *           |
| LNC2-12LU-5K-3-DB      | 2,868  | 29W     | 3            | 5000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | *           |
| LNC2-12LU-5K-3-DB-PC-U | 2,868  | 29W     | 3            | 5000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | Photocell * |
| LNC2-18LU-4K-3-DB      | 3,806  | 42W     | 3            | 4000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | *           |
| LNC2-18LU-5K-3-DB      | 4,106  | 42W     | 3            | 5000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | *           |
| LNC2-18LU-5K-3-DB-PC-U | 4,106  | 42W     | 3            | 5000K/70CRI | 120-277V | Type 3       | 7.0 (13.3)       | Bronze | Photocell * |
| LNC2-P35-4K-PCU        | 4,025  | 37W     | FT           | 4000K/70CRI | 120-277V | FT           | 7.0 (13.3)       | Bronze | Photocell   |
| LNC2-P35-PCU           | 4,108  | 37W     | FT           | 5000K/70CRI | 120-277V | FT           | 7.0 (13.3)       | Bronze | Photocell   |

### REPLACEMENT PART - MADE TO ORDER

| Catalog Number                      | Description                                                                                    |
|-------------------------------------|------------------------------------------------------------------------------------------------|
| <input type="checkbox"/> SCP-Remote | Remote control for SCP option. Order at least one per project to program and control fixtures* |

Notes:

\* IES distributions only available with 9L, 12L and 18L versions

|                                                                                  |                                                        |                                                  |                               |
|----------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------|-------------------------------|
| Submitted by Swaney Lighting                                                     |                                                        | <b>Catalog Number:</b><br>LNC2-9L-3K-070-4-U-*** | <b>Type:</b><br><br><b>W4</b> |
|  | <b>Job Name:</b><br>CONDITIONED SELF-STORAGE BIDDEFORD | <b>Notes:</b>                                    | SLA21-50001                   |



|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

## LNC2

SMALL LED LITEPAK

### PERFORMANCE DATA

#### STANDARD 9, 12 AND 18L VERSIONS

| # Of LEDs | Nominal Wattage | System Watts | Dist. Type | 5K (5000K NOMINAL 70 CRI) |      |   |   |   | 4K (4000K NOMINAL 70 CRI) |      |   |   |   | 3K (3000K NOMINAL 80 CRI) |      |   |   |   |
|-----------|-----------------|--------------|------------|---------------------------|------|---|---|---|---------------------------|------|---|---|---|---------------------------|------|---|---|---|
|           |                 |              |            | Lumens                    | LPW* | B | U | G | Lumens                    | LPW* | B | U | G | Lumens                    | LPW* | B | U | G |
| 9         | 700mA           | 21W          | 2          | 2,083                     | 97   | 1 | 0 | 1 | 2,072                     | 97   | 1 | 0 | 1 | 1,927                     | 90   | 1 | 0 | 1 |
|           |                 |              | 3          | 1,972                     | 92   | 0 | 0 | 1 | 1,962                     | 92   | 0 | 0 | 1 | 1,825                     | 85   | 0 | 0 | 1 |
|           |                 |              | 4          | 2,097                     | 98   | 0 | 0 | 1 | 2,087                     | 98   | 0 | 0 | 1 | 1,941                     | 91   | 0 | 0 | 1 |
| 12        | 350mA           | 14W          | 2          | 1,513                     | 110  | 0 | 0 | 1 | 1,506                     | 109  | 0 | 0 | 1 | 1,440                     | 104  | 0 | 0 | 1 |
|           |                 |              | 3          | 1,433                     | 104  | 0 | 0 | 1 | 1,426                     | 103  | 0 | 0 | 1 | 1,364                     | 99   | 0 | 0 | 1 |
|           |                 |              | 4          | 1,524                     | 110  | 0 | 0 | 1 | 1,543                     | 112  | 0 | 0 | 1 | 1,476                     | 107  | 0 | 0 | 1 |
|           | 700mA           | 29W          | 2          | 2,777                     | 97   | 1 | 0 | 1 | 2,763                     | 97   | 1 | 0 | 1 | 2,570                     | 90   | 1 | 0 | 1 |
|           |                 |              | 3          | 2,629                     | 92   | 1 | 0 | 1 | 2,616                     | 91   | 1 | 0 | 1 | 2,433                     | 85   | 1 | 0 | 1 |
|           |                 |              | 4          | 2,797                     | 98   | 1 | 0 | 1 | 2,783                     | 97   | 1 | 0 | 1 | 2,588                     | 90   | 1 | 0 | 1 |
| 18        | 350mA           | 21W          | 2          | 2,270                     | 107  | 1 | 0 | 1 | 2,259                     | 106  | 1 | 0 | 1 | 2,074                     | 97   | 1 | 0 | 1 |
|           |                 |              | 3          | 2,149                     | 101  | 0 | 0 | 1 | 2,138                     | 100  | 0 | 0 | 1 | 1,963                     | 92   | 0 | 0 | 1 |
|           |                 |              | 4          | 2,286                     | 107  | 0 | 0 | 1 | 2,275                     | 107  | 0 | 0 | 1 | 2,125                     | 100  | 0 | 0 | 1 |
|           | 700mA           | 43W          | 2          | 4,261                     | 99   | 1 | 0 | 1 | 4,240                     | 98   | 1 | 0 | 1 | 3,943                     | 91   | 1 | 0 | 1 |
|           |                 |              | 3          | 4,033                     | 93   | 1 | 0 | 1 | 4,014                     | 93   | 1 | 0 | 1 | 3,733                     | 86   | 1 | 0 | 1 |
|           |                 |              | 4          | 4,290                     | 99   | 1 | 0 | 1 | 4,270                     | 99   | 1 | 0 | 1 | 3,971                     | 92   | 1 | 0 | 1 |

#### PRISMATIC REFRACTOR

| # Of LEDs | Nominal Wattage | Dist. Type | 5K (5000K NOMINAL 70 CRI) |      |   |   |   | 4K (4000K NOMINAL 70 CRI) |      |   |   |   | 3K (3000K NOMINAL 80 CRI) |      |   |   |   |
|-----------|-----------------|------------|---------------------------|------|---|---|---|---------------------------|------|---|---|---|---------------------------|------|---|---|---|
|           |                 |            | Lumens                    | LPW* | B | U | G | Lumens                    | LPW* | B | U | G | Lumens                    | LPW* | B | U | G |
| 1         | 15W             | FT         | 1,741                     | 132  | 0 | 3 | 2 | 1,706                     | 129  | 0 | 3 | 2 | 1,648                     | 125  | 0 | 3 | 2 |
|           | 25W             |            | 2,929                     | 117  | 1 | 3 | 2 | 2,806                     | 112  | 1 | 3 | 2 | 2,773                     | 111  | 1 | 3 | 2 |
|           | 35W             |            | 4,108                     | 112  | 1 | 3 | 3 | 4,025                     | 110  | 1 | 3 | 3 | 3,889                     | 106  | 1 | 3 | 3 |

Notes:

\* Lumen values are from photometric tests performed in accordance with IESNA LM-79-08. Data is considered to be representative of the configurations shown. Actual performance may differ as a result of end-user environment and application. LNC2-12L battery mode produces 1,546 initial lumens. Meets UL924 90 minute discharge pattern.

### PROJECTED LUMEN MAINTENANCE

#### STANDARD 9, 12 AND 18L VERSIONS

| Ambient Temperature | OPERATING HOURS |        |        |                      |         |             |
|---------------------|-----------------|--------|--------|----------------------|---------|-------------|
|                     | 0               | 25,000 | 50,000 | TM-21-11* L96 60,000 | 100,000 | L70 (Hours) |
| 25°C / 77°F         | 1.00            | 0.98   | 0.97   | 0.96                 | 0.95    | >791,000    |
| 40°C / 104°F        | 0.99            | 0.98   | 0.96   | 0.96                 | 0.95    | >635,000    |

#### PRISMATIC REFRACTOR

| Ambient Temperature | OPERATING HOURS |        |        |                      |         |             |
|---------------------|-----------------|--------|--------|----------------------|---------|-------------|
|                     | 0               | 25,000 | 50,000 | TM-21-11* L96 60,000 | 100,000 | L70 (Hours) |
| 25°C / 77°F         | 1.00            | 0.94   | 0.89   | 0.87                 | 0.80    | >160,000    |
| 40°C / 104°F        | 0.99            | 0.93   | 0.88   | 0.86                 | 0.78    | >150,000    |

\* Projected per IESNA TM-21-11 \* (Nichia 219B, 700mA, 85°C Ts, 10,000hrs). Data references the extrapolated performance projections for the LNC-12LU-5K base model in a 40°C ambient, based on 10,000 hours of LED testing per IESNA LM-80-08.



## LNC2

SMALL LED LITEPAK

DATE: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TYPE: \_\_\_\_\_ PROJECT: \_\_\_\_\_

CATALOG #: \_\_\_\_\_

## ELECTRICAL DATA

## STANDARD 9, 12 AND 18L VERSIONS

| # OF LEDS | Drive Current (mA) | Input Voltage (V) | Oper. Current (Amps) | System Power (W) |
|-----------|--------------------|-------------------|----------------------|------------------|
| 9         | 700mA              | 120               | 0.18                 | 21               |
|           |                    | 277               | 0.08                 | 21               |
| 12        | 350mA              | 120               | 0.12                 | 14               |
|           |                    | 277               | 0.05                 | 14               |
|           | 700mA              | 120               | 0.24                 | 29               |
|           |                    | 277               | 0.10                 | 29               |
|           |                    | 347               | 0.08                 | 29               |
|           |                    | 480               | 0.06                 | 29               |
| 18        | 350mA              | 120               | 0.18                 | 21               |
|           |                    | 277               | 0.08                 | 21               |
|           | 700mA              | 120               | 0.36                 | 43               |
|           |                    | 277               | 0.16                 | 43               |

## PRISMATIC REFRACTOR

| # OF LEDS | Drive Current (mA) | Input Voltage (V) | Oper. Current (Amps) | System Power (W) |
|-----------|--------------------|-------------------|----------------------|------------------|
| 1         | 350mA              | 120               | 0.11                 | 13               |
|           |                    | 277               | 0.05                 | 13               |
|           | 600mA              | 120               | 0.21                 | 25               |
|           |                    | 277               | 0.09                 | 25               |
|           | 900mA              | 120               | 0.31                 | 37               |
|           |                    | 277               | 0.13                 | 37               |

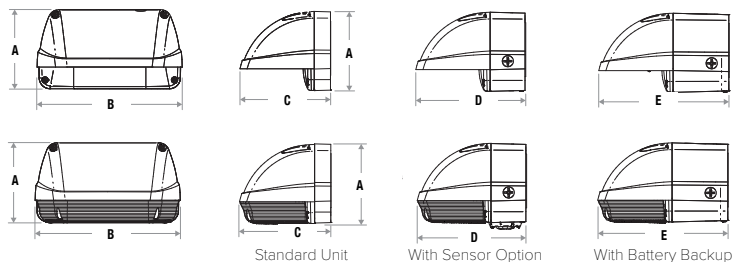
## LUMINAIRE AMBIENT TEMPERATURE FACTOR (LATF)

Standard 9, 12, 18L and Prismatic Versions

| Ambient Temperature |        | Lumen Multiplier |
|---------------------|--------|------------------|
| 0° C                | 32° F  | 1.02             |
| 10° C               | 50° F  | 1.01             |
| 20° C               | 68° F  | 1.00             |
| 25° C               | 77° F  | 1.00             |
| 30° C               | 86° F  | 1.00             |
| 40° C               | 104° F | 0.99             |
| 50° C               | 122° F | 0.98             |

Use these factors to determine relative lumen output for average ambient temperatures from 0-40°C (32-104°F).

## DIMENSIONS



| A                 | B                  | C                 | D                 | E                 |
|-------------------|--------------------|-------------------|-------------------|-------------------|
| 5.54"<br>(141 mm) | 10.16"<br>(258 mm) | 6.33"<br>(161 mm) | 7.64"<br>(194 mm) | 9.10"<br>(231 mm) |

|                                                                                  |                                                 |                                           |                    |
|----------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------|--------------------|
| Submitted by Swaney Lighting                                                     | Job Name:<br>CONDITIONED SELF-STORAGE BIDDEFORD | Catalog Number:<br>LNC2-9L-3K-070-4-U-*** | Type:<br><b>W4</b> |
|  |                                                 | Notes:                                    | SLA21-50001        |



## LNC2

SMALL LED LITEPAK

### ADDITIONAL INFORMATION

#### SHIPPING INFORMATION

| Catalog Number | G.W(kg)/CTN | Carton Dimensions |                 |                  | Carton Qty. per Master Pack |
|----------------|-------------|-------------------|-----------------|------------------|-----------------------------|
|                |             | Length Inch (cm)  | Width Inch (cm) | Height Inch (cm) |                             |
| LNC2-12LU      | 14.3 (6.5)  | 14.5 (37)         | 11.4 (29)       | 8.4 (21.5)       | 2                           |
| LNC2-18LU      | 14.8 (6.7)  | 14.9 (38)         | 11.4 (29)       | 8.4 (21.5)       | 2                           |

|            |           |
|------------|-----------|
| DATE:      | LOCATION: |
| TYPE:      | PROJECT:  |
| CATALOG #: |           |

#### NV - INVERTED MOUNTING OPTIONS



\*Requires Factory Installed Lens Option

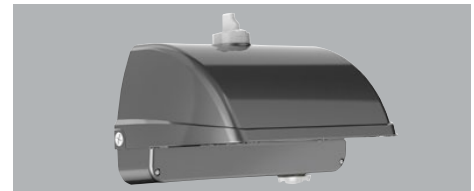
Inverted mounting capabilities for uplighting applications. Specially designed frosted acrylic diffuser option softens output, improves uniformity and protects LED lenses.

#### SCP - PROGRAMMABLE OCCUPANCY SENSOR



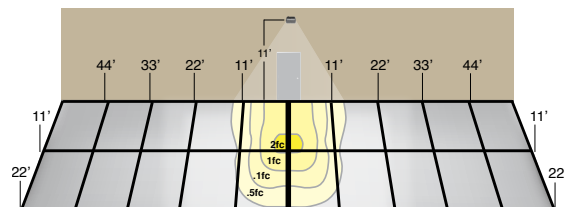
Sensor offers greater control and energy savings with SCP programmable sensor with adjustable delay and dimming levels (Factory default is 10%) Visit: <http://www.hubbellighting.com/solutions/controls/> for control application information

#### SWP & SWPM - SITESYNC™



When ordering a fixture with the SiteSync lighting control option, additional information will be required to complete the order. The SiteSync Commissioning Form or alternate schedule information must be completed. This form includes Project locations Group information, and Operating schedules. For more detailed information please visit [www.HubbellLighting.com/products/sitesync](http://www.HubbellLighting.com/products/sitesync) or contact Hubbell Lighting tech support at (800) 345-4928.

#### LNC2 - BATTERY BACK UP



#### 11' Mounting Height

Provides Life Safety Code average illuminance of 1.0 fc. Assumes open space with no obstructions and mounting height of 11'.

Diagrams for illustration purposes only, please consult factory for application layout.

Battery backup units consume 6 watts when charging a dead battery and 2 watts during maintenance charging. EH (units with a heater) consume up to an additional 8 watts when charging if the battery temp is lower than 10°C

#### E & EH EMERGENCY BATTERY BACKUP

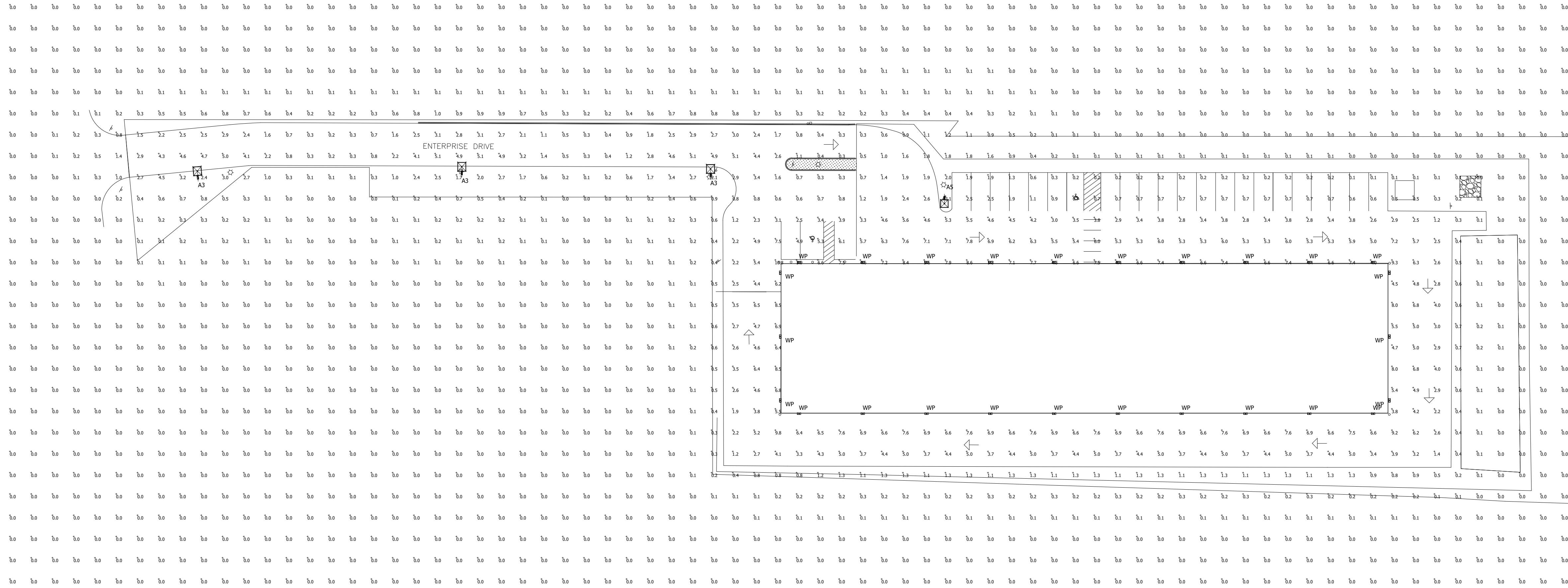


Standard versions utilize 9, 12 or 18 High Power LEDs to generate 1,600 - 4,200 lumens in Normal Mode and use 4 LEDs for up to 700 lumens in Emergency Mode. Prismatic refractor versions utilize 1 COB LED to generate approximately 900 lumens in emergency mode.

### USE OF TRADEMARKS AND TRADE NAMES

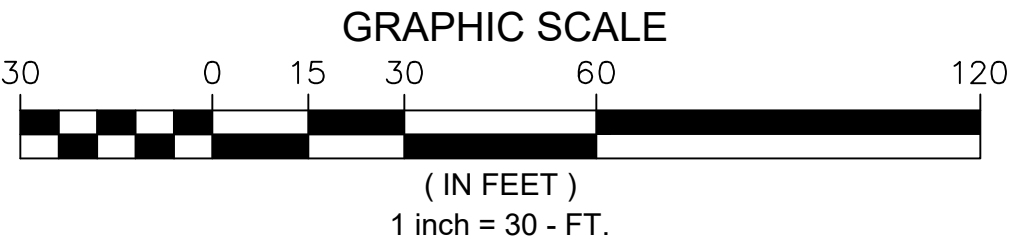
All product and company names, logos and product identifies are trademarks ™ or registered trademarks ® of Hubbell Lighting, Inc. or their respective owners. Use of them does not necessarily imply any affiliation with or endorsement by such respective owners.





| Luminaire Schedule |     |       |                 |       |             |            |                         |
|--------------------|-----|-------|-----------------|-------|-------------|------------|-------------------------|
| Symbol             | Qty | Label | Mounting Height | LLF   | Lum. Lumens | Lum. Watts | Description             |
|                    | 3   | A3    | 15' - 0" AFG    | 0.900 | 9512        | 70         | RAR1-160L-70-4K7-3-U    |
|                    | 1   | A5    | 15' - 0" AFG    | 0.900 | 9562        | 70         | RAR-1-160L-70-4K7-5QW-U |
|                    | 26  | WP    | 15' - 0" AFG    | 0.900 | 5704        | 45         | RWL1-48L-45-4K7-4W-U    |

| Calculation Summary |             |       |      |      |     |         |         |
|---------------------|-------------|-------|------|------|-----|---------|---------|
| Label               | CalcType    | Units | Avg  | Max  | Min | Avg/Min | Max/Min |
| Overall Area        | Illuminance | Fc    | 0.78 | 10.8 | 0.0 | N.A.    | N.A.    |
| Paved Area          | Illuminance | Fc    | 3.78 | 10.8 | 0.1 | 37.80   | 108.00  |



1. THIS LIGHTING DESIGN IS BASED ON LIMITED INFORMATION SUPPLIED BY OTHERS TO HUBBELL LIGHTING. SITE DETAILS PROVIDED HEREON ARE REPRODUCED ONLY AS A VISUALIZATION AID. FIELD DEVIATIONS MAY SIGNIFICANTLY AFFECT PREDICTED PERFORMANCE. PRIOR TO INSTALLATION, CRITICAL SITE INFORMATION (POLE LOCATIONS, ORIENTATION, MOUNTING HEIGHT, ETC.) SHOULD BE COORDINATED WITH THE CONTRACTOR AND/OR SPECIFIER RESPONSIBLE FOR THE PROJECT.

2. LUMINAIRE DATA IS TESTED TO INDUSTRY STANDARDS UNDER LABORATORY CONDITIONS. OPERATING VOLTAGE AND NORMAL MANUFACTURING TOLERANCES OF LAMP, BALLAST, AND LUMINAIRE MAY AFFECT FIELD RESULTS.

3. CONFORMANCE TO FACILITY CODE AND OTHER LOCAL REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER AND/OR THE OWNER'S REPRESENTATIVE.

TITLE:

SELF STORAGE  
BIDDEFORD, ME  
SITE PHOTOMETRIC PLAN

REVISED FROM DRAWING NUMBER(S):

R1: 03/24/22

Hubbell Lighting, Inc.  
701 MILLENNIUM BLVD.  
GREENVILLE, SC 29607

DN BY:  
DHK

REV BY:  
DHK

QUOTE:  
N/A

DATE:  
03/18/22

DATE:  
03/24/22

DRAWING / DESIGN NO:  
2229412R1

CHK BY:  
N/A

SCALE:  
AS NOTED



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# SECTION 10

## SOLID WASTE



## **Section 10: Solid Waste**

The Applicant does not intend to provide a dumpster on site. If trash or recycling is generated by a tenant, the expectation is that the tenant will deal with it on their own accord. This is standard practice in the climate controlled self-storage industry.



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# SECTION 11

## PHOTOGRAPHS



## Section 11: Photographs



1. Future entrance of property facing North-West along West Cole Road.



2. Looking southeast along the property line where future entrance road will lay.







3. Northern corner of property abutting Route 111 near existing sewer easement.



4. Typical vegetative growth on the property.





5. Overview of Site



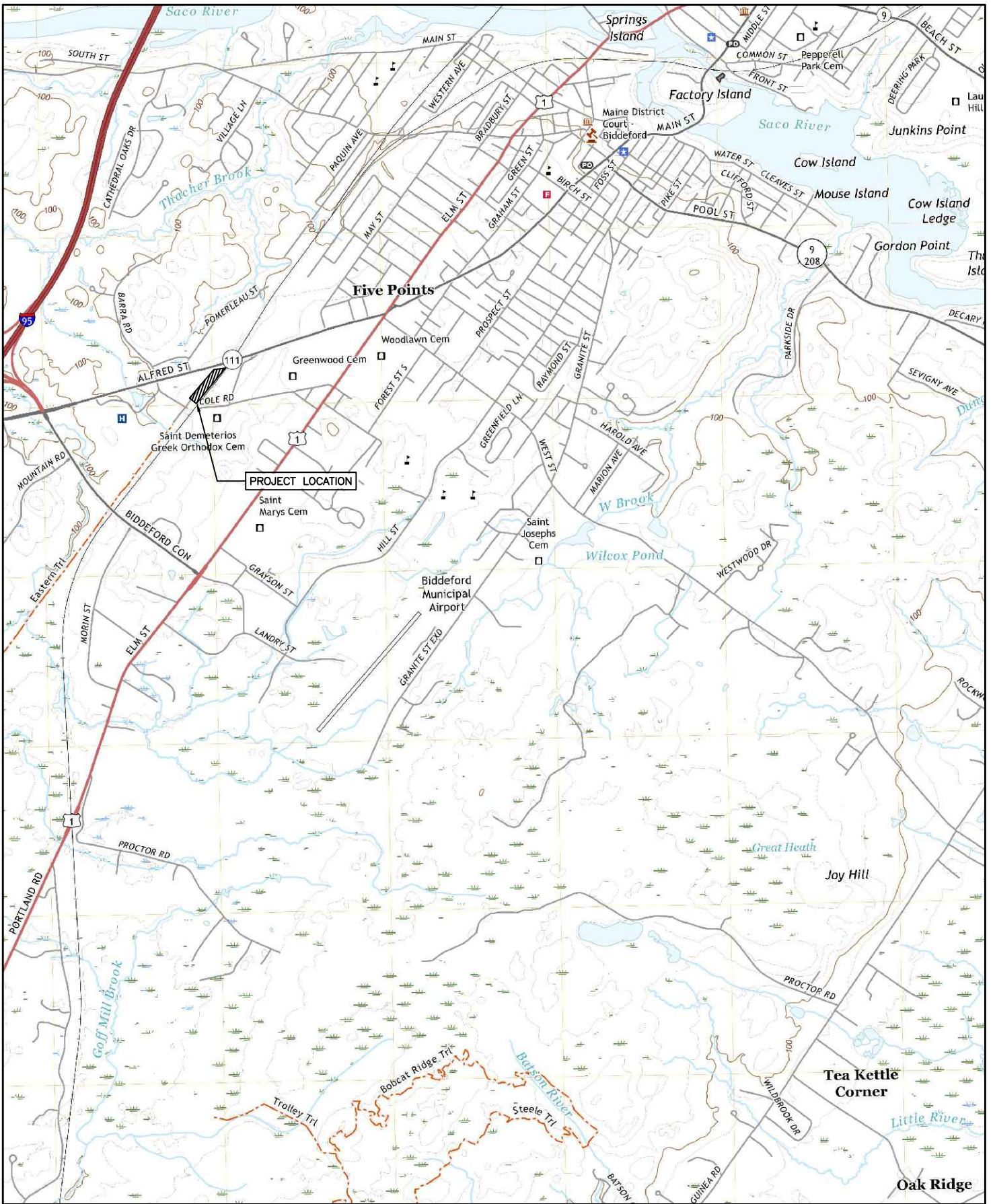
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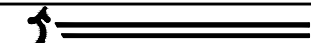
# SECTION 12

## VICINITY MAP







|                                                                                                                                                                                                                     |                 |                                                                                                                                                                                                        |                                           |               |               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------------|---------------|
| THIS PLAN SHALL NOT BE MODIFIED WITHOUT WRITTEN PERMISSION FROM ACORN ENGINEERING, INC. ANY ALTERATIONS, AUTHORIZED OR OTHERWISE, SHALL BE AT THE USER'S SOLE RISK AND WITHOUT LIABILITY TO ACORN ENGINEERING, INC. | FILE: 1158      | <br><b>ACORN ENGINEERING, INC.</b><br>ACORN ENGINEERING, INC. P.O. BOX 3372<br>PORTLAND, MAINE 04104 (207) 775-2655 | DRAWING NAME:<br>SITE LOCATION MAP        | ISSUED FOR    | BY<br>DATE    |
|                                                                                                                                                                                                                     | DATE: 3/5/22    |                                                                                                                                                                                                        | PROJECT NAME:<br>CONDITIONED SELF-STORAGE | SITE PLAN APP | SJL<br>3/5/22 |
| DRAWING NO.<br>LOCATION/TOPO<br>MAP                                                                                                                                                                                 | JN: 1158        |                                                                                                                                                                                                        | CLIENT:                                   |               |               |
|                                                                                                                                                                                                                     | SCALE: 1:2500   |                                                                                                                                                                                                        | STEELCLAD BIDDEFORD                       |               |               |
|                                                                                                                                                                                                                     | DESIGN BY: SJL  |                                                                                                                                                                                                        |                                           |               |               |
|                                                                                                                                                                                                                     | DRAWN BY: AWG   |                                                                                                                                                                                                        |                                           |               |               |
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# **SECTION 13**

## **CONDITIONAL USE REVIEW SHEET**



## CONDITIONAL USES

### *VII Attachment 1*

#### **City of Biddeford**

#### **Conditional Use Review Sheet [Amended 2-2-2010 by Ord. No. 2009.98]**

1. Applications for conditional use permits must meet the standards specified in Article VI of this ordinance as well as the standards of subdivision (Chapter 66 of the Biddeford Code of Ordinances), or site review (Article XI, of this ordinance). In addition, because of the unique nature and particular concern that the general public may have relating to a conditional use in a particular zone, the Planning Board shall consider each of the applications in light of the guidelines presented below.
2. The Planning Board shall approve, approve with conditions, or deny all applications for a conditional use permit. The applicant shall have the burden of proving that his or her application is in compliance with the requirements of this ordinance and that none of the conditions listed below would result from the approval of the conditional use permit. Failure of the applicant to submit required information shall constitute a basis for denial without a review of the remainder of the application. After the submission of a complete application and a review of the required submissions, the Planning Board shall approve the application or approve with conditions if the application meets the following standards:

| <b>Standards for Conditional Use Permit</b>                                                                                                                                                                                                                                   | <b>Yes</b> | <b>No</b> | <b>N/A</b> | <b>Remark</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------|---------------|
| A. The proposed use meets specified requirements set forth in compliance with state or federal laws;                                                                                                                                                                          | ✓          |           |            |               |
| B. The proposed use would not create fire safety hazards by providing adequate access to the site, or to the buildings on the site, for emergency vehicles and would not create hazards through the storage of chemicals and wastes;                                          | ✓          |           |            |               |
| C. The proposed exterior lighting, where allowed, would not create hazards to motorists traveling on adjacent public streets or is adequate for the safety of occupants or users of the site or would not damage the value and diminish the usability of adjacent properties; | ✓          |           |            |               |
| D. The provisions for buffers and on-site landscaping provide adequate protection to neighboring properties from detrimental or unsightly features of the development;                                                                                                        | ✓          |           |            |               |
| E. The proposed use would not have a significant detrimental effect on the use                                                                                                                                                                                                | ✓          |           |            |               |

BIDDEFORD CODE

| Standards for Conditional Use Permit                                                                                                                                                                                                                                                                                             | Yes | No | N/A | Remark |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-----|--------|
| and peaceful enjoyment of abutting property as the result of noise, vibrations, fumes, odor, dust, glare, hours of operation, or other causes;                                                                                                                                                                                   |     |    |     |        |
| F. The provisions for vehicular loading and unloading and parking and for vehicular and pedestrian circulation on the site and onto adjacent public streets would not create hazards to public safety or traffic congestion;                                                                                                     | ✓   |    |     |        |
| G. The proposed use would generate a volume of traffic that can reasonably be accommodated by the existing road network, or would not create unreasonable traffic hazards or would not exacerbate an existing traffic hazard, or would not create unreasonable traffic congestion (example: decrease existing level of service); | ✓   |    |     |        |
| H. The proposed use would not have a significant, detrimental effect on the value of adjacent properties which could be avoided by reasonable modification of the proposal;                                                                                                                                                      | ✓   |    |     |        |
| I. The proposed use would not have an adverse impact on the privacy of the residents of the immediate area (within 500 feet) which could be avoided by reasonable modification of the proposal;                                                                                                                                  | ✓   |    |     |        |
| J. The proposed use would be in compliance with Biddeford's Comprehensive Plan;                                                                                                                                                                                                                                                  | ✓   |    |     |        |
| K. The proposed use would not have an adverse impact on the community relative to architectural design, scale, bulk and building height, identity and historical character, or visual integrity, which could be avoided by reasonable modification of the proposal;                                                              | ✓   |    |     |        |
| L. The design of the site would not result in significant flood hazards or flood damage or would be in conformance with applicable flood hazard protection requirements;                                                                                                                                                         | ✓   |    |     |        |
| M. Adequate provision has been made for disposal of wastewater or solid waste or                                                                                                                                                                                                                                                 | ✓   |    |     |        |

## CONDITIONAL USES

| Standards for Conditional Use Permit                                                                                                                                                                       | Yes | No | N/A | Remark |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----|-----|--------|
| for the prevention of ground or surface water contamination;                                                                                                                                               |     |    |     |        |
| N. Adequate provision has been made to control erosion or sedimentation;                                                                                                                                   | ✓   |    |     |        |
| O. Adequate provision has been made to handle stormwater runoff or other drainage problem on the site; and the proposed development will not unduly burden off-site surface water system;                  | ✓   |    |     |        |
| P. The proposed water supply would meet the demands of the proposed use for fire protection purposes;                                                                                                      | ✓   |    |     |        |
| Q. Adequate provision has been made for the transport, storage, and disposal of hazardous substances and materials as defined by state law;                                                                | ✓   |    |     |        |
| R. The proposed use would not have an adverse impact on scenic vistas or significant wildlife habitat or wetland areas and water bodies which could be avoided by reasonable modification of the proposal; | ✓   |    |     |        |
| S. When located in the Shoreland Zone, the proposed use would meet the purposes of Shoreland Zoning as identified in Article XIV, Section 1 (Purposes) of this Ordinance.                                  |     |    | ✓   |        |

The Planning Board may attach such conditions in addition to those required elsewhere in this ordinance, that would mitigate any adverse effects on adjoining or neighboring properties which might otherwise result from the proposed use. These conditions may include but are not limited to, specifications for:

- a. Type of vegetation for landscaping;
- b. Increased setbacks and yards;
- c. Specified sewage disposal and water supply facilities;
- d. Landscaping and planting screens;
- e. Periods of operation;

## BIDDEFORD CODE

- f. Operational controls;
- g. Professional inspection and maintenance;
- h. Sureties;
- i. Deed restrictions;
- j. Locations of piers, docks, parking and signs;
- k. Type of construction; or
- l. Any other conditions, restrictions, or safeguards that would uphold the spirit and intent of this ordinance or further review by the Biddeford Planning Board.

PLANNING BOARD  
REPORT

April 28, 2021

Biddeford Planning Board  
Hannah Bonine, Assistant City Planner  
City of Biddeford  
205 Main Street  
Biddeford, Maine 04005

Application: West Brook Subdivision – E & R Development Corp.  
Winding Creek Lane (Tax Map 8 Lot 3-1 and Lot 3)

**Subdivision Preliminary Subdivision Review**

Review Status: New application, Sketch Plan reviewed on January 5, 2022.

Board members and Ms. Bonine,

The following application information has been provided for review:

1. Application form dated 12/14/2021.
2. Application submittal: *Preliminary Subdivision Application, West Brook Subdivision, Winding Creek Lane, Biddeford, Maine...*February 2022.
3. Cover letter submitted for May 4<sup>th</sup> meeting, *Re: West Brook Subdivision*, from BH2M Engineers, Surveyors.
4. Stormwater Management Report, *West Brook Subdivision, Biddeford, Maine...Date: February 2022, Updated: April 2022.*
5. Draft Homeowner's Association documents.
6. *Ability to Serve* request letters to Sewer and Water from BH2M.
7. Preliminary Plan set entitled: *West Brook Subdivision, Winding Creek Lane, Biddeford, Maine, For: E & R Development Corp...* Prepared by BH2M Engineers, Surveyors, REV Date 3/30/2022.

With review of the above information and the Land Development Regulations and Subdivision Ordinance, I offer the following comments on compliance with the City's ordinances.

## **PROJECT DESCRIPTION**

The applicant seeks to create 19 residential lots via an extension of Winding Creek Lane, a dead-end public street that connects to Granite Street by means of Robin Court and Alison Avenue. The site is approximately 8.3 acres in size, approximately 350 feet wide and 1,050 feet in length, located in the Residential 1 (R-1-A) zone. It is adjacent to the West Brook, straddling lands owned by E & R Development Corp. (Tax Map 8 Lot 3) and a portion of Clifford Park that is owned by the City (Tax Map 8 Lot 3-1). The applicant, along with adjacent property owner Gervais Dube (Tax Map 30 Lot 58) and the City have an understanding on land conveyances among the three parties as outlined in the attached letter.

## **COMPLETENESS REVIEW**

The application is before the Planning Board as required by Chapter 66 (Subdivisions) subject to Subdivision review and approval. Per the City's Subdivision ordinance (66-26), all applications have a three-tier approval process beginning with a Sketch plan review, reviewed on 1/6/2022.

The applicant has submitted a preliminary plan application with the information outlined in Sec. 66-35 that is required for a complete application; with the exception of the following items that are missing or are in need of clarification:

1. Sec. 66-35(a)(18). This requirement anticipates information that addresses historic and natural features. No information has been submitted to vet historic and archeological presence resources (typically a letter from the Maine Historic Preservation Commission) nor anything from the state environmental agencies as to *significant wildlife habitats, habitat for rare and endangered plants and animals, and unique natural communities and natural areas*, etc.... A vernal pool assessment has not been submitted.
2. Sec. 66-35(d)(6). *Statement of financial capability of subdivider to undertake the proposed project.* Has not been submitted.
3. Sec. 66-35(d)(10). *Review by water company, power company and City Engineering, police, and fire department.* Only request letters from the agent to the water company and the City Engineer have been submitted, no review responses.

## **COMPLIANCE WITH THE CITY'S ORDINANCES**

The Planning Board, at its 1/5/2022 meeting requested the application be reviewed by Long Meadow Planning & Landscape Architecture, LLC (LMP&LA) and BRI Environmental (who prepared the wildlife report). This review is this first opportunity for the consultants to provide comment on the application since the LMP&LA's 3/2021 report and BRI Environmental completing the wildlife report.

The following are comments that Board and the applicant should consider:

ENVIRONMENTALLY SENSITIVE AREAS (Sec. 66-39(b)(8))

*When reviewing the context of the overall area through a lens of land conservation and wildlife habitat, it appears that this and subsequent developments as identified in the Letter of Understanding, will encroach and likely block what looks to be a corridor connecting conserved land within Clifford Park (Maine Coast Heritage Trust conservation easement) and the Blandings Park Wildlife Sanctuary (conserved significant wildlife habitat). This particular location in the City is part of an identified Undeveloped Habitat Block that is 939 acres in size. See attached Beginning with Habitat map.* This comment from the 3/2021 Board Report remains pertinent and the current design, even with reduced proposed lot sizes and denoted wildlife corridor, appears to divide the undeveloped habitat block in two. (See Fig 1 and ATT 1(BRI Aerial Plan))

1. It was recommended in March of 2021 that a different form of development other than single family lots would have a more compact overall footprint and have less impact to the adjacent natural resources, that have been identified in the BRI report as significant habitat. The attached sketch (Fig. 2) demonstrates how much less the encroachment on the significant riparian habitat associated with West Brook would be if an alternative housing type was used, such as duplexes in a condominium form of ownership.

The sketch is not meant to be construed as a solution, but only as a diagram that shows the greater flexibility than what is possible in the model of development being proposed.

Developing this portion of the site will have its own challenges related to steep slopes (See Pre-Development Existing Grading Plan). What the exercise does indicate is that the parcel may not be ideal for the type or amount of development proposed when considering all the site constraints.

2. While not permitted in the base zone, multi-family condominiums would allow for even less impact while realizing the same density, and would likely be a good candidate for a contract zone given the large public benefit associated with the open space being conveyed to the City.
3. The applicant has made an effort to cluster the development as requested, however, it is difficult to realize the benefits of a cluster development when the starting point (the limits of the site) are based on the bare minimum area required for a conventional single-family subdivision. Using a different development model than single-family lots (and/or different location in determining the site limits) would help to achieve a typical cluster development resulting in less overall impact.
4. The BRI report's recommendations (ATT. 2) raises a number of questions that some of which have not been addressed. An important regulatory review threshold item is the question of Maine DEP Site Location Development review of all 50 proposed lots (identified in the LOU, ATT. 3) in a comprehensive manner. Considering the state's regulations and statutes (Maine DEP Chap. 371 Definitions; and MRS Title 38 §482 Definitions) it appears the application may be subject to Site Law. For clarity, the applicant should request Maine DEP its opinion on this.



5. If Site Law is not applicable, it may still make good sense to review the total impacts of all proposed 50 lots comprehensively, or at a minimum, the 19 proposed in the application, with the Maine Department of Inland Fisheries and Wildlife (MDIF&W) and the state's Maine Natural Areas Program (MNAP) as it relates to potential impacts to the wildlife and plant habitats in the area. Attached is a letter dated 6/22/2021 from MDIF&W in response to BRI's request for information that identifies a great number of observations of endangered and threatened species indicating significant habitat southeast of the study area. Speaking to John Perry, Environmental Review Coordinator for MDIF&W, he explained that the map included in the June letter only shows documented observations, however, it is likely the observed species are also located within the study area. As such there are concerns of fragmentation in this area from potential development.

To determine if the endangered and threatened species identified in the MDIF&W letter are located in the West Brook riparian habitat, a presence and absence survey can be completed. The Board may want to consider requiring this survey to determine if the 250 and 300 foot buffers from West Brook that are recommended by BRI and MDIF&W are warranted. The applicant can coordinate with MDIF&W to complete the survey.

6. The submitted wetland report from 10/20/2019 identifies the wetlands associated with West Brook as *wetlands of special significance*. The applicant has identified on the plan a *wildlife travel corridor* that is located mostly outside of the development parcel. The area located within the limits of the proposed subdivision includes varying distances from West Brook between 100 feet to 150 feet. Distances of up to 300 feet are recommended by BRI and is clarified in a recent email, attached. The recommended distances are depicted on the sketch in Fig. 2 for reference.
7. As anticipated by Sec. 63-39 (b), the Planning Board shall make a positive finding on approval criteria listed (63-39 (b) (1) through (15). To this end, especially as it relates to Sec. 63-39 (b) (8) (which is based on the required state subdivision review criteria (30-A M.R.S.A. § 4404.8), it is important for the Board to have information that supports that significant wildlife habitats are maintained and preserved to the maximum extent with the proposed development. In considering the above comments the current application does not appear to provide that information, and it is difficult to see how the proposed development at this point maximizes preservation of what is likely significant habitat for endangered and threatened species.

#### LAND NOT SUITABLE FOR DEVELOPMENT (Sec. 66-71)

8. Sec. 66-71 (a) seems to anticipate land not suitable for development as not being part of any buildable lot. Among other areas, slopes greater than 33% is included in this category. Sec. 66-70 (b) (1) also references steep slopes. The applicant has prepared a *Pre-Development Existing Grading Plan* to address this section. The applicant interprets the requirement *Building envelopes shall not include any areas with a slope of more than 25%* as a condition of post-development, and provides plan note #27 (Sht. 1) to address it. The Board should determine if

it concurs with this interpretation or if the clause is referring to a pre-development condition. When considering both sections of the ordinance (66-70 and 66-71) the intention might be construed as proposed *building envelopes* and *buildable lots* as not physically including areas of steep slopes. Depending on how the Board interprets this would determine if a waiver should be considered if the site design is not altered.

9. Net Density Calculations (Sec. 44 in Article VI of the Zoning Ordinance) has been added to the Subdivision Plan (Sheet 1) plan note #24. The Pre-Development Existing Grading Plan should reference the values listed in note #24 and should be denoted on this plan.

#### SUBDIVIDING LAND DESIGNATED FOR PUBLIC USE. (SEC. 66-72.)

10. From plan note #25 (Sht. 1) the proposed open space is intended to be conveyed to the City. It should be determined if the City Council will be required to approve the designation prior to final approval or a condition of final approval will suffice. A draft deed, with expectations cited in plan note #26 should be drafted for the Board's and City staff's review prior to final approval.

#### AUTHORITY TO REQUIRE SUBDIVISION DESIGN TO SHOW RESPECT FOR NATURAL FEATURES (Sec. 66-76).

11. The Board should determine to what extent this provision applies to the application and if mature trees >24" in caliper should be shown on the plan and limits of tree clearing should be included on the plans to inform tree removal.

#### ARTICLE VI (LAND DEVELOPMENT REGULATIONS), SECTION 16 CLUSTER DEVELOPMENT

12. The applicant should review Section 16 and provide a written narrative on how the proposed development conforms to the applicable provisions and identify provisions that the applicant may want to request a waiver for (other than Sec. 16.C.8).
13. Sec. 16.D Siting and buffering standards anticipates consideration of building locations as well as a site visit by the Planning Board. The Board should determine if it will conduct a site walk.
14. Sec. 16 includes open space standards that require more specificity of the designated use/purpose that has not been clearly identified.

#### **WAIVER REQUESTS**

The applicant has requested a waiver from Article VI of the Land Development Regulations, Section 16.C.8 to permit buildings closer than 30 feet.

#### **CONCLUSION**

The Planning Board should determine if the application is complete, there appears to be some items outstanding for preliminary review. If it concurs that the outstanding items are pertinent to determining a positive finding of Sec. 66-39(b) it may consider tabling the application until such time the information is submitted. If the Board finds the application is complete it can discuss and

deliberate on the application and determine if there is enough information to make a positive finding on the criteria listed under Sec. 66-39(b) to grant preliminary approval. If so, the action can be to grant preliminary approval (or approval with conditions, e.g. conditioned on receiving outstanding information the Board finds it needs for final approval), to deny the preliminary application, or to continue (table) the preliminary application to a time when outstanding information is submitted and/or changes are made.

Feel free to contact me with questions.

Best regards,



Christopher Di Matteo  
City of Biddeford Contract Planner.  
cdimatteo@longmeadowpla.com  
207.604.4245



## Conserved Land and Undeveloped Habitat

Welcome Layers Legend

### Beginning with HABITAT

#### Conserved Lands and Undeveloped Habitat Blocks

This map viewer is an on-line adaptation of the Beginning with Habitat Map 3. It depicts the State of Maine's conserved lands database including lands in federal, state, and nonprofit ownership. Some privately owned conservation lands may not be represented. For the most accurate and current information about land ownership, consult with the local assessor and/or other local land management agencies. If public access potential to any of the properties displayed here is uncertain, landowners should be contacted first to determine if permission is necessary. If errors are noted in the current depiction of resources, please contact our office:

[www.BeginningWithHabitat.org](http://www.BeginningWithHabitat.org)

#### Ownership Types:

- Federal: National parks, forests, and wildlife refuges.
- State: Wildlife Management Areas and other properties managed by the Department of Inland Fisheries and Wildlife, state parks, and parcels managed by the Bureau of Parks & Lands.
- Municipal: Town parks, water district properties, community forests, etc.
- Private Conservation: Properties owned and managed by private (usually nonprofit) organizations such as The Nature Conservancy, Maine Coast Heritage Trust; Trust for Public Land, and local land trusts.
- Easement: Voluntary legal agreements that allow landowners to realize economic benefit by permanently restricting the amount and type of future development and other uses on all or part of their property as they continue to own and use it.

#### Focus Areas of Statewide Ecological Significance:

- Focus Areas of Statewide Ecological Significance have been designated based on an unusually rich convergence of rare plant and animal occurrences, high value habitat, and relatively intact natural landscapes (the combined elements of Beginning with Habitat Maps 1-3). Focus area boundaries were drawn

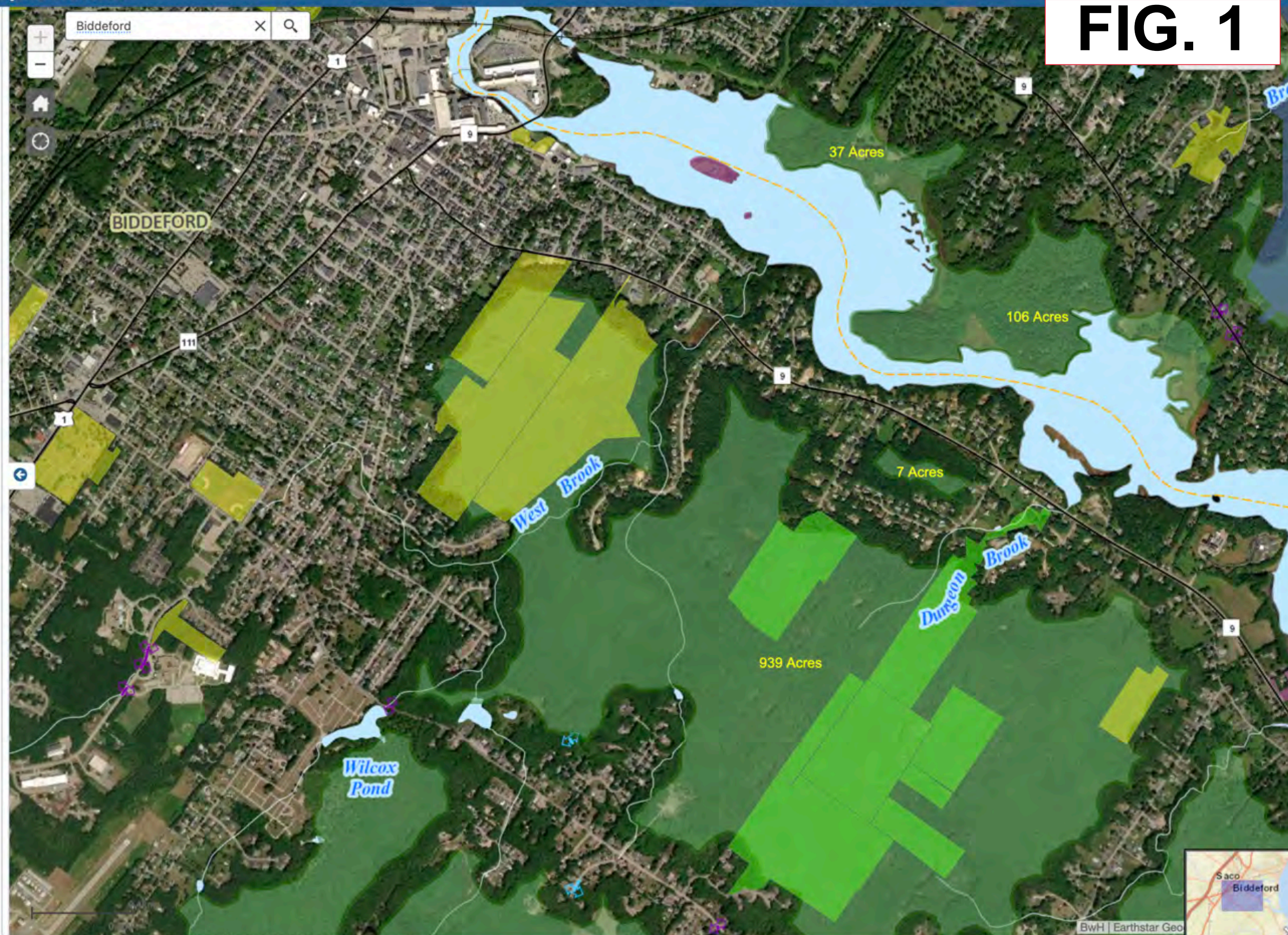
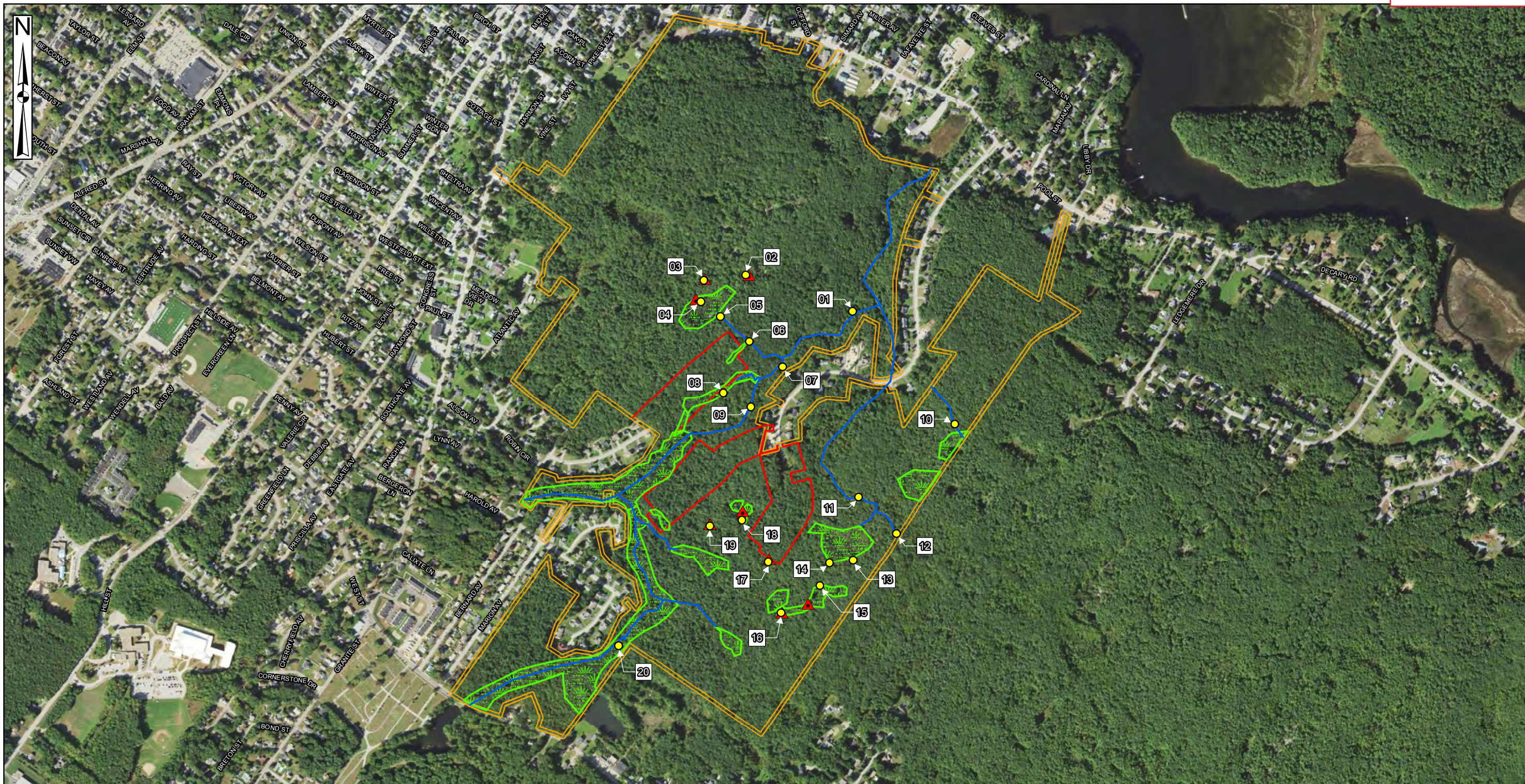


FIG. 1





|                         |                                                                                                                                                                                                                                               |                                                                                                                                                       |                                                                                                                                                            |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>INDEX MAP</b></p> | <p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>● Photograph Location</li> <li>▲ Potential Vernal Pool</li> <li>— Stream</li> <li>■ Wetland</li> <li>— Proposed Area of Development</li> <li>— Project Survey Boundary</li> </ul> | <p><b>bri</b><br/>BIODIVERSITY RESEARCH INSTITUTE<br/>innovative wildlife science</p> <p><b>SCALE:</b><br/>0 800 1,600 Feet<br/>1 inch = 800 feet</p> | <p><b>CITY OF BIDDEFORD MAINE</b></p> <p><b>RECON NATURAL RESOURCES &amp; PHOTOGRAPHIC LOCATION MAP<br/>BIDDEFORD, MAINE</b></p> <p>SEPTEMBER 29, 2021</p> |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|

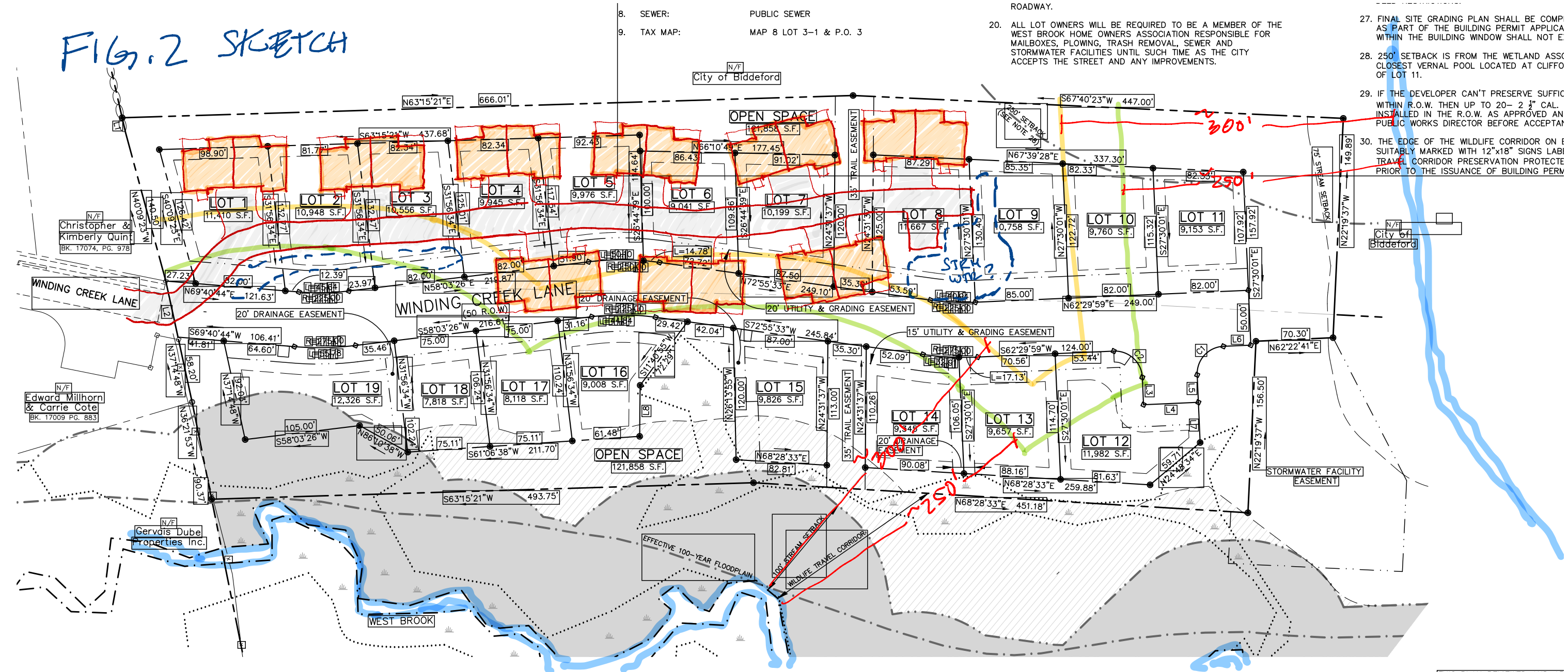


FIG. 2

FIG. 2 SKETCH

8. SEWER: PUBLIC SEWER

9. TAX MAP: MAP 8 LOT 3-1 & P.O. 3
20. ALL LOT OWNERS WILL BE REQUIRED TO BE A MEMBER OF THE WEST BROOK HOME OWNERS ASSOCIATION RESPONSIBLE FOR MAILBOXES, PLOWING, TRASH REMOVAL, SEWER AND STORMWATER FACILITIES UNTIL SUCH TIME AS THE CITY ACCEPTS THE STREET AND ANY IMPROVEMENTS.
27. FINAL SITE GRADING PLAN SHALL BE COMPALED AS PART OF THE BUILDING PERMIT APPLICATION WITHIN THE BUILDING WINDOW SHALL NOT EXCEED.
28. 250' SETBACK IS FROM THE WETLAND ASSOCIATED CLOSEST VERNAL POOL LOCATED AT CLIFF OF LOT 11.
29. IF THE DEVELOPER CAN'T PRESERVE SUFFICIENT WITHIN R.O.W. THEN UP TO 20'- 2 1/2" CAL. INSTALLED IN THE R.O.W. AS APPROVED BY A PUBLIC WORKS DIRECTOR BEFORE ACCEPTANCE.
30. THE EDGE OF THE WILDLIFE CORRIDOR ON THE SUITABLY MARKED WITH 12"x18" SIGNS LABELLED TRAVEL CORRIDOR PRESERVATION PROTECTIVE PRIOR TO THE ISSUANCE OF BUILDING PERMIT.



CERTIFY THAT THIS SURVEY CONFORMS TO THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS

THIS PLAN REVIEWED AND APPROVED BY BIDDEFORD PLANNING BOARD

The northern long-eared bat hibernates in caves and mines during winter. During summer, these bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and dead trees, and rock structures. Males and non-reproductive females may also roost in cooler places, like caves and mines, during summer. The northern long-eared bat is also known to occasionally roost in anthropogenic structures, such as barns and sheds.

The northern long-eared bat was listed as threatened under the ESA on April 2, 2015. A final 4(d), rule was subsequently published in the Federal Register on January 14, 2016. The 4(d) rule specifically defines the "take" prohibitions for this species. "Take" is defined by the ESA as 'to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect' any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. Intentionally killing or harming bats is also purposeful take and is prohibited. "Incidental take" is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

## 7.0 Discussion

Based on our desktop review and field surveys, the Clifford Park area and the PAD provide excellent wildlife habitat for a variety of species. The field work confirmed that several common birds and mammals utilize the area, and more importantly the PAD and larger Survey Area likely provide habitat to several protected reptiles and amphibians. The consultation response from the MDIFW identified that spotted turtles, Blanding's turtles, wood turtles, and ribbon snakes may occur within the Survey Area. The review of the habitat present within the Survey Area and the PAD confirm that habitat used by these species is present. In addition, while the survey was completed outside the breeding season, there are several features that are likely vernal pools. During the fieldwork, biologists observed wood frogs in upland areas which indicate that these species are present within both the Survey Area and PAD.

Habitat within the Survey Area accounts for approximately 1.4 square miles (~920 acres) of intact and unfragmented forested habitat within the City of Biddeford. Habitat connectivity is defined as the degree to which the landscape facilitates or impedes animal movement and other ecological processes. Maintaining habitat connectivity (i.e. unfragmented habitat) allows wildlife to migrate and disperse throughout changing seasons, boost biodiversity and resilience in degraded ecosystems, safeguards genetic flow between populations, and ensure species are better able to adapt to changes. The Survey Area may include species which require intact upland and wetland habitats within close proximity. Several mapped significant vernal pools occur adjacent to the subject parcels (within Clifford Park) and several potential pools were observed within the Survey Area. Vernal pools provide important habitat for several obligate species including the yellow spotted salamander, blue spotted salamander, and wood frog. These species

require not only seasonal pools for breeding, but spend much of their time within adjacent upland and wetland habitats. In the case of the yellow and blue spotted salamander, these species may disperse hundreds or even thousands of feet from the breeding pool. Recent studies completed have identified direct loss of vernal pools as well as loss of critical upland and terrestrial habitat as significant drivers for the loss of obligate vernal pool species (Calhoun 2008). The state of Maine protects terrestrial habitats within 250 feet of a significant pool, but connectivity to a larger intact forested habitat is best to maintain a healthy vernal pool ecosystem.

To the southeast there is an area of mapped Deer Wintering Habitat (DWA). Deer wintering areas include a variety of habitat components that may change with forest condition and management strategy. These habitat components contribute to the long-term functioning of a DWA as a source of winter shelter and food. White-tailed deer utilize predominantly mature coniferous forest habitat during critical winter conditions. Biologists did not identify any significant wintering habitat (i.e., dense stands of northern white cedar or similar). There are some areas of hemlock forest which are commonly used for shelter from passing storms or some temperature refuge due to dense overstory cover, but these forests are not typically considered “yards” or wintering areas. There is however significant deer sign throughout the Survey Area, likely a result from the mast producing species of oak, which are prevalent throughout the area.

The Survey Area includes several streams, both perennial and intermittent. In general, wider riparian and habitat corridors provide overall higher habitat quality and diversity. However, a balance must be struck between the need for development and the need to maintain habitat corridors. The U.S. Department of Agriculture (USDA) made recommendations on the minimum riparian corridor based on several species (i.e., large mammals, small mammals, birds, and herptiles). While recommendations may vary, generally larger mammals require a minimum of 330-foot corridors and smaller species such as reptiles and amphibians or small mammals require 200-foot corridors. This is general guidance, and corridor widths often vary by species. In most cases, the recommended corridor width is much larger than the minimum standard (Bentrop 2008).



## 8.0 Recommendations

Based on our site work and a review of supplemental information, we have prepared the following list of recommendations for either additional work or questions to be answered by the applicant to better understand the potential impacts as they relate to the proposed project.

Questions That the Developer Should Answer for the Planning Board:

- Does this proposed development require 20 or more acres of disturbance? Is this development within a common scheme of development (i.e., same owner or utilize common infrastructure) as adjacent developments such that it exceeds 20 acres?
- Is there more than one (1) acre of disturbance and has the applicant obtained or plan to obtain a Stormwater Permit?
- Has the applicant completed a natural resource survey (i.e., wetland delineation and vernal pool survey) of the Survey Area (entire parcel)? If so are there any mapped significant vernal pools within 250' of the PAD?
- Is there a proposed impact within protected resource (i.e., within 250' of a significant vernal pool, freshwater wetland, or stream)?
- Is there proposed fill (temporary or permanent) within jurisdictional wetlands?
- Has the applicant coordinated with the MDIFW with regard to potential impacts to protected species or habitats?
- Based on our review of the development layout, it appears that buffers to streams and associated habitats are inadequate (i.e., narrower than recommended). Has an alternatives analysis been completed to ensure that the development focuses on areas, which would avoid fragmentation and reduce impacts on natural resources?

Recommendations:

- We recommend that the development better utilize the property to cluster development in order to reduce fragmentation and increase riparian corridors in size. Based on the current layout we have reviewed the riparian buffer provided in some locations is less than 100 feet, and does not include any buffer on wetlands adjacent to streams.
- We recommend including recommended buffers on habitat for rare species (i.e., spotted turtles, Blanding's turtles, wood turtles, and ribbon snakes), which would include up to 300 feet from habitats used by these species. These buffers would extend into currently proposed areas of development. At the very least, if these buffers are not included, a survey for these species should be completed by a qualified biologist.
- Consultation with the MDIFW should occur, given the proximity of rare reptiles and amphibians and the habitats present within the Survey Area. Any survey for rare species should involve coordination with the MDIFW.

## LETTER OF UNDERSTANDING

By Order of the Biddeford City Council (2020.100), the City Manager has been authorized to enter into a land conveyance agreement with both E & R Development Corporation (or official designee) and Mr. Gervais Dube (or official designee) under the terms of which there shall be an exchange of interests in certain parcels of real estate situated at and near Clifford Park, so-called, in Biddeford, Maine. The land mentioned as being owned by Mr. Gervais Dube in said Order is actually owned by Gervais Dube Properties, Inc. which will be hereinafter referred to as "Dube" and E & R Development Corporation shall be hereinafter referred to as "E & R". The City of Biddeford shall be referred to as "Biddeford".

E & R intends to transfer to Biddeford two separate parcels of land being designated as "Land to be Conveyed to the City of Biddeford from E & R Development Corp. 35.1+/- Acres" and "Land to be Conveyed to the City of Biddeford from E & R Development Corp., 24.1+/- Acres" in exchange for the transfer of land designated "Land to be Conveyed to E & R Development Corp. from the City of Biddeford-4.3+/- acres", all as shown as diagonally lined areas on plan entitled "Proposed Land Conveyances" attached hereto as Exhibit A.

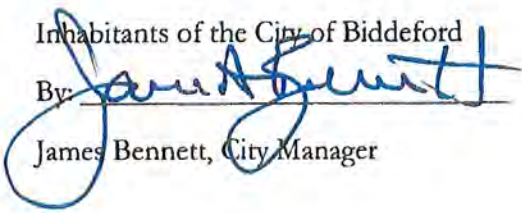
Dube intends to transfer to Biddeford a parcel of land designated as "Land to be Conveyed to the City of Biddeford from Gervais Dube-42.6+/- Acres" as shown as box lined areas on the above referenced plan. The City shall be obligated to provide Dube with an appraisal of the property to be transferred and an enforceable agreement that the transferred property shall only be used for recreational purposes.

E & R intends to develop portions of its remaining property, the property it is acquiring from the City and property it intends to acquire from Dube as additions to the existing Parkside Subdivision and the existing Winding Creek subdivision, said additions to contain a total of 50 residential lots, more or less. E & R understands and agrees that it shall promptly apply for and proceed diligently to obtain approvals for such additions, it being the desire of E & R that all municipal reviewing agencies give due consideration to the transfers made hereunder in the reviewing process and the issuance of all licenses, approvals and permits. E & R shall be entitled to retain such necessary drainage easements, filter beds, and outfall areas as may be required to secure approval of the development plans by any applicable governmental agencies.

The parties hereto recognize that E & R will be expending significant sums of money in reliance on the understanding set forth herein.

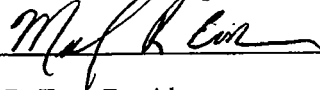
Dated: January 15, 2021

Inhabitants of the City of Biddeford

By: 

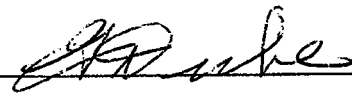
James Bennett, City Manager

E & R Development Corporation

BY: 

Michael R. Eon, President

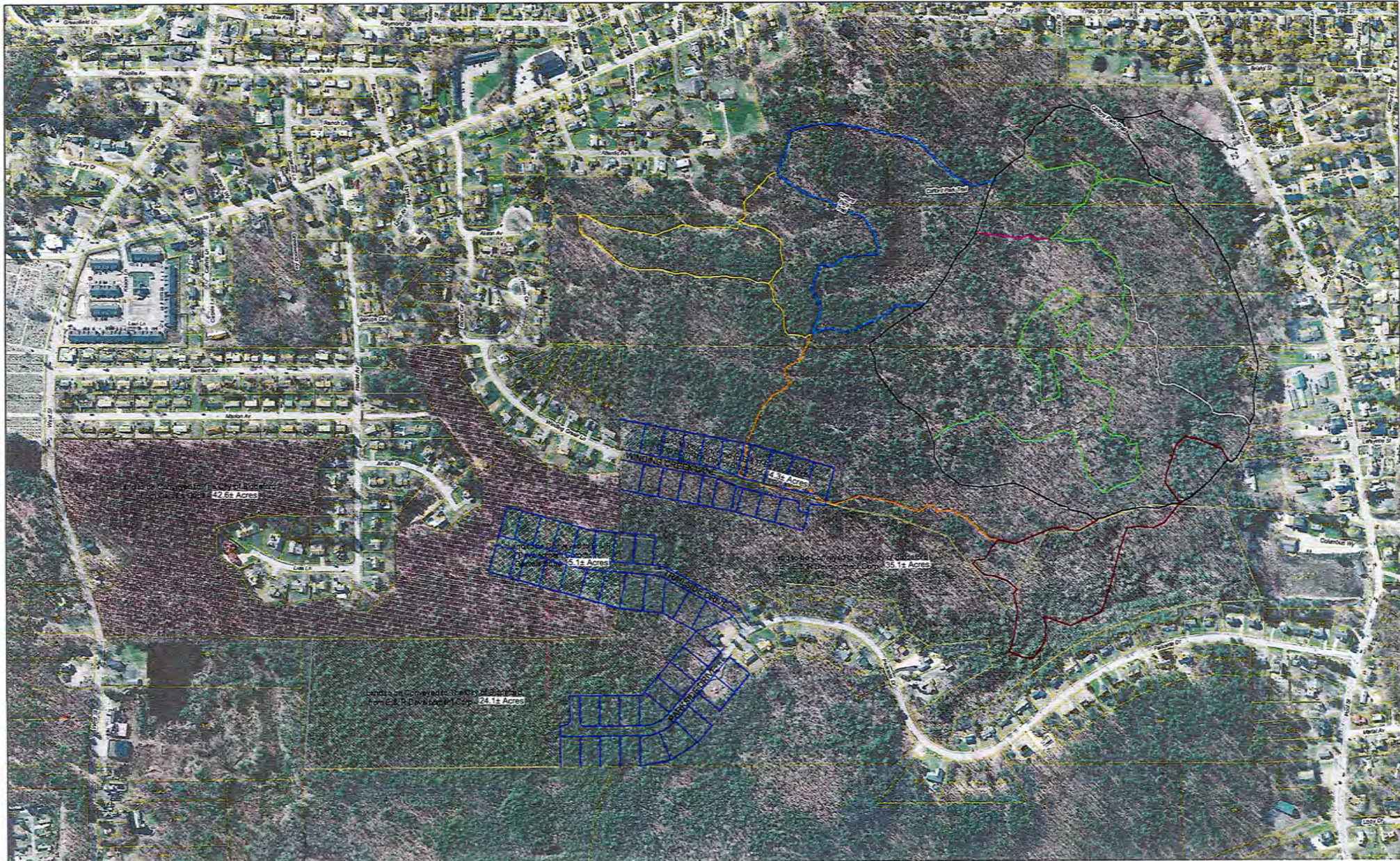
Gervais Dube Properties, Inc.

By: 

Gervais Dube, President

1022-114-ltrunderstading/l/rrevised1/14/2020





## EXHIBIT A Proposed Land Conveyances

### Legend

#### Proposed Parcels to be Transferred

|                                                                                       |                                               |                                                                                       |                                    |
|---------------------------------------------------------------------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------|------------------------------------|
|  | City of Biddeford to ESR Development Corp     |  | Genas Due to ESR Development Corp  |
|  | ESR Development Corp to the City of Biddeford |  | Genas Due to the City of Biddeford |

|                                                                                       |                      |                                                                                       |              |                                                                                       |              |
|---------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|--------------|
|  | Clifford Park Trails |  | Blue Trail   |  | Pink Trail   |
|  | Clifford Park Trails |  | Green Trail  |  | Yellow Trail |
|  | Black Trail          |  | Orange Trail |                                                                                       |              |





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



June 22, 2021

Steve Knapp  
Biodiversity Research Institute  
276 Canco Road  
Portland, ME 04103

**RE: Information Request – Winding Creek Lane Project, Biddeford**

Dear Steve:

Per your request received on May 21, 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 *Winding Creek Lane Solar* project in Biddeford. Note that as project details are lacking, our comments are non-specific and should be considered preliminary.

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

***Endangered, Threatened, and Special Concern Species***

Bats - Of the eight species of bats that occur in Maine, the three *Myotis* species are afforded special protection under Maine's Endangered Species Act (MESA, 12 M.R.S §12801 et. seq.): little brown bat (State Endangered), northern long-eared bat (State Endangered), and eastern small-footed bat (State Threatened). The five remaining bat species are designated as Species of 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.

Blanding's Turtle - Multiple occurrences of Blanding's turtles, a State Endangered species, have been documented in the immediate vicinity and within the proposed project area. In Maine, Blanding's turtles are found most frequently in complexes of small, vernal pools, acidic wetlands and larger marsh complexes in large blocks of forested habitat. Development activity that compromises riparian integrity or migration permeability among seasonally critical wetlands can lead to degradation of habitat quality and potential loss of local populations. Additionally, development projects that lead to significant increases in local traffic volume will likely lead to increased roadkill and possible extirpation of the local population. If these habitats are present in the project area, we recommend that they be avoided and adequately buffered with a 250-foot undisturbed, intact vegetative cover.

Spotted Turtle - Occurrences of spotted turtle, a State Threatened species, have been documented within the vicinity of the search area of the proposed project. Spotted turtles are most frequently associated with complexes of small, acidic wetlands and vernal pools located in large, intact landscapes. They also use small streams, shrub swamps, wet meadows, bogs, and forested swamps. Similar to Blanding's turtle, if

these habitats are present in the project area, we recommend that they be avoided and adequately buffered with a 250-foot undisturbed, intact vegetative cover.

Wood Turtle - Occurrences of wood turtle, a State Species of Special Concern, have been documented within the vicinity of the search area of the proposed project. Wood turtles use a mix of aquatic and terrestrial habitats throughout the year including riparian meadows, shrub thickets, farmland, and deciduous forests as well as bogs, forested wetlands, vernal pools, and streams. If these habitats are present in the project area, we recommend that they be avoided and adequately buffered with a 300-foot undisturbed, intact vegetative cover.

MDIFW is willing to work closely with the applicant to design a project that attempts to limit potential impacts to any of the turtle species listed above.

Eastern Ribbon Snake - There is a potential for occurrences of Eastern ribbon snake, a state Species of Special Concern, within the proposed project. This rare species is a slender, semiaquatic snake often observed near the edges of emergent marshes, wet meadows, scrub-shrub wetlands, beaver impoundments, bogs, river and stream floodplains, and vegetated shorelines of ponds and lakes.

### ***Significant Wildlife Habitat***

Deer Wintering Areas (DWAs) – The project search area intersects with a DWA. DWAs contain habitat cover components that provide conditions where deer find protection from deep snow and cold wind, which is important for overwinter survival. MDIFW recommends that development projects be designed to avoid losses or impacts to the continued availability of coniferous winter shelter. Any removal of vegetation should be conducted in such a way that improves the quality and vigor of the coniferous species providing this winter shelter.

Significant Vernal Pools - At this time, MDIFW Significant Wildlife Habitat maps indicate no known presence of Significant Vernal Pools in the project search area; 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 to 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,

A handwritten signature in black ink, appearing to read 'Becca Settele', with a stylized, flowing script.

Becca Settele  
Wildlife Biologist



382000

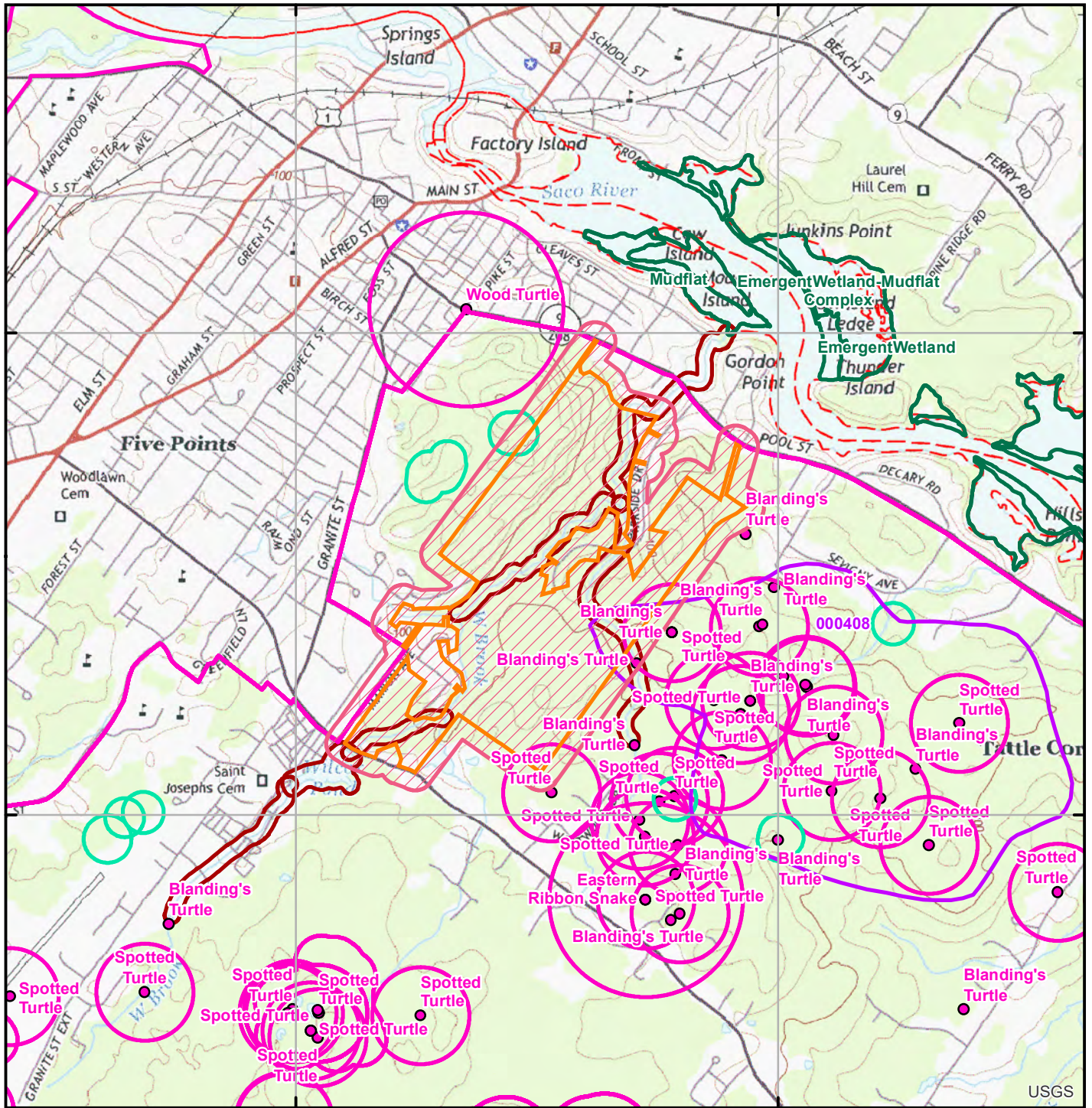
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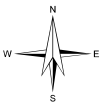
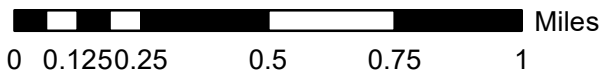
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## Environmental Review of Fish and Wildlife Observations and Priority Habitats

Project Name:

Project Name: Winding Creek Lane, Biddeford  
(Version 1)Maine Department of  
Inland Fisheries and Wildlife

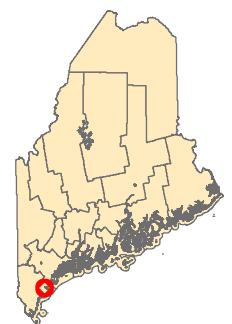
Projection: UTM, NAD83, Zone 19N

Date: 6/22/2021

- ProjectSearchAreas - All Versions
- Maine Cliff and Talus Areas

- Deer Winter Area
- LUPC p-fw
- Cooperative DWAs
- Seabird Nesting Islands
- Shorebird Areas
- Inland Waterfowl and Wading Bird
- 2008 Iwwh - Shoreland Zoning
- Tidal Waterfowl and Wading Bird
- Significant Vernal Pools
- Environmental Review Polygons

- Roseate Tern
- Piping Plover and Least Tern
- Aquatic ETSc - 2.5 mi review
- Rare Mussels - 5 mi review
- Maine Heritage Fish Waters
- Arctic Charr Habitat
- Redfin Pickerel and Swamp Darter Habitats - buffer100ft
- Special Concern occupied habitats - 100ft buffer
- Wild Lake Trout Habitats







WILLIAM A. THOMPSON  
ROBERT C. LIBBY, Jr.  
WALTER E. PELKEY  
ANDREW S. MORRELL  
STEVEN J. BLAKE

*Berry, Huff, McDonald, Milligan Inc.*  
*Engineers, Surveyors*

380B Main Street  
Gorham, Maine 04038

Tel. (207) 839-2771  
[www.bh2m.com](http://www.bh2m.com)

April 12, 2022

Thomas Milligan  
Biddeford City Engineer  
P.O. Box 586  
Biddeford, Maine 04005

Re: Ability to Serve for sanitary sewer  
19 Lot Subdivision – West Brook

Dear Tom;

We are preparing a design for a 19-lot residential subdivision on the extension of Winding Creek Lane. Our design will be a combination of a gravity sewer and individual e-one pump systems. The point of destination will be the existing city pump station at the end of Winding Creek Lane that was constructed as part of the Winding Creek Subdivision in 2008.

We are enclosing a copy of our project site plan and utility plans for your review. As a requirement of the planning board approval process, we would appreciate a letter stating the ability to serve this 19-lot subdivision.

Sincerely,

William A. Thompson  
Project Manager

encl.



WILLIAM A. THOMPSON  
ROBERT C. LIBBY, Jr.  
WALTER E. PELKEY  
ANDREW S. MORRELL  
STEVEN J. BLAKE

Berry, Huff, McDonald, Milligan Inc.  
*Engineers, Surveyors*

380B Main Street  
Gorham, Maine 04038

Tel. (207) 839-2771  
[www.bh2m.com](http://www.bh2m.com)

April 12, 2022

Marcus Knipp  
Maine Water  
93 Industrial Park Road  
Saco, Maine 04072

Re: Ability to Serve – West Brook Subdivision  
19 Lot Subdivision – Biddeford

Dear Marcus;

We are preparing a design for a 19-lot residential subdivision on the extension of Winding Creek Lane. Winding Creek Lane was constructed around 2008 with 16-residential lots served by an eight-inch water main.

We have contacted the Fire Chief to discuss location for a fire hydrant. The request was to install a new hydrant between Lots 18 and 19. We will propose installing an 8-inch waterline up to this point and then reduce to a 4-inch waterline to the end of the proposed road.

Please review our design and hopefully prepare a letter for the ability to serve along with your details. If you need anything else, please let us know.

Sincerely,

William A. Thompson  
Project Manager

encl.



Civil Engineering | Surveying

April 8, 2022

Hannah Bonine  
Biddeford City Planner  
205 Main Street  
Biddeford, Maine 04005

Re: West Brook Subdivision

Dear Hannah;

On behalf of the applicant E&R Development, we are submitting preliminary plans for the 19 lot West Brook Subdivision. We have made some changes and updates as the project design evolved.

Please find enclosed:

1. Letter addressed to Chris DiMatteo outlining changes reflected on the plans
2. Seven copies of the preliminary plans revision date 3/30/2022
3. Three copies of the Stormwater Management Report
4. Seven copies of the West Brook Homeowners Association documents

We appreciate your attention to the submission. We look forward to being on the next available planning board meeting for consideration of preliminary approval.

We are available to answer any questions during your review.

Sincerely,

William A. Thompson  
Project Manager

encl.

cc: E&R Development



Civil Engineering | Surveying

April 8, 2022

Chris DiMatteo  
Biddeford Planning Department  
205 Main Street  
Biddeford, Maine 04005

Re: West Brook Subdivision

Dear Chris;

Since our last meeting with you and Hannah we have made some changes to our design and plan details. We have been working on this plan for a year with Planning Staff and Planning Board and have incorporated all of the staff's comments as they pertain to this development. We look forward to presenting our preliminary design and moving forward to a final plan. This submission includes a full set of design plans, the green plan and proposed deed descriptions that will be part of the H.O.A.

The following is a summary of our updated plans:

1. We have completed a "Pre-development" grading plan detailing the existing grades on the proposed lots. At the time of application for a building permit on each lot, a detail site plan will be prepared to indicate that no slope of 25% or greater will be in the building envelope. Plan note 27 outlines this requirement.
2. The net residential calculations, plan note 24, have been revised adding the required deduction for 50% of slopes greater than 33%. The resulting allowable density is now 28.9 lots.
3. The plan highlighted in green was developed with consultation with the planning department after review of the "Clifford Park Habitat Connectivity Report" completed by BRI Environmental in September 2021.

Our latest revision to this plan has expanded the Wildlife Corridor to the rear property line of lots 12, 13, 14, 16, & 17. The revised Corridor is also shown on plan sheet 1.

4. Plan note 17 has been revised to better identify where proposed driveways need to be located.
5. Our wetland consultant has observed the closest vernal pool and associated wetland in Clifford Park as identified in the BRI report. Our plan shows a 250' setback on the northerly edge of lots 10 and 11 from this wetland and it does not encroach on any

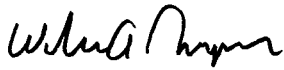
proposed building areas. This is detailed in plan note 28.

6. We have added plan note 29 addressing proposed street trees and the final approval that will be done by the Public Works Director before street acceptance.
7. The importance of identifying and protecting the Wildlife Travel Corridor will include the placement of 12"x 18" signs on each lot at the edge of the Wildlife Corridor signs will be labelled "Wildlife Travel Corridor Preservation Protected" and installed on green metal posts prior to the issuance of building permits. This is outlined in plan note 30. A sample copy of the sign was submitted and approved by the planning office.
8. Our letter to Greg Tansley dated March 14, 2022 is our response to Tom Saucier's initial comments from the March 4, 2022 letter.

Our next Planning Board submission will be completed after the Planning Boards review of our preliminary plans. At that time, we will include any new department and staff review comments.

We appreciate your review and comments.

Sincerely,



William A. Thompson  
Project Manager

encl:  
cc: E&R Development  
H. Bonine

## Customer Contact Cover Letter

Name of entity(s) on the submitted filings:

West Brook Homeowners' Association

**Optional** special handling request(s): (check only if applicable)

- ☐ Hold attested copy for pick up (will be required to pick up at our office in Augusta, Maine)
- ☐ 24-hour expedited filing (next business day) service: **\$50** additional filing fee per entity
- ☐ Immediate expedited filing (same business day): **\$100** additional filing fee per entity

**NOTE:** Only one expedite fee is required if filing multiple documents for the same entity/charter number at the same time.

Payment can be made by check or money order (payable to Maine Secretary of State) or by credit card. You may obtain a credit card voucher at <https://www.maine.gov/sos/cec/forms/credit.pdf>.

Total fee(s) enclosed: \$ 40.00

Richard A. Hull, III

(Name of contact person)

[closings@hulllawoffices.com](mailto:closings@hulllawoffices.com)

(Contact email address for this filing)

207-282-7100

(Daytime telephone number)

[closings@hulllawoffices.com](mailto:closings@hulllawoffices.com)

(Email address to use for annual report reminders)

Name and address of person to return the attested copy of the completed filing:

Richard A. Hull, III

(Name of attested copy recipient)

Woodman, Edmands

(Firm or Company)

409 Alfred Street

(Mailing Address)

Biddeford, ME 04005

(City, State & Zip)

**NOTE:** Failure to provide a contact name and telephone number or email address will result in any erroneous filing(s) being returned to the filer by the Secretary of State's office.

For questions regarding the above filing(s), please call or email our office at (207) 624-7752 or [cec.corporations@maine.gov](mailto:cec.corporations@maine.gov)

Submit filings to:

Mailing Address if using US Postal Service

Department of the Secretary of State  
Corporations, UCC and Commissions  
101 State House Station  
Augusta, ME 04333-0101

Mailing Address if using FedEx/UPS

Department of the Secretary of State  
Corporations, UCC and Commissions  
111 Sewall Street, 4<sup>th</sup> Floor  
Augusta, ME 04330

**DOMESTIC  
NONPROFIT CORPORATION**

**STATE OF MAINE**

**ARTICLES OF INCORPORATION**

**Filing Fee \$40.00**

\_\_\_\_\_  
Deputy Secretary of State

A True Copy When Attested By Signature

\_\_\_\_\_  
Deputy Secretary of State

Pursuant to 13-B MRSA §403, the undersigned incorporator(s) execute(s) and deliver(s) the following Articles of Incorporation:

**FIRST:** The name of the corporation is WEST BROOK HOMEOWNERS' ASSOCIATION.

**SECOND:** ("X" one box only. Attach additional page(s) if necessary.)

☐ The corporation is organized as a public benefit corporation for the following purpose or purposes:

☒ The corporation is organized as a mutual benefit corporation for all purposes permitted under Title 13-B or, if not for all such purposes, then for the following purpose or purposes:

**THIRD:** The Registered Agent is a: (select either a Commercial or Noncommercial Registered Agent)

☐ Commercial Registered Agent CRA Public Number: \_\_\_\_\_

\_\_\_\_\_  
(name of commercial registered agent)

☒ Noncommercial Registered Agent

Richard A. Hull, III

\_\_\_\_\_  
(name of noncommercial registered agent)

409 Alfred Street, Biddeford, ME 04005

\_\_\_\_\_  
(physical location, not P.O. Box – street, city, state and zip code)

Same

\_\_\_\_\_  
(mailing address if different from above)

**FOURTH:** Pursuant to 5 MRSA §108.3, the new commercial registered agent as listed above has consented to serve as the registered agent for this nonprofit corporation.



**FIFTH:** The number of directors (not less than 3) constituting the initial board of directors of the corporation, if the number has been designated or if the initial directors have been chosen, is three (3).

The minimum number of directors (not less than 3) shall be Three (3) and the maximum number of directors shall be Five (5).

**SIXTH:** Members: ("X" one box only.)

☐  
☒

There shall be no members.

There shall be one or more classes of members and the information required by 13-B MRSA §402 is attached.

**SEVENTH:** (Optional) ☐ (Check if this article is to apply.)

No substantial part of the activities of the Corporation shall be the carrying on of propaganda, or otherwise attempting to influence legislation, and the Corporation shall not participate in or intervene in (including the publication or distribution of statements) any political campaign on behalf of any candidate for public office.

**EIGHTH:** (Optional) ☐ (Check if this article is to apply.)

Other provisions of these articles including provisions for the regulation of the internal affairs of the corporation, distribution of assets on dissolution or final liquidation and the requirements of the Internal Revenue Code section 501(c) are set out in Exhibit \_\_\_\_\_ attached hereto and made a part hereof.

**Incorporators**

**Dated** April 8, 2022

**Street** 409 Alfred Street

(address)

**Biddeford, ME 04005**

(city, state and zip code)

**Street**

(address)

**Street**

(address)

\_\_\_\_\_  
(signature)

**Richard A. Hull, III**

(type or print name)

\_\_\_\_\_  
(signature)

(type or print name)

\_\_\_\_\_  
(signature)

(type or print name)

**For Corporate Incorporators\***

Name of Corporate Incorporator \_\_\_\_\_

By \_\_\_\_\_  
(signature of officer)

Street \_\_\_\_\_  
(principal business location)

\_\_\_\_\_  
(type or print name and capacity)

\_\_\_\_\_  
(city, state and zip code)

Name of Corporate Incorporator \_\_\_\_\_

By \_\_\_\_\_  
(signature of officer)

Street \_\_\_\_\_  
(principal business location)

\_\_\_\_\_  
(type or print name and capacity)

\_\_\_\_\_  
(city, state and zip code)

---

**\*Articles are to be executed as follows:**

If a corporation is an incorporator (13-B MRSA §401), the name of the corporation should be typed or printed and signed on its behalf by an officer of the corporation. The articles of incorporation must be accompanied by a certificate of an appropriate officer of the corporation, not the person signing the articles, certifying that the person executing the articles on behalf of the corporation was duly authorized to do so.

Please remit your payment made payable to the Maine Secretary of State.

Submit completed form to:

**Secretary of State  
Division of Corporations, UCC and Commissions  
101 State House Station  
Augusta, ME 04333-0101  
Telephone Inquiries: (207) 624-7752**

Email Inquiries: [CEC.Corporations@Maine.gov](mailto:CEC.Corporations@Maine.gov)

EXHIBIT A TO  
ARTICLES OF INCORPORATION  
FOR  
WEST BROOK HOMEOWNER'S ASSOCIATION

There shall be one class of members in the Association and the membership shall be comprised of each lot owner on the West Brook Subdivision plan located in Biddeford, Maine. The owner or owners of each lot in the subdivision shall be entitled to one vote in the Association regardless of the number of individual lot owners of each lot.

Exhibita/1/forms/realstate/subdivisions/west brook

**EXHIBIT A**  
**WEST BROOK SUBDIVISION**  
**(Winding Creek Lane )**

Each of the numbered lots (jointly and severally the "Lots") depicted on plan referred to in the deed to which this is attached (the "Plan") is conveyed subject to the following conditions and restrictions which shall run with and bind the premises conveyed hereby and the other numbered lots contained on the aforementioned Plan, shall be enforceable until December 31, 2053,(provided, however that the duties and obligations under paragraph 15 hereof shall not expire) and E & R. Development Corporation and the other numbered lot owners on said plan and the West Brook Homeowners' Association , their respective heirs, successors and assigns, shall have the right at any time or times to proceed at law or in equity against any person violating or attempting to violate any of the provisions hereof and to compel compliance with the terms hereof, but said E & R Development Corporation , its successors and assigns, shall be under no obligation to enforce any of said restrictions:

1. No structures except one and two family residences and/or associated Accessory Dwelling Units as may be permitted under local land use ordinances and structures ordinarily appurtenant thereto shall be built or erected upon each numbered lot herein conveyed. The main living structure shall contain at least 960 square feet of living area, if a single story structure, and at least 650 square feet of living area on each floor, if a two story structure and at least a one (1) car garage shall be built at the time of initial construction either as an integral part of the residential structure or as a separate structure. Living area shall not include basements, garages, porches, breezeways or decks and the areas must be suitable, when finished, for occupancy on a year round basis. "Structures ordinarily appurtenant thereto" shall include, but shall not be limited to, garages for use of the owner of the lot constructed either as an integral part of the dwelling or as a detached building, a swimming pool, suitable garden structures including a greenhouse, and such additional structures as shall from time to time be used in connection with residential uses situated in similar neighborhoods.

2. No building or structure of any type shall be erected, placed or permitted to remain on the above described premises unless the exterior color, finish and design and placement of such building or structure on the lot shall be approved by E & R Development Corporation, its successors or specific assigns, or by its duly authorized agent, such approval shall not be unreasonably withheld, delayed or conditioned. The approval required by this paragraph shall only apply until such time as E & R Development Corporation or its successors or specific assigns shall cease to have any ownership interest in the real property as shown on said recorded Plan or adjacent thereto and this restriction does not necessitate the approval in any form of any other lot owner on said Plan or West Brook Homeowners' Association. In general, all one and two story structures shall have a minimum roof pitch of 7/12. This does not include the roof pitch of a garage or dormers, all roof shingles shall be architectural shingles in earth tone colors, and vinyl siding shall be of a finish and appearance comparable to natural materials.

3. The Grantees herein agree to complete all building construction and landscaping within twelve (12) months from the beginning of construction. Completion, as used herein, includes, but is not limited to, porches, steps, decks, platforms, carports, other outside living terraces, grading and seeding of lawns. All driveways shall be paved with asphalt or finished with pavers or finished concrete within two (2) years of the commencement of construction.

4. No junk or abandoned vehicles or vehicles of a size larger than one (1) ton in carrying capacity, nor accumulations of trash or debris shall be allowed on said premises.

5. No animals other than ordinary household pets may be kept, boarded or otherwise maintained on the premises.

6. No mobile homes shall be placed on the property at any time; provided, however, that trailers used for camping or so-called recreational vehicles, boats, trailers or similar vehicles may be stored upon the property provided they are stored in a neat and reasonable manner.

7. The within Grantees, their heirs, successors and assigns, shall not alter the area encompassed within the bounds of the drainage easements or natural drainage courses as indicated on the aforesaid plan in any manner which would impede or adversely affect the drainage of the adjacent areas to the above described premises.

8. All curb cuts shall be made and driveways shall be constructed in such fashion so as not to impede or adversely affect the drainage of surface water in the location of the streets as shown on said plan into the drainage easements situated either in said streets or on the lots themselves and all construction shall be done in accordance with the specifications and in the manner required by the Public Works Director of the City of Biddeford, Maine.

In the event curb cuts shall be made or driveways shall be constructed in a fashion so as to violate this covenant and restriction, E & R Development Corporation may, but shall not be required to, correct the construction so that it does not violate this paragraph and the holder of title to the above lot shall be liable for all costs of the same. Costs shall include all direct and indirect costs and all costs of collection including, but not limited to, filing fees, sheriff's fees and reasonable attorney's fees. Similarly, the holder of title to the above lot shall be liable for all costs to repair asphalt, pavement or curbing caused as a result of construction activity by the owner or his agents, contracts and employees.

9. All pulpwood and firewood shall be stored in the backyard of the dwelling.

10. Trees standing upon the within conveyed premises or trees thereafter growing thereon in excess of six (6) inches in diameter measured five (5) feet above the surface of the ground shall not be cut or removed, except as hereinafter provided. Trees of such diameter which are dead, dying or diseased may be cut and removed and living trees may be trimmed or minimally thinned in accordance with good forestry practice. Trees of lesser diameter which are dead, dying or diseased may be cut and removed and living trees may be trimmed or selectively thinned in

accordance with good forestry practice and to provide growth space for larger trees. Further, trees, whether alive or dead may be cut and removed by the title holder thereof or the duly authorized agent of the title holder only to such extent as shall be minimally necessary for the construction of the buildings and accessory uses permitted upon the property and for the construction of driveways and normal lawn areas. It is further provided that all softwoods which may present a danger to persons or property may be cut.

To the extent a portion of a lot is contained within the limits of the Wildlife Corridor as shown on the Plan, no trees or growth of any sort may be cut, trimmed or removed within such corridor, except to the extent to prevent damage to adjacent structures in the event such trees or growth are of a condition that such damage is likely to occur from high winds, large amounts of precipitation or other likely weather conditions.

11. No signs, advertising the sale of the lot herein conveyed, or structure thereon, or for any other purpose, shall be permitted to be erected on the property other than one sign having dimensions of not more than 24 inches by 24 inches may be placed upon the lot to be sold and any informational signage or numbering required by any municipal authority to satisfy the provisions of any life safety codes shall be permitted.

During the period of construction of the improvements allowed to be constructed upon the lot conveyed, the builder may maintain one construction information sign of a size and design approved by E & R Development Corporation.

12. E & R Development Corporation, for itself, its successors and specific assigns, reserves the right to use all of the street and ways and areas marked as rights of way in any fashion shown on the Plans of the Subdivision for access to any other land adjacent or near to said Subdivision it may own or hereafter acquire. It is further agreed and understood that no purchaser of such adjacent or near land from E & R Development Corporation shall have the right to use such streets and ways for such purposes unless such right shall have been specifically granted to such purchaser by E & R Development Corporation. It is further understood and agreed that no purchaser shall have a right to access abutting land without the approval of E & R Development Corporation, which consent may be withheld or conditioned for any reason.

13. E & R Development Corporation, for itself, its successors and specific assigns, reserves the right to use all such streets and ways and rights of way shown and depicted on said Plans, all areas shown and depicted on said Plans as utility or other easement areas (in any fashion) for the use, introduction and maintenance of all utility services and to use all existing or hereinafter installed infrastructure improvements for use of lots in the Subdivision or to any other adjacent or nearby land owned by it or its specific assigns or hereinafter acquired by it or them. It is further agreed and understood that no purchaser of such adjacent or near land from E & R Development Corporation shall have the right to use such streets and ways for such purposes unless such right shall have been specifically granted to such purchaser by E & R Development Corporation.

14. E & R Development Corporation, reserves for itself, its successors and specific assigns, the right and privilege to alter, amend, reconfigure, combine or re-subdivide any unsold lots in the Subdivision or any adjacent real estate in its ownership or to use any such lots for access to and for the use, introduction, installation, and maintenance of utility services to any adjacent land owned by E & R Development Corporation, or hereinafter acquired by it or its specific assigns and to alter, amend or change the location of any streets, rights-of-way or access roads shown on said Plans to a location of its choosing provided that access to the premises to be conveyed is not materially impaired or affected.

15. Each owner of a lot in the Subdivision (and any owner of a lot created hereinafter from land now owned by or hereinafter acquired by E & R Development Corporation which is made specifically subject to these restrictions or obligations created herein) shall be a member of the West Brook Homeowners' Association (the "Association"), a Maine not-for-profit corporation at the time of the purchase of a lot or lots on the Plan. Each lot owner shall have one vote in the association for each lot owned. In the event there are multiple owners of a lot, such owners in the aggregate shall be entitled to one vote. The Association shall be charged with the costs of maintenance, repair, replacement and snow plowing of the roadways in the Subdivision and any surface or subsurface drainage systems including the detention pond or forced main sewer installations, pipes, cleanouts and appurtenances in or out of the Subdivision to the point where they become public improvements, but not the initial installation cost thereof, in the event the roadways, the drainage systems or sewer installations are not accepted by the City of Biddeford as public streets or public improvements and shall also be responsible for the maintenance and landscaping of all entrance areas, esplanades and boulevards and the maintenance, repair and replacement of any identification signage or common mailbox systems and any appurtenances thereto. In addition, and unless the City of Biddeford shall undertake responsibility therefor, it shall be the responsibility of the Association to implement, maintain and report to appropriate municipal officials with respect to the requirements of the maintenance plan for the detention pond and stormwater system and all associated parts thereof, all in accordance with the conditions of approval by the Planning Board of the City of Biddeford. It shall be the responsibility of each individual lot owner to make suitable arrangements for trash removal and for the installation, maintenance, repair and replacement of all portions of the forced main sewer system from the connection to the line located within the right of way to and including all components within the structure or structures erected on the lot.

It is specifically provided, however, that in the event adjacent land shall become subject to these restrictions, such land shall not be obligated to pay for the costs of maintenance, operation, repair and replacement of any services or utilities to which it is not connected and/or does not utilize.

16. The above restrictions contained in paragraphs (1) through (15) hereof shall not apply to any remaining land of E & R Development Corporation which may lie near or adjacent to the above described premises, except to the extent it shall be specifically made subject to the same.



# **STORMWATER MANAGEMENT REPORT**

## **WEST BROOK SUBDIVISION Biddeford, Maine**

Submitted by:

**E&R Development Corporation**

Prepared by:



Date:

**February 2022**

**Updated: April 2022**

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## 1.0 **INTRODUCTION**

E&R Development Corporation is proposing the development of the West Brook Subdivision (the project). The project proposes a 19 lot Cluster Subdivision located at the end of Winding Creek Lane in Biddeford, Maine.

The scope of work includes but is not limited to:

- Construction of an approximate 1000' long paved road meeting City standards
- Construction of sidewalks and esplanades
- Extension of municipal utilities for water, sewer, electrical and communications
- Construction of a closed drainage systems and stormwater management facilities

The proposed infrastructure improvements will create approximately 0.77 acres of new impervious area, which excludes single family home development.

In accordance with the City of Biddeford code requirements, the Stormwater Management Plan has been prepared to satisfy the requirements of the Maine Department of Environmental Protections "Stormwater Management Rules" Chapters 500, 501 and 502 as well as the most recent version of the "Maine Stormwater Best Management Practices Manual". Per the post construction stormwater discharge management standards of the City code, the proposed project will need to meet quality and quantity standards of Chapter 500, requiring meeting the Basic, General, and Flooding Standards.

## 1.1 **OVERVIEW OF MODELING METHODOGY AND SOURCE INFORMATION**

Hydrologic Analysis: The pre and post development conditions have been modeled using modeling software (Hydrocad Version 10) which is based upon the methodology contained within the USDA Soil Conservation Service Technical Release 55. Type III 24-hour storm distributions for York County were used for the analysis. The following frequencies and 24-hour rainfall depths were used for the analysis:

| Return Period | 24-Hour Rainfall Depth |
|---------------|------------------------|
| 2-Year Storm  | 3.30 inches            |
| 10-Year Storm | 4.90 inches            |
| 25-Year Storm | 6.20 inches            |

Soils: The soils boundaries used for the stormwater analysis were digitized from the Natural Resource Conservation Service (NRCS), web soil survey website. The source of the data is the York County Soil Survey (Class D). Refer to the following for additional documentation regarding the soils used for modeling:

- Appendix A of this Report
- Pre and Post Development Watershed Plans (Sheets A and B)

The soils include:

| Soil Map Unit | Unit Description                                | Hydrologic Soil Group* |
|---------------|-------------------------------------------------|------------------------|
| BuB           | Buxton silt loam,<br>3-8% slopes                | D                      |
| EmB           | Elmwood fine sandy loam,<br>0-8% slopes         | B                      |
| LyB           | Lyman-Rock outcrop<br>complex,<br>3-8% slopes   | D                      |
| RoE           | Rock outcrop-Lyman<br>complex,<br>15-80% slopes | D*                     |
| Sa            | Saco mucky silt loam                            | B/D**                  |
| SeB           | Scio silt loam,<br>3-8% slopes                  | C                      |

\*Assumed as D

\*\*Assumed as D for areas of known wetland

Boundary Survey: Field survey by BH2M

Topography: LIDAR data from the Maine Office of GIS

Natural Resources: Wetland delineations performed by Mark Hampton Associates

## 1.2 **DESCRIPTION OF POINTS OF ANALYSIS**

The watershed model analyzes the discharge of runoff at two Analysis Points as described below:

### Analysis Point #1

Description: Discharge from wetland area bordering West Brook along the south west parcel line

Pre-Development Tributary Drainage Areas: 6.36 acres

Post Development Tributary Drainage Areas: 4.57 acres

#### Analysis Point #2

Description: Concentrated discharge along wetland area along the south east corner of parcel

Pre-Development Tributary Drainage Areas: 9.06 acres

Post Development Tributary Drainage Areas: 10.86 acres

### **1.3 PRE DEVELOPMENT CONDITIONS**

The Pre Development Conditions are shown on Sheet A – Pre Development Stormwater Plan of the accompanying plans. The project located off the end of Winding Creek Lane in Biddeford. The site is bounded by West Brook to the south, the Winding Creek Subdivision to the west, and undeveloped wooded areas to the north and east. The project area to be disturbed is approximately 2.3 acres, excluding single family home development.

The watershed that was analyzed for this project is approximately 15.4 acres. Analysis points are described in Section 1.2 of this report. The project watershed is mostly comprised of wooded hillside marked by a steep section with some areas of ledge to the north, gradually reducing in slope to the south to West Brook. Following up on a comment from the City's review engineer, lengths used to calculate sheet flow time of concentration will be limited to 100' for the areas along the northern ridge line, as the steep slopes that exist along this ridge and areas of exposed ledge likely result in water concentrating in a shorter distance than the conventional 150' assumption.

The Pre Development Stormwater plans are included as Sheet of the accompanying plans and the Calculations are attached as Appendix B.

The Pre Development Watershed Model predicts the following peak flow rates:

| Pre Development Peak Flows (cu. ft./sec) |        |         |         |
|------------------------------------------|--------|---------|---------|
| Analysis Point                           | 2-Year | 10-Year | 25-Year |
| AP-1                                     | 6.07   | 12.93   | 18.96   |
| AP-2                                     | 9.10   | 18.85   | 27.40   |

### **1.4 POST DEVELOPMENT CONDITIONS**

The proposed project will include development of a 19 Lot Cluster Subdivision. The applicant proposes to construct approximately 1,000 linear feet of road and sidewalk, extend municipal utilities, and construct drainage systems, but is not proposing to construct the houses or grade lots for development. These lots will be offered for sale for individual development by others. Given this, the watersheds have been analyzed

with assumed cover types for lawn and homes to ensure that the flooding standard will be met for the ultimate build out.

Under proposed conditions, a swale is proposed along the northern side of the road to capture run off from the hillside above. This swale will be drained by culvert inlets, piped across the road, then outlet to level spreaders before draining to West Brook.

The proposed project will utilize an underdrained soil filter with a benched impoundment area both water quality treatment and storage for run off attenuation. Refer to Section 1.6 for detailed design calculations of the underdrained soil filter.

The Post Development Stormwater plans are included as Sheet B of the accompanying plan set, and the Calculations are attached as Appendix C.

The Post-Development Watershed Model predicts the following peak flow rates:

| Post Development Peak Flows (cu. ft./sec) |        |         |         |
|-------------------------------------------|--------|---------|---------|
| Analysis Point                            | 2-Year | 10-Year | 25-Year |
| AP-1                                      | 4.11   | 8.37    | 12.08   |
| AP-2                                      | 6.72   | 13.46   | 26.52   |

## 1.5 **BASIC STANDARDS**

The proposed project is required to meet the Basic Standards. To meet the Basic Standards the project design must demonstrate that the erosion and sedimentation control, inspection and maintenance, and housekeeping standards specified in Appendices A, B, and C of 06-096 Chapter 500 are met, and that the grading or other construction activity will not impede or otherwise alter drainageways so as to have an unreasonable adverse impact on a wetland or waterbody, or an adjacent downslope parcel.

The proposed project will provide temporary (during construction) BMP's and post-construction BMP's. Refer to Sheet 8 of the Project Plans for erosion and sedimentation control narratives and details. The project requirements for inspection and maintenance during construction and post-construction are described in the Inspection and Maintenance Plan for Stormwater Facilities found in Appendix E.

## 1.6 **GENERAL STANDARDS**

The proposed project is required to meet the General Standards. To meet the general standards, the project design must demonstrate that the stormwater management system includes treatment measures that will provide pollutant removal or treatment, and mitigate for the increased frequency and duration of channel erosive flows due to runoff from smaller storms and potential temperature impacts. This must be achieved by providing treatment of no less than 95% of the impervious area and no less than

80% of the developed area. For linear portions of projects, the treatment requirements can be reduced to no less than 75% of the impervious area and no less than 50% of the developed area (See 06-096 Chapter 500 4.C(5)(c)). As the project proposes to develop only the subdivision's road and associated drainage, the project is considered to be linear needing to meet the 75%/50% criteria.

#### Stormwater Treatment Method

The proposed project will utilize a grassed underdrained soil filter to meet treatment requirements. A closed drainage system will collect run off from along the road and outlet to a sedimentation forebay upgradient of the soil filter. The soil filter also provides additional storage for run off in a benched area above the soil filter in the southern portion of the system. This benched area will not be constructed as soil filter, but will function to retain additional run off from upgradient areas to minimize peak run off to less than existing conditions. A portion of the roadside ditch will empty into the forebay, allowing sections of the ditch to be treated by the filter and run off to be stored above the water quality volume.

#### Linear Project Components

Linear project components consist of elements of the 1,000 linear feet of roadway: the proposed 26' wide road, 5' sidewalk, 4' wide grassed esplanade, 3' deep swales, and roadside build up areas. The total proposed linear impervious area requiring treatment is 33,367 sq. ft. (0.77 acres).

The following Table summarizes the treatment calculations for linear project development.

| <b>Linear Treatment Summary</b>           |                               |
|-------------------------------------------|-------------------------------|
| Total Proposed (Linear) Impervious Area   | 0.77 acres                    |
| Total Proposed (Linear) Developed Area    | 2.27 acres                    |
| Total Treated (Linear) Impervious Area    | 0.77 acres                    |
| Total Treated (Linear) Developed Area     | 1.51 acres                    |
| <b>Linear Impervious Area Treatment %</b> | <b>100.00% (75% required)</b> |
| <b>Linear Developed Area Treatment %</b>  | <b>66.71% (50% required)</b>  |

As shown in the Table above, the stormwater management system has been designed to meet the General Standards requirements. Detailed linear treatment calculations can be found in Appendix D and the proposed location of the underdrained soil filter is shown on Sheets 4 and 5.

### **1.7 FLOODING STANDARD**

The proposed project is required to meet the Flooding Standards. To meet the Flooding Standard, the project design must demonstrate that the stormwater management systems will accomplish the following:



- a) The system must detain, retain, or result in the infiltration of stormwater from 24-hour storms of the 2-year, 10-year, and 25-year frequencies such that the peak flows of stormwater from the project site do not exceed the peak flows of stormwater prior to undertaking the project.
- b) The design of piped or open channel systems must be based on a 10-year, 24-hour storm without overloading or flooding beyond channel limits.
- c) The areas expected to be flooded by runoff from a 10-year or 25-year, 24-hour storm must be defined, and no buildings or other similar facilities may be planned within such areas.
- d) Runoff from the project may not flood the primary access road to the project and any public roads bordering the project as a result of a 25-year, 24-hour storm.

The following Table compares the Pre and Post Development peak flow rates for the 2-year, 10-year, and 25-year return periods. Refer to Appendix B for the Pre Development model and Appendix C for Post Development model.

| Peak Flow Comparison (cu. ft./sec) |        |      |         |       |         |       |
|------------------------------------|--------|------|---------|-------|---------|-------|
| Analysis Point                     | 2-Year |      | 10-Year |       | 25-Year |       |
|                                    | Pre    | Post | Pre     | Post  | Pre     | Post  |
| AP-1                               | 6.07   | 4.11 | 12.93   | 8.37  | 18.96   | 12.08 |
| AP-2                               | 9.10   | 6.72 | 18.85   | 13.46 | 27.40   | 26.52 |

As illustrated in the table above, development of the proposed project will not create a condition where peak flows of stormwater from the post development project site exceed the peak flows of existing conditions.

## 1.8 **CLOSURE**

The proposed stormwater management facilities have been designed to mitigate stormwater impacts associated with development of the proposed project. In accordance with City of Biddeford code requirements of meeting “quality and quantity standards of Chapter 500”, the proposed stormwater management facilities have been designed to meet the Basic, General and Flooding Standards.

**Appendix A**  
**Soils Report**



United States  
Department of  
Agriculture

NRCS

Natural  
Resources  
Conservation  
Service

A product of the National  
Cooperative Soil Survey,  
a joint effort of the United  
States Department of  
Agriculture and other  
Federal agencies, State  
agencies including the  
Agricultural Experiment  
Stations, and local  
participants

# Custom Soil Resource Report for York County, Maine

## West Brook Subdivision



# Preface

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Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist ([http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2\\_053951](http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951)).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

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# How Soil Surveys Are Made

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Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and



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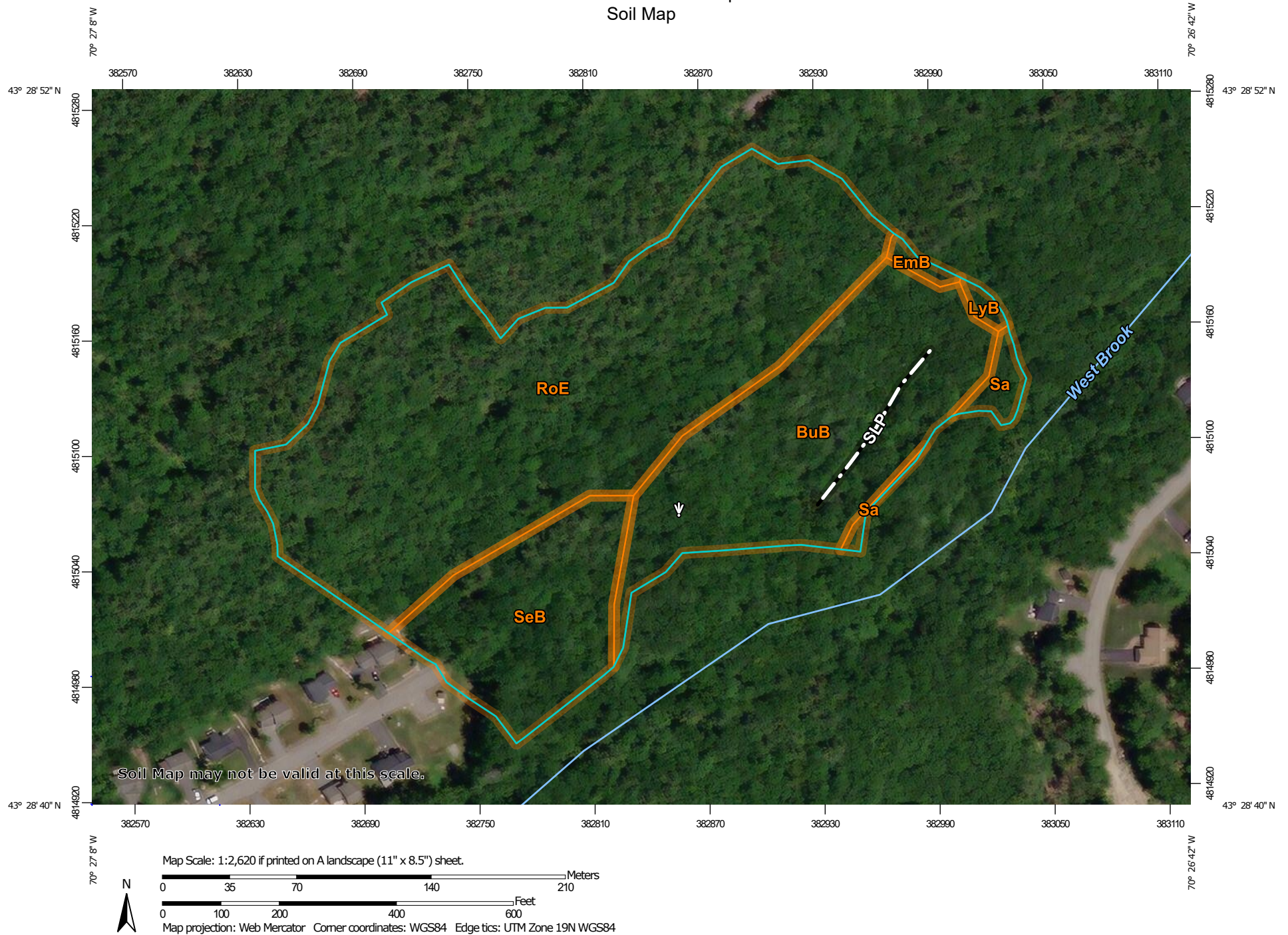
identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

# Soil Map

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The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

# Custom Soil Resource Report Soil Map



## MAP LEGEND

### Area of Interest (AOI)

 Area of Interest (AOI)

### Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

### Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

### Water Features

 Streams and Canals

### Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

### Background

 Aerial Photography

## MAP INFORMATION

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

Warning: Soil Map may not be valid at this scale.

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

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

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

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

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

Soil Survey Area: York County, Maine  
Survey Area Data: Version 20, Aug 31, 2021

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 9, 2017

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

## Map Unit Legend

| Map Unit Symbol                    | Map Unit Name                                       | Acres in AOI | Percent of AOI |
|------------------------------------|-----------------------------------------------------|--------------|----------------|
| BuB                                | Buxton silt loam, 3 to 8 percent slopes             | 4.1          | 25.7%          |
| EmB                                | Elmwood fine sandy loam, 0 to 8 percent slopes      | 0.1          | 0.6%           |
| LyB                                | Lyman-Rock outcrop complex, 3 to 8 percent slopes   | 0.1          | 0.5%           |
| RoE                                | Rock outcrop-Lyman complex, 15 to 80 percent slopes | 9.1          | 57.5%          |
| Sa                                 | Saco mucky silt loam                                | 0.3          | 1.6%           |
| SeB                                | Scio silt loam, 3 to 8 percent slopes               | 2.2          | 14.2%          |
| <b>Totals for Area of Interest</b> |                                                     | <b>15.8</b>  | <b>100.0%</b>  |

## Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it

was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

## York County, Maine

### BuB—Buxton silt loam, 3 to 8 percent slopes

#### Map Unit Setting

*National map unit symbol:* 9k54

*Elevation:* 10 to 900 feet

*Mean annual precipitation:* 34 to 48 inches

*Mean annual air temperature:* 43 to 46 degrees F

*Frost-free period:* 90 to 160 days

*Farmland classification:* Farmland of statewide importance

#### Map Unit Composition

*Buxton and similar soils:* 85 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

#### Description of Buxton

##### Setting

*Landform:* Coastal plains

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Glaciolacustrine deposits derived from siltstone and/or fine-silty marine deposits

##### Typical profile

*H1 - 0 to 7 inches:* silt loam

*H2 - 7 to 19 inches:* silt loam

*H3 - 19 to 37 inches:* silty clay

*H4 - 37 to 65 inches:* silty clay

##### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Somewhat poorly drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)

*Depth to water table:* About 7 to 18 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 9.8 inches)

##### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 3w

*Hydrologic Soil Group:* D

*Hydric soil rating:* No



## **EmB—Elmwood fine sandy loam, 0 to 8 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 9k5h

*Elevation:* 10 to 900 feet

*Mean annual precipitation:* 38 to 55 inches

*Mean annual air temperature:* 43 to 46 degrees F

*Frost-free period:* 130 to 195 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Elmwood and similar soils:* 89 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Elmwood**

#### **Setting**

*Landform:* Outwash plains

*Landform position (two-dimensional):* Summit

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Linear

*Across-slope shape:* Linear

*Parent material:* Coarse-loamy glaciolacustrine deposits

#### **Typical profile**

*Oa - 0 to 2 inches:* highly decomposed plant material

*H1 - 2 to 15 inches:* fine sandy loam

*H2 - 15 to 21 inches:* very fine sandy loam

*H3 - 21 to 65 inches:* silty clay

#### **Properties and qualities**

*Slope:* 0 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately high (0.00 to 0.20 in/hr)

*Depth to water table:* About 18 to 36 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 9.8 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2w

*Hydrologic Soil Group:* B

*Hydric soil rating:* No



## LyB—Lyman-Rock outcrop complex, 3 to 8 percent slopes

### Map Unit Setting

*National map unit symbol:* 2trqh

*Elevation:* 0 to 560 feet

*Mean annual precipitation:* 36 to 65 inches

*Mean annual air temperature:* 36 to 52 degrees F

*Frost-free period:* 60 to 160 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Lyman, very stony, and similar soils:* 65 percent

*Rock outcrop:* 20 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Lyman, Very Stony

#### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

#### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material

*A - 1 to 3 inches:* loam

*E - 3 to 5 inches:* fine sandy loam

*Bhs - 5 to 7 inches:* loam

*Bs1 - 7 to 11 inches:* loam

*Bs2 - 11 to 18 inches:* channery loam

*R - 18 to 28 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 8 percent

*Surface area covered with cobbles, stones or boulders:* 1.5 percent

*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock

*Drainage class:* Somewhat excessively drained

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)

*Depth to water table:* More than 80 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

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*Land capability classification (nonirrigated):* 6s

*Hydrologic Soil Group:* D

*Hydric soil rating:* No

### Description of Rock Outcrop

#### Setting

*Landform:* Hills, mountains

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainbase, side slope, crest

*Down-slope shape:* Convex

*Across-slope shape:* Convex

*Parent material:* Igneous and metamorphic rock

#### Typical profile

*R - 0 to 10 inches:* bedrock

#### Properties and qualities

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* 0 inches to lithic bedrock

*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high (0.00 to 14.17 in/hr)

#### Interpretive groups

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 8s

*Hydric soil rating:* Unranked

## RoE—Rock outcrop-Lyman complex, 15 to 80 percent slopes

### Map Unit Setting

*National map unit symbol:* 2trqv

*Elevation:* 0 to 1,180 feet

*Mean annual precipitation:* 36 to 65 inches

*Mean annual air temperature:* 36 to 52 degrees F

*Frost-free period:* 60 to 160 days

*Farmland classification:* Not prime farmland

### Map Unit Composition

*Rock outcrop:* 64 percent

*Lyman, very stony, and similar soils:* 21 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Rock Outcrop

#### Setting

*Landform:* Mountains, hills

*Landform position (two-dimensional):* Summit, shoulder, backslope

*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest, free face

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*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Igneous and metamorphic rock

### Typical profile

*R - 0 to 10 inches:* bedrock

### Properties and qualities

*Slope:* 15 to 80 percent  
*Depth to restrictive feature:* 0 inches to lithic bedrock  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to very high  
(0.00 to 14.17 in/hr)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 8s  
*Hydric soil rating:* Unranked

## Description of Lyman, Very Stony

### Setting

*Landform:* Hills, mountains  
*Landform position (two-dimensional):* Summit, shoulder, backslope  
*Landform position (three-dimensional):* Mountaintop, mountainflank, side slope, crest  
*Down-slope shape:* Convex  
*Across-slope shape:* Convex  
*Parent material:* Loamy supraglacial till derived from granite and gneiss and/or loamy supraglacial till derived from phyllite and/or loamy supraglacial till derived from mica schist

### Typical profile

*Oe - 0 to 1 inches:* moderately decomposed plant material  
*A - 1 to 3 inches:* loam  
*E - 3 to 5 inches:* fine sandy loam  
*Bhs - 5 to 7 inches:* loam  
*Bs1 - 7 to 11 inches:* loam  
*Bs2 - 11 to 18 inches:* channery loam  
*R - 18 to 28 inches:* bedrock

### Properties and qualities

*Slope:* 15 to 80 percent  
*Surface area covered with cobbles, stones or boulders:* 1.5 percent  
*Depth to restrictive feature:* 11 to 24 inches to lithic bedrock  
*Drainage class:* Somewhat excessively drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 14.03 in/hr)  
*Depth to water table:* More than 80 inches  
*Frequency of flooding:* None  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Low (about 3.4 inches)

### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 7s  
*Hydrologic Soil Group:* D  
*Ecological site:* F144BY701ME - Shallow Till  
*Hydric soil rating:* No

## Sa—Saco mucky silt loam

### Map Unit Setting

*National map unit symbol:* 9k6j  
*Elevation:* 10 to 1,750 feet  
*Mean annual precipitation:* 34 to 48 inches  
*Mean annual air temperature:* 37 to 46 degrees F  
*Frost-free period:* 80 to 160 days  
*Farmland classification:* Not prime farmland

### Map Unit Composition

*Saco and similar soils:* 85 percent  
*Estimates are based on observations, descriptions, and transects of the mapunit.*

### Description of Saco

#### Setting

*Landform:* Flood plains  
*Landform position (two-dimensional):* Toeslope  
*Landform position (three-dimensional):* Talf  
*Down-slope shape:* Linear  
*Across-slope shape:* Linear  
*Parent material:* Coarse-silty alluvium

#### Typical profile

*H1 - 0 to 13 inches:* mucky silt loam  
*H2 - 13 to 24 inches:* silt loam  
*H3 - 24 to 65 inches:* very fine sandy loam

#### Properties and qualities

*Slope:* 0 to 2 percent  
*Depth to restrictive feature:* More than 80 inches  
*Drainage class:* Very poorly drained  
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.60 to 2.00 in/hr)  
*Depth to water table:* About 0 to 6 inches  
*Frequency of flooding:* FrequentNone  
*Frequency of ponding:* None  
*Available water supply, 0 to 60 inches:* Very high (about 16.3 inches)

#### Interpretive groups

*Land capability classification (irrigated):* None specified  
*Land capability classification (nonirrigated):* 6w  
*Hydrologic Soil Group:* B/D  
*Hydric soil rating:* Yes

## **SeB—Scio silt loam, 3 to 8 percent slopes**

### **Map Unit Setting**

*National map unit symbol:* 9k6l

*Elevation:* 0 to 300 feet

*Mean annual precipitation:* 48 to 51 inches

*Mean annual air temperature:* 45 to 46 degrees F

*Frost-free period:* 145 to 160 days

*Farmland classification:* Farmland of statewide importance

### **Map Unit Composition**

*Scio and similar soils:* 89 percent

*Estimates are based on observations, descriptions, and transects of the mapunit.*

### **Description of Scio**

#### **Setting**

*Landform:* Lakebeds

*Landform position (two-dimensional):* Toeslope

*Landform position (three-dimensional):* Tread

*Down-slope shape:* Concave

*Across-slope shape:* Linear

*Parent material:* Very fine sand glaciolacustrine deposits

#### **Typical profile**

*H1 - 0 to 7 inches:* silt loam

*H2 - 7 to 26 inches:* silt loam

*H3 - 26 to 36 inches:* silt loam

*H4 - 36 to 65 inches:* very fine sandy loam

#### **Properties and qualities**

*Slope:* 3 to 8 percent

*Depth to restrictive feature:* More than 80 inches

*Drainage class:* Moderately well drained

*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high  
(0.60 to 2.00 in/hr)

*Depth to water table:* About 18 to 30 inches

*Frequency of flooding:* None

*Frequency of ponding:* None

*Available water supply, 0 to 60 inches:* High (about 10.1 inches)

#### **Interpretive groups**

*Land capability classification (irrigated):* None specified

*Land capability classification (nonirrigated):* 2e

*Hydrologic Soil Group:* C

*Hydric soil rating:* No

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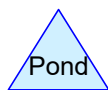
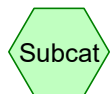
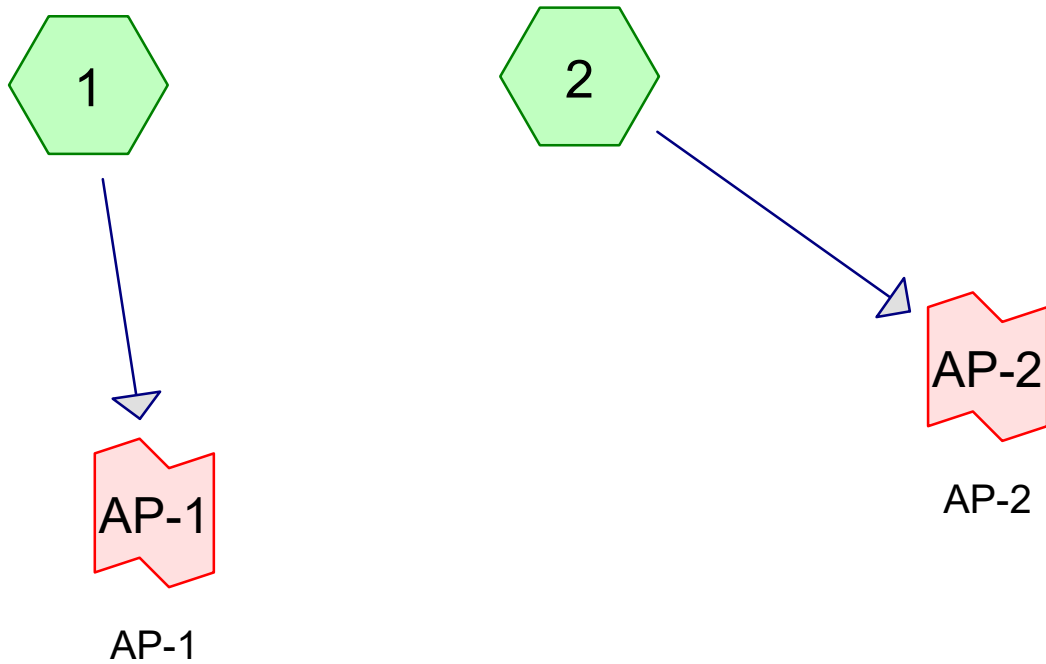
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**Appendix B**  
**Pre-Development Calculations**





**Routing Diagram for West Brook Pre Development**

Prepared by BH2M, Printed 4/4/2022

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## West Brook Pre Development

Type III 24-hr 25 YR Rainfall=6.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 1:** Runoff Area=277,225 sf 0.00% Impervious Runoff Depth>3.21"  
Flow Length=806' Tc=16.0 min CN=75 Runoff=18.96 cfs 1.702 af

**Subcatchment 2:** Runoff Area=394,708 sf 0.00% Impervious Runoff Depth>3.31"  
Flow Length=1,086' Tc=16.4 min CN=76 Runoff=27.40 cfs 2.497 af

**Link AP-1: AP-1** Inflow=18.96 cfs 1.702 af  
Primary=18.96 cfs 1.702 af

**Link AP-2: AP-2** Inflow=27.40 cfs 2.497 af  
Primary=27.40 cfs 2.497 af

**Total Runoff Area = 15.425 ac Runoff Volume = 4.199 af Average Runoff Depth = 3.27"**  
**100.00% Pervious = 15.425 ac 0.00% Impervious = 0.000 ac**

**West Brook Pre Development**

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Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Subcatchment 1:**

Runoff = 18.96 cfs @ 12.22 hrs, Volume= 1.702 af, Depth&gt; 3.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 82,085    | 70 | Woods, Good, HSG C    |
| 195,140   | 77 | Woods, Good, HSG D    |
| 277,225   | 75 | Weighted Average      |
| 277,225   |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------|
| 10.3     | 100           | 0.1200        | 0.16              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                |
| 5.5      | 521           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                       |
| 0.2      | 185           | 0.0700        | 15.79             | 736.64         | <b>Parabolic Channel,</b><br>W=35.00' D=2.00' Area=46.7 sf Perim=35.3' n= 0.030 |
| 16.0     | 806           | Total         |                   |                |                                                                                 |

**Summary for Subcatchment 2:**

Runoff = 27.40 cfs @ 12.23 hrs, Volume= 2.497 af, Depth&gt; 3.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description           |
|-----------|----|-----------------------|
| 9,560     | 55 | Woods, Good, HSG B    |
| 14,586    | 70 | Woods, Good, HSG C    |
| 370,562   | 77 | Woods, Good, HSG D    |
| 394,708   | 76 | Weighted Average      |
| 394,708   |    | 100.00% Pervious Area |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------|
| 12.1     | 100           | 0.0800        | 0.14              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                |
| 0.1      | 102           | 0.1760        | 20.27             | 270.28         | <b>Parabolic Channel,</b><br>W=10.00' D=2.00' Area=13.3 sf Perim=11.0' n= 0.035 |
| 3.4      | 342           | 0.1111        | 1.67              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                       |
| 0.8      | 542           | 0.0332        | 10.89             | 580.56         | <b>Parabolic Channel,</b><br>W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.030 |
| 16.4     | 1,086         | Total         |                   |                |                                                                                 |

**Summary for Link AP-1: AP-1**

Inflow Area = 6.364 ac, 0.00% Impervious, Inflow Depth > 3.21" for 25 YR event  
Inflow = 18.96 cfs @ 12.22 hrs, Volume= 1.702 af  
Primary = 18.96 cfs @ 12.22 hrs, Volume= 1.702 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: AP-2**

Inflow Area = 9.061 ac, 0.00% Impervious, Inflow Depth > 3.31" for 25 YR event  
Inflow = 27.40 cfs @ 12.23 hrs, Volume= 2.497 af  
Primary = 27.40 cfs @ 12.23 hrs, Volume= 2.497 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## West Brook Pre Development

Type III 24-hr 2 YR Rainfall=3.30"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 1:

Runoff Area=277,225 sf 0.00% Impervious Runoff Depth>1.06"  
Flow Length=806' Tc=16.0 min CN=75 Runoff=6.07 cfs 0.562 af

### Subcatchment 2:

Runoff Area=394,708 sf 0.00% Impervious Runoff Depth>1.12"  
Flow Length=1,086' Tc=16.4 min CN=76 Runoff=9.10 cfs 0.843 af

### Link AP-1: AP-1

Inflow=6.07 cfs 0.562 af  
Primary=6.07 cfs 0.562 af

### Link AP-2: AP-2

Inflow=9.10 cfs 0.843 af  
Primary=9.10 cfs 0.843 af

**Total Runoff Area = 15.425 ac Runoff Volume = 1.404 af Average Runoff Depth = 1.09"**  
**100.00% Pervious = 15.425 ac 0.00% Impervious = 0.000 ac**

## West Brook Pre Development

Type III 24-hr 10 YR Rainfall=4.90"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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 1:

Runoff Area=277,225 sf 0.00% Impervious Runoff Depth>2.19"  
Flow Length=806' Tc=16.0 min CN=75 Runoff=12.93 cfs 1.161 af

### Subcatchment 2:

Runoff Area=394,708 sf 0.00% Impervious Runoff Depth>2.27"  
Flow Length=1,086' Tc=16.4 min CN=76 Runoff=18.85 cfs 1.714 af

### Link AP-1: AP-1

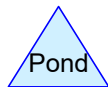
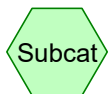
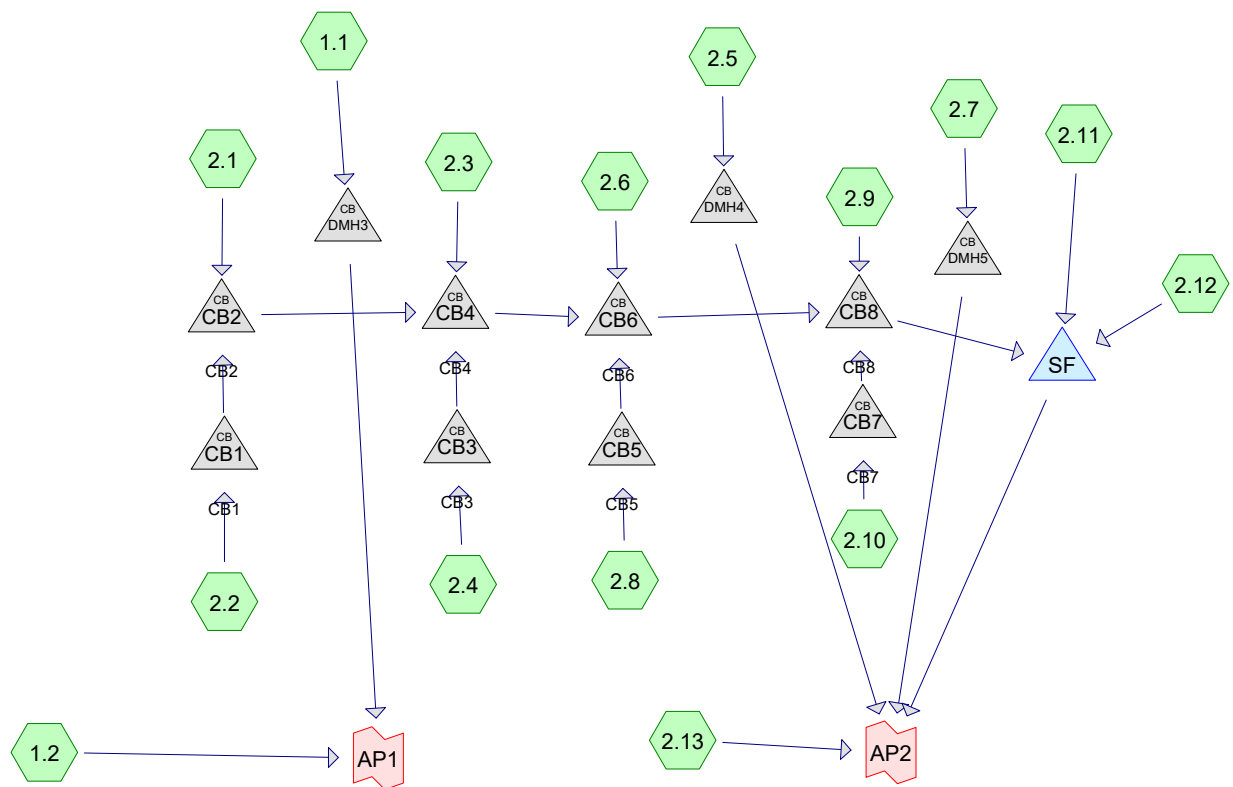
Inflow=12.93 cfs 1.161 af  
Primary=12.93 cfs 1.161 af

### Link AP-2: AP-2

Inflow=18.85 cfs 1.714 af  
Primary=18.85 cfs 1.714 af

**Total Runoff Area = 15.425 ac Runoff Volume = 2.875 af Average Runoff Depth = 2.24"**  
**100.00% Pervious = 15.425 ac 0.00% Impervious = 0.000 ac**





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Type III 24-hr 25 YR Rainfall=6.20"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                           |                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment 1.1:</b>  | Runoff Area=162,502 sf 5.34% Impervious Runoff Depth>3.49"<br>Flow Length=738' Tc=24.3 min CN=78 Runoff=10.17 cfs 1.086 af                |
| <b>Subcatchment 1.2:</b>  | Runoff Area=36,530 sf 0.00% Impervious Runoff Depth>2.83"<br>Flow Length=150' Slope=0.0933 '/' Tc=15.8 min CN=71 Runoff=2.21 cfs 0.198 af |
| <b>Subcatchment 2.1:</b>  | Runoff Area=6,795 sf 88.40% Impervious Runoff Depth>5.27"<br>Tc=6.0 min CN=95 Runoff=0.91 cfs 0.068 af                                    |
| <b>Subcatchment 2.10:</b> | Runoff Area=19,380 sf 56.87% Impervious Runoff Depth>4.76"<br>Flow Length=276' Tc=9.4 min CN=90 Runoff=2.19 cfs 0.177 af                  |
| <b>Subcatchment 2.11:</b> | Runoff Area=82,756 sf 8.84% Impervious Runoff Depth>3.61"<br>Flow Length=506' Tc=12.1 min CN=79 Runoff=6.98 cfs 0.571 af                  |
| <b>Subcatchment 2.12:</b> | Runoff Area=19,459 sf 0.00% Impervious Runoff Depth>3.72"<br>Tc=6.0 min CN=80 Runoff=2.02 cfs 0.138 af                                    |
| <b>Subcatchment 2.13:</b> | Runoff Area=118,781 sf 0.00% Impervious Runoff Depth>3.30"<br>Flow Length=779' Tc=23.8 min CN=76 Runoff=7.10 cfs 0.750 af                 |
| <b>Subcatchment 2.2:</b>  | Runoff Area=15,687 sf 59.00% Impervious Runoff Depth>4.55"<br>Flow Length=257' Tc=9.3 min CN=88 Runoff=1.72 cfs 0.137 af                  |
| <b>Subcatchment 2.3:</b>  | Runoff Area=6,753 sf 87.43% Impervious Runoff Depth>5.27"<br>Tc=6.0 min CN=95 Runoff=0.90 cfs 0.068 af                                    |
| <b>Subcatchment 2.4:</b>  | Runoff Area=16,736 sf 63.92% Impervious Runoff Depth>4.87"<br>Flow Length=337' Tc=9.0 min CN=91 Runoff=1.95 cfs 0.156 af                  |
| <b>Subcatchment 2.5:</b>  | Runoff Area=106,121 sf 5.84% Impervious Runoff Depth>3.60"<br>Flow Length=758' Tc=15.6 min CN=79 Runoff=8.17 cfs 0.732 af                 |
| <b>Subcatchment 2.6:</b>  | Runoff Area=2,412 sf 87.06% Impervious Runoff Depth>5.36"<br>Tc=6.0 min CN=96 Runoff=0.32 cfs 0.025 af                                    |
| <b>Subcatchment 2.7:</b>  | Runoff Area=64,789 sf 7.25% Impervious Runoff Depth>3.61"<br>Flow Length=409' Tc=12.2 min CN=79 Runoff=5.45 cfs 0.447 af                  |
| <b>Subcatchment 2.8:</b>  | Runoff Area=7,461 sf 54.91% Impervious Runoff Depth>4.76"<br>Flow Length=132' Tc=6.6 min CN=90 Runoff=0.93 cfs 0.068 af                   |
| <b>Subcatchment 2.9:</b>  | Runoff Area=5,772 sf 86.82% Impervious Runoff Depth>5.36"<br>Tc=6.0 min CN=96 Runoff=0.78 cfs 0.059 af                                    |
| <b>Pond CB1: CB1</b>      | Peak Elev=99.17' Inflow=1.72 cfs 0.137 af<br>12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.72 cfs 0.137 af                   |

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**Pond CB2: CB2**

Peak Elev=99.19' Inflow=2.59 cfs 0.205 af  
12.0" Round Culvert n=0.013 L=515.0' S=0.0054 '/' Outflow=2.59 cfs 0.205 af

**Pond CB3: CB3**

Peak Elev=96.36' Inflow=1.95 cfs 0.156 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.95 cfs 0.156 af

**Pond CB4: CB4**

Peak Elev=96.63' Inflow=5.41 cfs 0.429 af  
15.0" Round Culvert n=0.013 L=106.0' S=0.0151 '/' Outflow=5.41 cfs 0.429 af

**Pond CB5: CB5**

Peak Elev=94.57' Inflow=0.93 cfs 0.068 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=0.93 cfs 0.068 af

**Pond CB6: CB6**

Peak Elev=94.82' Inflow=6.64 cfs 0.522 af  
18.0" Round Culvert n=0.013 L=254.0' S=0.0088 '/' Outflow=6.64 cfs 0.522 af

**Pond CB7: CB7**

Peak Elev=92.35' Inflow=2.19 cfs 0.177 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=2.19 cfs 0.177 af

**Pond CB8: CB8**

Peak Elev=93.40' Inflow=9.56 cfs 0.757 af  
18.0" Round Culvert n=0.013 L=26.0' S=0.0050 '/' Outflow=9.56 cfs 0.757 af

**Pond DMH3:**

Peak Elev=104.17' Inflow=10.17 cfs 1.086 af  
Outflow=10.17 cfs 1.086 af

**Pond DMH4:**

Peak Elev=102.19' Inflow=8.17 cfs 0.732 af  
Outflow=8.17 cfs 0.732 af

**Pond DMH5:**

Peak Elev=98.22' Inflow=5.45 cfs 0.447 af  
Outflow=5.45 cfs 0.447 af

**Pond SF:**

Peak Elev=91.38' Storage=31,698 cf Inflow=17.82 cfs 1.467 af  
Outflow=9.12 cfs 0.825 af

**Link AP1:**

Inflow=12.08 cfs 1.284 af  
Primary=12.08 cfs 1.284 af

**Link AP2:**

Inflow=26.52 cfs 2.753 af  
Primary=26.52 cfs 2.753 af

**Total Runoff Area = 15.425 ac Runoff Volume = 4.680 af Average Runoff Depth = 3.64"**  
**87.95% Pervious = 13.567 ac 12.05% Impervious = 1.859 ac**

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Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Subcatchment 1.1:**

Runoff = 10.17 cfs @ 12.34 hrs, Volume= 1.086 af, Depth&gt; 3.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,153     | 70 | Woods, Good, HSG C            |
| 131,512   | 77 | Woods, Good, HSG D            |
| 16,110    | 74 | >75% Grass cover, Good, HSG C |
| 4,056     | 80 | >75% Grass cover, Good, HSG D |
| 5,955     | 98 | Roofs, HSG D                  |
| 2,716     | 98 | Paved parking, HSG D          |
| 162,502   | 78 | Weighted Average              |
| 153,831   |    | 94.66% Pervious Area          |
| 8,671     |    | 5.34% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 21.1     | 100           | 0.0200        | 0.08              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                              |
| 0.2      | 218           | 0.1100        | 16.93             | 677.05         | <b>Parabolic Channel,</b><br>W=30.00' D=2.00' Area=40.0 sf Perim=30.4' n= 0.035               |
| 2.3      | 233           | 0.1150        | 1.70              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.7      | 187           | 0.0100        | 4.51              | 54.17          | <b>Trap/Vee/Rect Channel Flow,</b><br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.035 |
| 24.3     | 738           | Total         |                   |                |                                                                                               |

**Summary for Subcatchment 1.2:**

Runoff = 2.21 cfs @ 12.22 hrs, Volume= 0.198 af, Depth&gt; 2.83"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 26,011    | 70 | Woods, Good, HSG C            |
| 1,916     | 77 | Woods, Good, HSG D            |
| 8,183     | 74 | >75% Grass cover, Good, HSG C |
| 420       | 80 | >75% Grass cover, Good, HSG D |
| 36,530    | 71 | Weighted Average              |
| 36,530    |    | 100.00% Pervious Area         |

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Type III 24-hr 25 YR Rainfall=6.20"

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| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                                      |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------------------------------------------|
| 15.8        | 150              | 0.0933           | 0.16                 |                   | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30" |

**Summary for Subcatchment 2.1:**

Runoff = 0.91 cfs @ 12.09 hrs, Volume= 0.068 af, Depth&gt; 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 788       | 74 | >75% Grass cover, Good, HSG C |
| 6,007     | 98 | Paved parking, HSG C          |
| 6,795     | 95 | Weighted Average              |
| 788       |    | 11.60% Pervious Area          |
| 6,007     |    | 88.40% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                  |
|-------------|------------------|------------------|----------------------|-------------------|------------------------------|
| 6.0         |                  |                  |                      |                   | <b>Direct Entry, Assumed</b> |

**Summary for Subcatchment 2.10:**

Runoff = 2.19 cfs @ 12.13 hrs, Volume= 0.177 af, Depth&gt; 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 8,358     | 80 | >75% Grass cover, Good, HSG D |
| 3,264     | 98 | Roofs, HSG D                  |
| 7,758     | 98 | Paved parking, HSG D          |
| 19,380    | 90 | Weighted Average              |
| 8,358     |    | 43.13% Pervious Area          |
| 11,022    |    | 56.87% Impervious Area        |

| Tc<br>(min) | Length<br>(feet) | Slope<br>(ft/ft) | Velocity<br>(ft/sec) | Capacity<br>(cfs) | Description                                             |
|-------------|------------------|------------------|----------------------|-------------------|---------------------------------------------------------|
| 7.5         | 43               | 0.0070           | 0.10                 |                   | <b>Sheet Flow,</b><br>Grass: Short n= 0.150 P2= 3.30"   |
| 1.9         | 233              | 0.0100           | 2.03                 |                   | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps |
| 9.4         | 276              | Total            |                      |                   |                                                         |

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Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Subcatchment 2.11:**

Runoff = 6.98 cfs @ 12.17 hrs, Volume= 0.571 af, Depth&gt; 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 58,607    | 77 | Woods, Good, HSG D            |
| 16,836    | 80 | >75% Grass cover, Good, HSG D |
| 4,968     | 98 | Roofs, HSG D                  |
| 2,345     | 98 | Paved parking, HSG D          |
| 82,756    | 79 | Weighted Average              |
| 75,443    |    | 91.16% Pervious Area          |
| 7,313     |    | 8.84% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 9.7      | 100           | 0.1400        | 0.17              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                              |
| 1.6      | 201           | 0.1790        | 2.12              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.8      | 205           | 0.0100        | 4.51              | 54.17          | <b>Trap/Vee/Rect Channel Flow,</b><br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.035 |
| 12.1     | 506           | Total         |                   |                |                                                                                               |

**Summary for Subcatchment 2.12:**

Runoff = 2.02 cfs @ 12.09 hrs, Volume= 0.138 af, Depth&gt; 3.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 230       | 77 | Woods, Good, HSG D            |
| 19,229    | 80 | >75% Grass cover, Good, HSG D |
| 19,459    | 80 | Weighted Average              |
| 19,459    |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                  |
|----------|---------------|---------------|-------------------|----------------|------------------------------|
| 6.0      |               |               |                   |                | <b>Direct Entry, Assumed</b> |

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Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Subcatchment 2.13:**

Runoff = 7.10 cfs @ 12.33 hrs, Volume= 0.750 af, Depth&gt; 3.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 74,811    | 77 | Woods, Good, HSG D            |
| 34,410    | 80 | >75% Grass cover, Good, HSG D |
| 9,560     | 55 | Woods, Good, HSG B            |
| 118,781   | 76 | Weighted Average              |
| 118,781   |    | 100.00% Pervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                     |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------------------------------|
| 20.8     | 150           | 0.0467        | 0.12              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                |
| 1.7      | 80            | 0.0250        | 0.79              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                       |
| 1.3      | 549           | 0.0200        | 7.24              | 386.23         | <b>Parabolic Channel,</b><br>W=40.00' D=2.00' Area=53.3 sf Perim=40.3' n= 0.035 |
| 23.8     | 779           | Total         |                   |                |                                                                                 |

**Summary for Subcatchment 2.2:**

Runoff = 1.72 cfs @ 12.13 hrs, Volume= 0.137 af, Depth&gt; 4.55"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 6,432     | 74 | >75% Grass cover, Good, HSG C |
| 3,348     | 98 | Roofs, HSG C                  |
| 5,907     | 98 | Paved parking, HSG C          |
| 15,687    | 88 | Weighted Average              |
| 6,432     |    | 41.00% Pervious Area          |
| 9,255     |    | 59.00% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                             |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------|
| 7.5      | 43            | 0.0070        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Short n= 0.150 P2= 3.30"   |
| 1.8      | 214           | 0.0100        | 2.03              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps |
| 9.3      | 257           | Total         |                   |                |                                                         |

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Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Subcatchment 2.3:**

Runoff = 0.90 cfs @ 12.09 hrs, Volume= 0.068 af, Depth&gt; 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 310       | 74 | >75% Grass cover, Good, HSG C |
| 539       | 80 | >75% Grass cover, Good, HSG D |
| 5,904     | 98 | Paved parking, HSG D          |
| 6,753     | 95 | Weighted Average              |
| 849       |    | 12.57% Pervious Area          |
| 5,904     |    | 87.43% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                  |
|----------|---------------|---------------|-------------------|----------------|------------------------------|
| 6.0      |               |               |                   |                | <b>Direct Entry, Assumed</b> |

**Summary for Subcatchment 2.4:**

Runoff = 1.95 cfs @ 12.12 hrs, Volume= 0.156 af, Depth&gt; 4.87"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 2,384     | 74 | >75% Grass cover, Good, HSG C |
| 3,654     | 80 | >75% Grass cover, Good, HSG D |
| 4,028     | 98 | Roofs, HSG C                  |
| 6,670     | 98 | Paved parking, HSG C          |
| 16,736    | 91 | Weighted Average              |
| 6,038     |    | 36.08% Pervious Area          |
| 10,698    |    | 63.92% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                             |
|----------|---------------|---------------|-------------------|----------------|---------------------------------------------------------|
| 7.5      | 43            | 0.0070        | 0.10              |                | <b>Sheet Flow,</b><br>Grass: Short n= 0.150 P2= 3.30"   |
| 1.5      | 294           | 0.0250        | 3.21              |                | <b>Shallow Concentrated Flow,</b><br>Paved Kv= 20.3 fps |
| 9.0      | 337           | Total         |                   |                |                                                         |

**Summary for Subcatchment 2.5:**

Runoff = 8.17 cfs @ 12.21 hrs, Volume= 0.732 af, Depth&gt; 3.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

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| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 85,018    | 77 | Woods, Good, HSG D            |
| 2,234     | 74 | >75% Grass cover, Good, HSG C |
| 12,669    | 80 | >75% Grass cover, Good, HSG D |
| 4,557     | 98 | Roofs, HSG D                  |
| 1,643     | 98 | Paved parking, HSG D          |
| 106,121   | 79 | Weighted Average              |
| 99,921    |    | 94.16% Pervious Area          |
| 6,200     |    | 5.84% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 10.3     | 100           | 0.1200        | 0.16              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                              |
| 4.8      | 453           | 0.1000        | 1.58              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.5      | 205           | 0.0250        | 7.14              | 85.66          | <b>Trap/Vee/Rect Channel Flow,</b><br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.035 |
| 15.6     | 758           | Total         |                   |                |                                                                                               |

**Summary for Subcatchment 2.6:**

Runoff = 0.32 cfs @ 12.09 hrs, Volume= 0.025 af, Depth&gt; 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 312       | 80 | >75% Grass cover, Good, HSG D |
| 2,100     | 98 | Paved parking, HSG D          |
| 2,412     | 96 | Weighted Average              |
| 312       |    | 12.94% Pervious Area          |
| 2,100     |    | 87.06% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                  |
|----------|---------------|---------------|-------------------|----------------|------------------------------|
| 6.0      |               |               |                   |                | <b>Direct Entry, Assumed</b> |

**Summary for Subcatchment 2.7:**

Runoff = 5.45 cfs @ 12.17 hrs, Volume= 0.447 af, Depth&gt; 3.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"



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Type III 24-hr 25 YR Rainfall=6.20"

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| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 45,593    | 77 | Woods, Good, HSG D            |
| 14,497    | 80 | >75% Grass cover, Good, HSG D |
| 3,264     | 98 | Roofs, HSG D                  |
| 1,435     | 98 | Paved parking, HSG D          |
| 64,789    | 79 | Weighted Average              |
| 60,090    |    | 92.75% Pervious Area          |
| 4,699     |    | 7.25% Impervious Area         |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                                                   |
|----------|---------------|---------------|-------------------|----------------|-----------------------------------------------------------------------------------------------|
| 10.3     | 100           | 0.1200        | 0.16              |                | <b>Sheet Flow,</b><br>Woods: Light underbrush n= 0.400 P2= 3.30"                              |
| 1.5      | 195           | 0.2000        | 2.24              |                | <b>Shallow Concentrated Flow,</b><br>Woodland Kv= 5.0 fps                                     |
| 0.4      | 114           | 0.0100        | 4.51              | 54.17          | <b>Trap/Vee/Rect Channel Flow,</b><br>Bot.W=2.00' D=2.00' Z= 2.0 '/' Top.W=10.00'<br>n= 0.035 |
| 12.2     | 409           | Total         |                   |                |                                                                                               |

**Summary for Subcatchment 2.8:**

Runoff = 0.93 cfs @ 12.10 hrs, Volume= 0.068 af, Depth&gt; 4.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 3,364     | 80 | >75% Grass cover, Good, HSG D |
| 1,608     | 98 | Roofs, HSG C                  |
| 2,489     | 98 | Paved parking, HSG C          |
| 7,461     | 90 | Weighted Average              |
| 3,364     |    | 45.09% Pervious Area          |
| 4,097     |    | 54.91% Impervious Area        |

| Tc (min) | Length (feet) | Slope (ft/ft) | Velocity (ft/sec) | Capacity (cfs) | Description                                                        |
|----------|---------------|---------------|-------------------|----------------|--------------------------------------------------------------------|
| 5.5      | 29            | 0.0070        | 0.09              |                | <b>Sheet Flow,</b><br>Grass: Short n= 0.150 P2= 3.30"              |
| 1.1      | 103           | 0.0100        | 1.50              |                | <b>Shallow Concentrated Flow,</b><br>Grassed Waterway Kv= 15.0 fps |
| 6.6      | 132           | Total         |                   |                |                                                                    |

**Summary for Subcatchment 2.9:**

Runoff = 0.78 cfs @ 12.09 hrs, Volume= 0.059 af, Depth&gt; 5.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25 YR Rainfall=6.20"

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| Area (sf) | CN | Description                   |
|-----------|----|-------------------------------|
| 761       | 80 | >75% Grass cover, Good, HSG D |
| 5,011     | 98 | Paved parking, HSG D          |
| 5,772     | 96 | Weighted Average              |
| 761       |    | 13.18% Pervious Area          |
| 5,011     |    | 86.82% Impervious Area        |

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

**Summary for Pond CB1: CB1**

Inflow Area = 0.360 ac, 59.00% Impervious, Inflow Depth > 4.55" for 25 YR event  
 Inflow = 1.72 cfs @ 12.13 hrs, Volume= 0.137 af  
 Outflow = 1.72 cfs @ 12.13 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.72 cfs @ 12.13 hrs, Volume= 0.137 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 99.17' @ 12.13 hrs

Flood Elev= 104.30'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                            |
|--------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 98.30' | <b>12.0" Round Culvert</b><br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.30' / 98.20' S= 0.0050 ' / S= 0.0050 ' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |

**Primary OutFlow** Max=1.69 cfs @ 12.13 hrs HW=99.16' (Free Discharge)↑**1=Culvert** (Barrel Controls 1.69 cfs @ 3.16 fps)**Summary for Pond CB2: CB2**

Inflow Area = 0.516 ac, 67.89% Impervious, Inflow Depth > 4.77" for 25 YR event  
 Inflow = 2.59 cfs @ 12.11 hrs, Volume= 0.205 af  
 Outflow = 2.59 cfs @ 12.11 hrs, Volume= 0.205 af, Atten= 0%, Lag= 0.0 min  
 Primary = 2.59 cfs @ 12.11 hrs, Volume= 0.205 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 99.19' @ 12.11 hrs

Flood Elev= 105.17'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                             |
|--------|---------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 98.10' | <b>12.0" Round Culvert</b><br>L= 515.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 98.10' / 95.32' S= 0.0054 ' / S= 0.0054 ' Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |

**Primary OutFlow** Max=2.55 cfs @ 12.11 hrs HW=99.17' (Free Discharge)↑**1=Culvert** (Barrel Controls 2.55 cfs @ 3.75 fps)

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**Summary for Pond CB3: CB3**

Inflow Area = 0.384 ac, 63.92% Impervious, Inflow Depth > 4.87" for 25 YR event  
 Inflow = 1.95 cfs @ 12.12 hrs, Volume= 0.156 af  
 Outflow = 1.95 cfs @ 12.12 hrs, Volume= 0.156 af, Atten= 0%, Lag= 0.0 min  
 Primary = 1.95 cfs @ 12.12 hrs, Volume= 0.156 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 96.36' @ 12.12 hrs

Flood Elev= 100.42'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                               |
|--------|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 95.42' | <b>12.0" Round Culvert</b><br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 95.42' / 95.32' S= 0.0050 '/ Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |

**Primary OutFlow** Max=1.90 cfs @ 12.12 hrs HW=96.35' (Free Discharge)

↑1=Culvert (Barrel Controls 1.90 cfs @ 3.27 fps)

**Summary for Pond CB4: CB4**

Inflow Area = 1.055 ac, 69.31% Impervious, Inflow Depth > 4.88" for 25 YR event  
 Inflow = 5.41 cfs @ 12.11 hrs, Volume= 0.429 af  
 Outflow = 5.41 cfs @ 12.11 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.41 cfs @ 12.11 hrs, Volume= 0.429 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 96.63' @ 12.11 hrs

Flood Elev= 100.42'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                |
|--------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 95.17' | <b>15.0" Round Culvert</b><br>L= 106.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 95.17' / 93.57' S= 0.0151 '/ Cc= 0.900<br>n= 0.013, Flow Area= 1.23 sf |

**Primary OutFlow** Max=5.31 cfs @ 12.11 hrs HW=96.60' (Free Discharge)

↑1=Culvert (Inlet Controls 5.31 cfs @ 4.32 fps)

**Summary for Pond CB5: CB5**

Inflow Area = 0.171 ac, 54.91% Impervious, Inflow Depth > 4.76" for 25 YR event  
 Inflow = 0.93 cfs @ 12.10 hrs, Volume= 0.068 af  
 Outflow = 0.93 cfs @ 12.10 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min  
 Primary = 0.93 cfs @ 12.10 hrs, Volume= 0.068 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 94.57' @ 12.10 hrs

Flood Elev= 98.97'

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| Device | Routing | Invert | Outlet Devices                                                                                                                                                               |
|--------|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 93.97' | <b>12.0" Round Culvert</b><br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.97' / 93.87' S= 0.0050 '/ Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |

**Primary OutFlow** Max=0.92 cfs @ 12.10 hrs HW=94.57' (Free Discharge)↑**1=Culvert** (Barrel Controls 0.92 cfs @ 2.70 fps)**Summary for Pond CB6: CB6**

Inflow Area = 1.282 ac, 68.16% Impervious, Inflow Depth > 4.88" for 25 YR event  
Inflow = 6.64 cfs @ 12.11 hrs, Volume= 0.522 af  
Outflow = 6.64 cfs @ 12.11 hrs, Volume= 0.522 af, Atten= 0%, Lag= 0.0 min  
Primary = 6.64 cfs @ 12.11 hrs, Volume= 0.522 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 94.82' @ 12.11 hrs

Flood Elev= 98.97'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                |
|--------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 93.47' | <b>18.0" Round Culvert</b><br>L= 254.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.47' / 91.23' S= 0.0088 '/ Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=6.56 cfs @ 12.11 hrs HW=94.81' (Free Discharge)↑**1=Culvert** (Inlet Controls 6.56 cfs @ 3.94 fps)**Summary for Pond CB7: CB7**

Inflow Area = 0.445 ac, 56.87% Impervious, Inflow Depth > 4.76" for 25 YR event  
Inflow = 2.19 cfs @ 12.13 hrs, Volume= 0.177 af  
Outflow = 2.19 cfs @ 12.13 hrs, Volume= 0.177 af, Atten= 0%, Lag= 0.0 min  
Primary = 2.19 cfs @ 12.13 hrs, Volume= 0.177 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 92.35' @ 12.13 hrs

Flood Elev= 96.33'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                               |
|--------|---------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 91.33' | <b>12.0" Round Culvert</b><br>L= 20.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 91.33' / 91.23' S= 0.0050 '/ Cc= 0.900<br>n= 0.013, Flow Area= 0.79 sf |

**Primary OutFlow** Max=2.15 cfs @ 12.13 hrs HW=92.34' (Free Discharge)↑**1=Culvert** (Barrel Controls 2.15 cfs @ 3.38 fps)

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**Summary for Pond CB8: CB8**

Inflow Area = 1.859 ac, 66.79% Impervious, Inflow Depth > 4.89" for 25 YR event  
 Inflow = 9.56 cfs @ 12.11 hrs, Volume= 0.757 af  
 Outflow = 9.56 cfs @ 12.11 hrs, Volume= 0.757 af, Atten= 0%, Lag= 0.0 min  
 Primary = 9.56 cfs @ 12.11 hrs, Volume= 0.757 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 93.40' @ 12.11 hrs

Flood Elev= 96.33'

| Device | Routing | Invert | Outlet Devices                                                                                                                                                                |
|--------|---------|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Primary | 91.13' | <b>18.0" Round Culvert</b><br>L= 26.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 91.13' / 91.00' S= 0.0050 ' / Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |

**Primary OutFlow** Max=9.40 cfs @ 12.11 hrs HW=93.37' (Free Discharge)↑ **1=Culvert** (Barrel Controls 9.40 cfs @ 5.32 fps)**Summary for Pond DMH3:**

Inflow Area = 3.731 ac, 5.34% Impervious, Inflow Depth > 3.49" for 25 YR event  
 Inflow = 10.17 cfs @ 12.34 hrs, Volume= 1.086 af  
 Outflow = 10.17 cfs @ 12.34 hrs, Volume= 1.086 af, Atten= 0%, Lag= 0.0 min  
 Primary = 10.17 cfs @ 12.34 hrs, Volume= 1.086 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 104.17' @ 12.34 hrs

Flood Elev= 105.29'

| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                     |
|--------|----------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Device 2 | 102.29' | <b>24.0" Round Culvert</b><br>L= 10.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 102.29' / 102.19' S= 0.0100 ' / Cc= 0.900<br>n= 0.013, Flow Area= 3.14 sf |
| #2     | Primary  | 100.12' | <b>18.0" Round Culvert</b><br>L= 124.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 100.12' / 99.50' S= 0.0050 ' / Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf    |

**Primary OutFlow** Max=10.12 cfs @ 12.34 hrs HW=104.17' (Free Discharge)↑ **2=Culvert** (Passes 10.12 cfs of 13.00 cfs potential flow)↑ **1=Culvert** (Barrel Controls 10.12 cfs @ 4.28 fps)

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**Summary for Pond DMH4:**

Inflow Area = 2.436 ac, 5.84% Impervious, Inflow Depth > 3.60" for 25 YR event  
 Inflow = 8.17 cfs @ 12.21 hrs, Volume= 0.732 af  
 Outflow = 8.17 cfs @ 12.21 hrs, Volume= 0.732 af, Atten= 0%, Lag= 0.0 min  
 Primary = 8.17 cfs @ 12.21 hrs, Volume= 0.732 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 102.19' @ 12.21 hrs

Flood Elev= 103.30'

| Device | Routing  | Invert  | Outlet Devices                                                                                                                                                                  |
|--------|----------|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Device 2 | 100.30' | <b>18.0" Round Culvert</b><br>L= 10.0' CMP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 100.30' / 100.20' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2     | Primary  | 93.80'  | <b>18.0" Round Culvert</b><br>L= 65.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 93.80' / 93.48' S= 0.0049 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf   |

**Primary OutFlow** Max=8.09 cfs @ 12.21 hrs HW=102.17' (Free Discharge)

**2=Culvert** (Passes 8.09 cfs of 23.19 cfs potential flow)


**1=Culvert** (Barrel Controls 8.09 cfs @ 4.71 fps)
**Summary for Pond DMH5:**

Inflow Area = 1.487 ac, 7.25% Impervious, Inflow Depth > 3.61" for 25 YR event  
 Inflow = 5.45 cfs @ 12.17 hrs, Volume= 0.447 af  
 Outflow = 5.45 cfs @ 12.17 hrs, Volume= 0.447 af, Atten= 0%, Lag= 0.0 min  
 Primary = 5.45 cfs @ 12.17 hrs, Volume= 0.447 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Peak Elev= 98.22' @ 12.17 hrs

Flood Elev= 99.73'

| Device | Routing  | Invert | Outlet Devices                                                                                                                                                                   |
|--------|----------|--------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| #1     | Device 2 | 96.73' | <b>18.0" Round Culvert</b><br>L= 10.0' CMP, projecting, no headwall, Ke= 0.900<br>Inlet / Outlet Invert= 96.73' / 96.63' S= 0.0100 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf |
| #2     | Primary  | 91.00' | <b>18.0" Round Culvert</b><br>L= 64.0' CPP, square edge headwall, Ke= 0.500<br>Inlet / Outlet Invert= 91.00' / 90.68' S= 0.0050 '/' Cc= 0.900<br>n= 0.013, Flow Area= 1.77 sf    |

**Primary OutFlow** Max=5.35 cfs @ 12.17 hrs HW=98.20' (Free Discharge)

**2=Culvert** (Passes 5.35 cfs of 21.29 cfs potential flow)


**1=Culvert** (Barrel Controls 5.35 cfs @ 3.84 fps)

**West Brook Post Development**

Type III 24-hr 25 YR Rainfall=6.20"

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**Summary for Pond SF:**

Inflow Area = 4.206 ac, 33.52% Impervious, Inflow Depth > 4.19" for 25 YR event  
 Inflow = 17.82 cfs @ 12.12 hrs, Volume= 1.467 af  
 Outflow = 9.12 cfs @ 12.36 hrs, Volume= 0.825 af, Atten= 49%, Lag= 14.4 min  
 Primary = 9.12 cfs @ 12.36 hrs, Volume= 0.825 af

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 91.38' @ 12.36 hrs Surf.Area= 11,101 sf Storage= 31,698 cf

Plug-Flow detention time= 159.0 min calculated for 0.822 af (56% of inflow)  
 Center-of-Mass det. time= 80.1 min ( 848.7 - 768.6 )

| Volume              | Invert               | Avail.Storage    | Storage Description                                        |                           |                     |
|---------------------|----------------------|------------------|------------------------------------------------------------|---------------------------|---------------------|
| #1                  | 87.00'               | 38,810 cf        | <b>Custom Stage Data (Irregular)</b> Listed below (Recalc) |                           |                     |
| Elevation<br>(feet) | Surf.Area<br>(sq-ft) | Perim.<br>(feet) | Inc.Store<br>(cubic-feet)                                  | Cum.Store<br>(cubic-feet) | Wet.Area<br>(sq-ft) |
| 87.00               | 2,405                | 228.3            | 0                                                          | 0                         | 2,405               |
| 88.00               | 3,118                | 247.2            | 2,754                                                      | 2,754                     | 3,159               |
| 88.50               | 7,299                | 412.7            | 2,531                                                      | 5,285                     | 11,851              |
| 89.00               | 7,925                | 422.1            | 3,805                                                      | 9,090                     | 12,510              |
| 90.00               | 9,220                | 441.0            | 8,564                                                      | 17,654                    | 13,878              |
| 91.00               | 10,571               | 459.8            | 9,888                                                      | 27,542                    | 15,298              |
| 92.00               | 11,979               | 478.7            | 11,268                                                     | 38,810                    | 16,786              |

| Device | Routing | Invert | Outlet Devices                                                   |  |  |  |  |  |  |  |  |  |
|--------|---------|--------|------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| #1     | Primary | 91.00' | <b>15.0' long x 10.0' breadth Broad-Crested Rectangular Weir</b> |  |  |  |  |  |  |  |  |  |
|        |         |        | Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60              |  |  |  |  |  |  |  |  |  |
|        |         |        | Coef. (English) 2.49 2.56 2.70 2.69 2.68 2.69 2.67 2.64          |  |  |  |  |  |  |  |  |  |

**Primary OutFlow** Max=9.01 cfs @ 12.36 hrs HW=91.38' (Free Discharge)  
 ↑1=**Broad-Crested Rectangular Weir** (Weir Controls 9.01 cfs @ 1.58 fps)

**Summary for Link AP1:**

Inflow Area = 4.569 ac, 4.36% Impervious, Inflow Depth > 3.37" for 25 YR event  
 Inflow = 12.08 cfs @ 12.31 hrs, Volume= 1.284 af  
 Primary = 12.08 cfs @ 12.31 hrs, Volume= 1.284 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Link AP2:**

Inflow Area = 10.856 ac, 15.29% Impervious, Inflow Depth > 3.04" for 25 YR event  
 Inflow = 26.52 cfs @ 12.31 hrs, Volume= 2.753 af  
 Primary = 26.52 cfs @ 12.31 hrs, Volume= 2.753 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## West Brook Post Development

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Type III 24-hr 2 YR Rainfall=3.30"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                           |                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment 1.1:</b>  | Runoff Area=162,502 sf 5.34% Impervious Runoff Depth>1.23"<br>Flow Length=738' Tc=24.3 min CN=78 Runoff=3.57 cfs 0.383 af                 |
| <b>Subcatchment 1.2:</b>  | Runoff Area=36,530 sf 0.00% Impervious Runoff Depth>0.85"<br>Flow Length=150' Slope=0.0933 '/' Tc=15.8 min CN=71 Runoff=0.62 cfs 0.059 af |
| <b>Subcatchment 2.1:</b>  | Runoff Area=6,795 sf 88.40% Impervious Runoff Depth>2.59"<br>Tc=6.0 min CN=95 Runoff=0.46 cfs 0.034 af                                    |
| <b>Subcatchment 2.10:</b> | Runoff Area=19,380 sf 56.87% Impervious Runoff Depth>2.13"<br>Flow Length=276' Tc=9.4 min CN=90 Runoff=1.02 cfs 0.079 af                  |
| <b>Subcatchment 2.11:</b> | Runoff Area=82,756 sf 8.84% Impervious Runoff Depth>1.30"<br>Flow Length=506' Tc=12.1 min CN=79 Runoff=2.52 cfs 0.206 af                  |
| <b>Subcatchment 2.12:</b> | Runoff Area=19,459 sf 0.00% Impervious Runoff Depth>1.37"<br>Tc=6.0 min CN=80 Runoff=0.75 cfs 0.051 af                                    |
| <b>Subcatchment 2.13:</b> | Runoff Area=118,781 sf 0.00% Impervious Runoff Depth>1.11"<br>Flow Length=779' Tc=23.8 min CN=76 Runoff=2.36 cfs 0.253 af                 |
| <b>Subcatchment 2.2:</b>  | Runoff Area=15,687 sf 59.00% Impervious Runoff Depth>1.95"<br>Flow Length=257' Tc=9.3 min CN=88 Runoff=0.77 cfs 0.059 af                  |
| <b>Subcatchment 2.3:</b>  | Runoff Area=6,753 sf 87.43% Impervious Runoff Depth>2.59"<br>Tc=6.0 min CN=95 Runoff=0.46 cfs 0.033 af                                    |
| <b>Subcatchment 2.4:</b>  | Runoff Area=16,736 sf 63.92% Impervious Runoff Depth>2.21"<br>Flow Length=337' Tc=9.0 min CN=91 Runoff=0.92 cfs 0.071 af                  |
| <b>Subcatchment 2.5:</b>  | Runoff Area=106,121 sf 5.84% Impervious Runoff Depth>1.30"<br>Flow Length=758' Tc=15.6 min CN=79 Runoff=2.95 cfs 0.264 af                 |
| <b>Subcatchment 2.6:</b>  | Runoff Area=2,412 sf 87.06% Impervious Runoff Depth>2.69"<br>Tc=6.0 min CN=96 Runoff=0.17 cfs 0.012 af                                    |
| <b>Subcatchment 2.7:</b>  | Runoff Area=64,789 sf 7.25% Impervious Runoff Depth>1.30"<br>Flow Length=409' Tc=12.2 min CN=79 Runoff=1.95 cfs 0.161 af                  |
| <b>Subcatchment 2.8:</b>  | Runoff Area=7,461 sf 54.91% Impervious Runoff Depth>2.13"<br>Flow Length=132' Tc=6.6 min CN=90 Runoff=0.43 cfs 0.030 af                   |
| <b>Subcatchment 2.9:</b>  | Runoff Area=5,772 sf 86.82% Impervious Runoff Depth>2.69"<br>Tc=6.0 min CN=96 Runoff=0.40 cfs 0.030 af                                    |
| <b>Pond CB1: CB1</b>      | Peak Elev=98.84' Inflow=0.77 cfs 0.059 af<br>12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=0.77 cfs 0.059 af                   |



**West Brook Post Development**

Type III 24-hr 2 YR Rainfall=3.30"

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**Pond CB2: CB2**

Peak Elev=98.74' Inflow=1.21 cfs 0.092 af  
12.0" Round Culvert n=0.013 L=515.0' S=0.0054 '/' Outflow=1.21 cfs 0.092 af

**Pond CB3: CB3**

Peak Elev=96.02' Inflow=0.92 cfs 0.071 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=0.92 cfs 0.071 af

**Pond CB4: CB4**

Peak Elev=95.98' Inflow=2.57 cfs 0.197 af  
15.0" Round Culvert n=0.013 L=106.0' S=0.0151 '/' Outflow=2.57 cfs 0.197 af

**Pond CB5: CB5**

Peak Elev=94.36' Inflow=0.43 cfs 0.030 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=0.43 cfs 0.030 af

**Pond CB6: CB6**

Peak Elev=94.31' Inflow=3.17 cfs 0.239 af  
18.0" Round Culvert n=0.013 L=254.0' S=0.0088 '/' Outflow=3.17 cfs 0.239 af

**Pond CB7: CB7**

Peak Elev=91.96' Inflow=1.02 cfs 0.079 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.02 cfs 0.079 af

**Pond CB8: CB8**

Peak Elev=92.39' Inflow=4.56 cfs 0.348 af  
18.0" Round Culvert n=0.013 L=26.0' S=0.0050 '/' Outflow=4.56 cfs 0.348 af

**Pond DMH3:**

Peak Elev=103.29' Inflow=3.57 cfs 0.383 af  
Outflow=3.57 cfs 0.383 af

**Pond DMH4:**

Peak Elev=101.25' Inflow=2.95 cfs 0.264 af  
Outflow=2.95 cfs 0.264 af

**Pond DMH5:**

Peak Elev=97.52' Inflow=1.95 cfs 0.161 af  
Outflow=1.95 cfs 0.161 af

**Pond SF:**

Peak Elev=90.88' Storage=26,325 cf Inflow=7.51 cfs 0.605 af  
Outflow=0.00 cfs 0.000 af

**Link AP1:**

Inflow=4.11 cfs 0.442 af  
Primary=4.11 cfs 0.442 af

**Link AP2:**

Inflow=6.72 cfs 0.678 af  
Primary=6.72 cfs 0.678 af

**Total Runoff Area = 15.425 ac Runoff Volume = 1.724 af Average Runoff Depth = 1.34"**  
**87.95% Pervious = 13.567 ac 12.05% Impervious = 1.859 ac**

## West Brook Post Development

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Type III 24-hr 10 YR Rainfall=4.90"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points  
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN  
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

|                           |                                                                                                                                           |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Subcatchment 1.1:</b>  | Runoff Area=162,502 sf 5.34% Impervious Runoff Depth>2.43"<br>Flow Length=738' Tc=24.3 min CN=78 Runoff=7.11 cfs 0.756 af                 |
| <b>Subcatchment 1.2:</b>  | Runoff Area=36,530 sf 0.00% Impervious Runoff Depth>1.87"<br>Flow Length=150' Slope=0.0933 '/' Tc=15.8 min CN=71 Runoff=1.45 cfs 0.131 af |
| <b>Subcatchment 2.1:</b>  | Runoff Area=6,795 sf 88.40% Impervious Runoff Depth>4.07"<br>Tc=6.0 min CN=95 Runoff=0.71 cfs 0.053 af                                    |
| <b>Subcatchment 2.10:</b> | Runoff Area=19,380 sf 56.87% Impervious Runoff Depth>3.57"<br>Flow Length=276' Tc=9.4 min CN=90 Runoff=1.67 cfs 0.132 af                  |
| <b>Subcatchment 2.11:</b> | Runoff Area=82,756 sf 8.84% Impervious Runoff Depth>2.53"<br>Flow Length=506' Tc=12.1 min CN=79 Runoff=4.93 cfs 0.400 af                  |
| <b>Subcatchment 2.12:</b> | Runoff Area=19,459 sf 0.00% Impervious Runoff Depth>2.62"<br>Tc=6.0 min CN=80 Runoff=1.44 cfs 0.098 af                                    |
| <b>Subcatchment 2.13:</b> | Runoff Area=118,781 sf 0.00% Impervious Runoff Depth>2.26"<br>Flow Length=779' Tc=23.8 min CN=76 Runoff=4.88 cfs 0.514 af                 |
| <b>Subcatchment 2.2:</b>  | Runoff Area=15,687 sf 59.00% Impervious Runoff Depth>3.37"<br>Flow Length=257' Tc=9.3 min CN=88 Runoff=1.30 cfs 0.101 af                  |
| <b>Subcatchment 2.3:</b>  | Runoff Area=6,753 sf 87.43% Impervious Runoff Depth>4.07"<br>Tc=6.0 min CN=95 Runoff=0.71 cfs 0.053 af                                    |
| <b>Subcatchment 2.4:</b>  | Runoff Area=16,736 sf 63.92% Impervious Runoff Depth>3.67"<br>Flow Length=337' Tc=9.0 min CN=91 Runoff=1.50 cfs 0.117 af                  |
| <b>Subcatchment 2.5:</b>  | Runoff Area=106,121 sf 5.84% Impervious Runoff Depth>2.52"<br>Flow Length=758' Tc=15.6 min CN=79 Runoff=5.76 cfs 0.512 af                 |
| <b>Subcatchment 2.6:</b>  | Runoff Area=2,412 sf 87.06% Impervious Runoff Depth>4.16"<br>Tc=6.0 min CN=96 Runoff=0.25 cfs 0.019 af                                    |
| <b>Subcatchment 2.7:</b>  | Runoff Area=64,789 sf 7.25% Impervious Runoff Depth>2.53"<br>Flow Length=409' Tc=12.2 min CN=79 Runoff=3.84 cfs 0.313 af                  |
| <b>Subcatchment 2.8:</b>  | Runoff Area=7,461 sf 54.91% Impervious Runoff Depth>3.57"<br>Flow Length=132' Tc=6.6 min CN=90 Runoff=0.71 cfs 0.051 af                   |
| <b>Subcatchment 2.9:</b>  | Runoff Area=5,772 sf 86.82% Impervious Runoff Depth>4.16"<br>Tc=6.0 min CN=96 Runoff=0.61 cfs 0.046 af                                    |
| <b>Pond CB1: CB1</b>      | Peak Elev=99.03' Inflow=1.30 cfs 0.101 af<br>12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.30 cfs 0.101 af                   |

**West Brook Post Development**

Type III 24-hr 10 YR Rainfall=4.90"

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**Pond CB2: CB2**

Peak Elev=98.97' Inflow=1.97 cfs 0.154 af  
12.0" Round Culvert n=0.013 L=515.0' S=0.0054 '/' Outflow=1.97 cfs 0.154 af

**Pond CB3: CB3**

Peak Elev=96.21' Inflow=1.50 cfs 0.117 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.50 cfs 0.117 af

**Pond CB4: CB4**

Peak Elev=96.28' Inflow=4.14 cfs 0.324 af  
15.0" Round Culvert n=0.013 L=106.0' S=0.0151 '/' Outflow=4.14 cfs 0.324 af

**Pond CB5: CB5**

Peak Elev=94.48' Inflow=0.71 cfs 0.051 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=0.71 cfs 0.051 af

**Pond CB6: CB6**

Peak Elev=94.59' Inflow=5.09 cfs 0.394 af  
18.0" Round Culvert n=0.013 L=254.0' S=0.0088 '/' Outflow=5.09 cfs 0.394 af

**Pond CB7: CB7**

Peak Elev=92.18' Inflow=1.67 cfs 0.132 af  
12.0" Round Culvert n=0.013 L=20.0' S=0.0050 '/' Outflow=1.67 cfs 0.132 af

**Pond CB8: CB8**

Peak Elev=92.90' Inflow=7.33 cfs 0.572 af  
18.0" Round Culvert n=0.013 L=26.0' S=0.0050 '/' Outflow=7.33 cfs 0.572 af

**Pond DMH3:**

Peak Elev=103.79' Inflow=7.11 cfs 0.756 af  
Outflow=7.11 cfs 0.756 af

**Pond DMH4:**

Peak Elev=101.74' Inflow=5.76 cfs 0.512 af  
Outflow=5.76 cfs 0.512 af

**Pond DMH5:**

Peak Elev=97.92' Inflow=3.84 cfs 0.313 af  
Outflow=3.84 cfs 0.313 af

**Pond SF:**

Peak Elev=91.15' Storage=29,126 cf Inflow=13.14 cfs 1.070 af  
Outflow=2.14 cfs 0.430 af

**Link AP1:**

Inflow=8.37 cfs 0.887 af  
Primary=8.37 cfs 0.887 af

**Link AP2:**

Inflow=13.46 cfs 1.770 af  
Primary=13.46 cfs 1.770 af

**Total Runoff Area = 15.425 ac Runoff Volume = 3.297 af Average Runoff Depth = 2.56"**  
**87.95% Pervious = 13.567 ac 12.05% Impervious = 1.859 ac**

**Appendix D**  
**Treatment Calculations**

# WATER QUALITY CALCULATIONS

## West Brook Subdivision Biddeford

| Subcatchment ID   | Proposed Impervious Area (sq. ft.) | Proposed Lawn Area (sq. ft.) | Proposed Developed Area (sq. ft.) | Treated Impervious Area (sq. ft.) | Treated Developed Area (sq. ft.) | BMP ID      |
|-------------------|------------------------------------|------------------------------|-----------------------------------|-----------------------------------|----------------------------------|-------------|
| Road              | 28,463                             | 0                            | 28,463                            | 28,463                            | 28,463                           | Soil Filter |
| Sidewalk          | 4,904                              | 0                            | 4,904                             | 4,904                             | 4,904                            | Soil Filter |
| Esplanade         | 0                                  | 9,737                        | 9,737                             | 0                                 | 9,737                            | Soil Filter |
| Soil Filter       | 0                                  | 19,229                       | 19,229                            | 0                                 | 19,229                           | Soil Filter |
| Eastern Ditch     | 0                                  | 3,654                        | 3,654                             | 0                                 | 3,654                            | Soil Filter |
| Western Ditches   | 0                                  | 10,360                       | 10,360                            | 0                                 | 0                                | None        |
| Southern Roadside | 0                                  | 22,575                       | 22,575                            | 0                                 | 0                                | None        |
| <b>Total</b>      | <b>33,367</b>                      | <b>65,555</b>                | <b>98,922</b>                     | <b>33,367</b>                     | <b>65,987</b>                    |             |

| Treatment Summary                         |                |
|-------------------------------------------|----------------|
| Total Proposed Impervious Area (sq. ft.)= | 33,367         |
| Total Proposed Developed Area (sq. ft.)=  | 98,922         |
| Total Treated Impervious Area (sq. ft.)=  | 33,367         |
| Total Treated Developed Area (sq. ft.)=   | 65,987         |
| <b>Impervious Area Treatment % =</b>      | <b>100.00%</b> |
| <b>Developed Area Treatment % =</b>       | <b>66.71%</b>  |

## Grassed Underdrain Soil Filter Calculations

| Subcatchment ID | Proposed Impervious Area (ft <sup>2</sup> ) | WQ Impervious Area Runoff Depth (inches) | WQ Impervious Volume Required (ft <sup>3</sup> ) | Proposed Landscaped Area (ft <sup>2</sup> ) | WQ Landscape Area Runoff Depth (inches) | WQ Landscape Volume Required (ft <sup>3</sup> ) | Total WQ Volume Required (ft <sup>3</sup> ) |
|-----------------|---------------------------------------------|------------------------------------------|--------------------------------------------------|---------------------------------------------|-----------------------------------------|-------------------------------------------------|---------------------------------------------|
| Road            | 28,463                                      | 1.00                                     | 2,372                                            | 0                                           | 0.40                                    | 0                                               | 2,372                                       |
| Sidewalk        | 4,904                                       | 1.00                                     | 409                                              | 0                                           | 0.40                                    | 0                                               | 409                                         |
| Esplanade       | 0                                           | 1.00                                     | 0                                                | 9,737                                       | 0.40                                    | 325                                             | 325                                         |
| Soil Filter     | 0                                           | 1.00                                     | 0                                                | 19,229                                      | 0.40                                    | 641                                             | 641                                         |
| Eastern Ditch   | 0                                           | 1.00                                     | 0                                                | 3,654                                       | 0.40                                    | 122                                             | 122                                         |
| <b>Total</b>    | <b>33,367</b>                               |                                          | <b>2,781</b>                                     | <b>32,620</b>                               |                                         | <b>1,087</b>                                    | <b>3,868</b>                                |

| Summary of Underdrain Filter Sizing                |              |    |
|----------------------------------------------------|--------------|----|
| Total WQ Volume Required (ft <sup>3</sup> )        | <b>3,868</b> | OK |
| WQ Volume Provided (ft <sup>3</sup> )              | 5,642        |    |
| Filter Surface Elevation                           | 87.00        |    |
| WQ Surface Elevation                               | 88.50        |    |
| Invert of Underdrain                               | 84.67        |    |
| 5% of Tributary Impervious Area (ft <sup>2</sup> ) | 1,668        |    |
| 2% of Tributary Landscaped (ft <sup>2</sup> )      | 652          |    |
| Filter Surface Area Required (ft <sup>2</sup> )    | <b>2,321</b> | OK |
| Filter Surface Area Provided (ft <sup>2</sup> )    | 2,411        |    |

| Orifice Sizing                  |       |
|---------------------------------|-------|
| Discharge Coefficient           | 0.62  |
| Orifice Size (inches)           | 2.25  |
| Orifice Size (feet)             | 0.19  |
| Orifice Area (ft <sup>2</sup> ) | 0.028 |
| Orifice Centerline Elevation    | 84.92 |

| Underdrain Filter Volume                                   |                                 |        |                                 |                                      |
|------------------------------------------------------------|---------------------------------|--------|---------------------------------|--------------------------------------|
| Elevation                                                  | Surface Area (ft <sup>2</sup> ) | 0.4    | Stage Volume (ft <sup>3</sup> ) | Cumulative Volume (ft <sup>3</sup> ) |
| 87                                                         | 2,411                           |        |                                 | 0                                    |
|                                                            |                                 | 2,748  | 2,748                           |                                      |
| 88                                                         | 3,086                           |        |                                 | 2,748                                |
|                                                            |                                 | 5,787  | 2,893                           |                                      |
| 88.5                                                       | 8,488                           |        |                                 | 5,642                                |
|                                                            |                                 | 8,819  | 4,410                           |                                      |
| 89                                                         | 9,151                           |        |                                 | 10,052                               |
|                                                            |                                 | 9,834  | 9,834                           |                                      |
| 90                                                         | 10,518                          |        |                                 | 19,886                               |
|                                                            |                                 | 11,230 | 11,230                          |                                      |
| 91                                                         | 11,943                          |        |                                 | 31,116                               |
|                                                            |                                 | 12,683 | 12,683                          |                                      |
| 92                                                         | 13,423                          |        |                                 | 43,799                               |
| <b>Water Quality Volume Provided (at Elevation 88.5) =</b> |                                 |        |                                 | <b>5,642</b>                         |

Orifice Eqn:  $C \cdot A \cdot (2gH)^{1/2}$

| Q (cfs)                      | Stage Elevation | Total Drawdown at Stage | Pond Area | Drawdown Time (hrs) |
|------------------------------|-----------------|-------------------------|-----------|---------------------|
| 0.1980                       | 87              | 0.00                    | 2,411     | 0.00                |
| 0.2409                       | 88              | 1.00                    | 3,086     | 3.56                |
| 0.2773                       | 89              | 1.00                    | 9,151     | 9.17                |
| 0.3094                       | 90              | 1.00                    | 10,518    | 9.44                |
| 0.3385                       | 91              | 1.00                    | 11,943    | 9.80                |
| <b>Total Drawdown Time =</b> |                 |                         |           | <b>31.97</b>        |



**INSPECTION & MAINTENANCE PLAN**  
**FOR STORMWATER FACILITIES**

**For**  
**E&R Development Corporation**  
**West Brook Subdivision**  
**Biddeford, Maine**

**Prepared By:**

**Berry Huff McDonald Milligan, Inc.**  
**Engineers Surveyors Planners**  
**380B Main Street**  
**Gorham, ME 04038**  
**207-839-2771**  
**[cmacdonald@bh2m.com](mailto:cmacdonald@bh2m.com)**



### **Project Narrative**

The proposed project is a 19 lot cluster subdivision. The development includes a 1,000 linear foot roadway with a closed drainage system, sidewalk and esplanade, upgradient swale drained by field inlets, a grassed underdrained soil filter, and level spreaders. The proposed development is subject to the standard conditions of the City of Biddeford stormwater ordinance. The following outlines the proposed BMP's and their required inspection, maintenance, and reporting:

The Applicant, E&R Development Corp., will be responsible for all operation and maintenance of the proposed site improvements during construction. If an inspection determines that corrective action is required during construction the applicant's contractor is responsible for making the repair. This repair shall begin by the end of the following work day and completed within seven days or before the next storm event.

The Applicant, E&R Development Corp., will also be responsible for post construction operations and maintenance until such time that facilities are accepted by The West Brook Home Owners Association, to be established, or the City of Biddeford.

**Contacts:**

Design Engineer: BH2M  
380B Main Street  
Gorham, Me. 04038  
(207) 839-2771

Developer/Applicant: E&R Development Corp.  
P.O. Box 444  
Biddeford, Maine 04005

Owner: E&R Development Corp.  
P.O. Box 444  
Biddeford, Maine 04005

Post Construction Stormwater Inspector: (See definition of Inspector in Post Construction  
Stormwater Infrastructure Management Ordinance)

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Contractors:

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### **Inspection**

The applicant, E&R Development Corp., is responsible for complying with the City of Biddeford stormwater ordinance. The Applicant will be responsible for inspection and maintenance during construction and will also be responsible for Post-Construction operations. The development is not subject to permitting by the Maine DEP for Stormwater Law.

### **Purpose**

The following O&M Plan provides guidance and schedules for compliance with the City's Post Construction Stormwater Infrastructure Management Ordinance.

### **Definitions**

Significant Period of Rain: 1" or more of rain in a 24-hour period.

### **Inspection Scope**

Construction inspections shall include all disturbed and impervious areas, material storage areas, vehicle access points, and all erosion and sediment control measures.

### **Inspection Frequency**

An inspection is required at least once a week and before and after (within twenty-four (24) hours) a significant storm event during construction. If an inspection determines that corrective action is required, the repair shall begin by the end of the following work day and completed within seven (7) days or before the next storm event.

### **Inspector Qualifications**

For Post-Construction Inspections, the qualified post-construction stormwater inspector with knowledge of erosion and stormwater control, including the standards and conditions of this projects permit shall be retained by the owner.

During construction, it is the responsibility of the applicant and the applicant's contractor to inspect, maintain and repair Post-Construction BMP's until such time that the BMP's are accepted by the West Brook Home Owners Association or City of Biddeford.

### **Inspection/Maintenance Responsibility**

The Applicant, E&R Development Corp., shall be responsible for inspection and maintenance during construction. If an inspection determines that corrective action is required during construction the applicant's contractor is responsible for making the repair. This repair shall begin by the end of the following work day and completed within seven days or before the next storm event.

It shall also be E&R Development Corp's responsibility to retain the services of the Post-Construction Stormwater Inspector and provide for the repair and maintenance noted by inspections, if any. When maintenance is required by inspection, E&R Development Corp. shall perform the required maintenance and/or repairs in a timely fashion and notify the inspector when the maintenance is complete.

### **Documentation**

Construction inspection forms and documentation of corrective active actions shall be maintained for at least three (3) years. Post construction inspection forms and documentation of corrective active actions shall be maintained for at least five (5) years.

### **O&M Plan**

The following is a summary of the required inspection and maintenance for the Post-Construction BMP's:

### **Access Roads**

1. On-site inspection of the roads shall be performed at least twice annually and after a significant period of rainfall.
  - a) All low spots of pooling water shall be re-graded to direct the water off the pavement and to the appropriate, catch basin or ditch.
  - b) Areas of erosions shall be repaired immediately. This includes all grassy area adjacent to the road.
  - c) Sweeping the roadway free of sand after the winter season should be completed annually in the spring of the year.

### **Storm Drain and Catch Basins**

1. Inspect catch basin inlets on a monthly basis for debris or conditions which could inhibit flow entry. Remove debris and properly dispose.
2. Inspect all catch basin structures annually.
  - a) Check that rims are securely attached and properly set to optimize flow entry.
  - b) Measure and record silt accumulation, if any. Sumps shall be cleaned at least on a yearly basis in the spring. All sediment removed should be disposed of properly.
3. Check pipelines annually to determine silt accumulation, if any. Remove excess silt if found.

### **Vegetated Swales/Ditches**

1. On-site inspection of the vegetated ditches shall be on a monthly schedule and after a significant period of rainfall.
  - a) Ditches should be inspected to repair erosion problems, remove any accumulated debris and to check the condition and integrity of the check dams.
  - b) Ditches shall be mowed periodically to a minimum grass height of 6". Ditches shall be maintained such that woody vegetation is removed from the flow line of the ditch or areas that may impede the capacity of the ditch.
  - c) Any basin field inlets along ditches shall be inspected periodically to ensure that the inlets are free from debris or clogging that would impair run off from entering the structure.
  - d) The use of pesticides and fertilizer should be limited to what is needed to promote a healthy/stable growth of vegetation.

### **Sediment Forebay**

1. On-site inspection of the rip-rap on a monthly schedule or after a significant period of rainfall.
  - a.) Carefully inspect to determine if high flows have caused scour beneath the rip-rap or dislodged any of the stones. If repairs are needed, they should be accomplished immediately.

### **Grassed Underdrain Filter**

1. On-site inspection of Grassed Underdrain Filters shall be twice per year (May 1 and October 1). The following shall be accomplished:
  - a.) Record date of inspection
  - b.) Identify person making the inspection
  - c.) Record observed water depth. (If no rain within last 24-36 hours should be dry.
  - d.) Inspect rip rap for debris accumulation
  - e.) Remove debris.
  - f.) Inspect for evidence of snow storage.
  - g.) Inspect for evidence of vehicles driving on bmp.
  - h.) Mow grassed slopes and/or repair slopes if eroded.
  - i.) Clean accumulated sediment from forebay.

## **Attachments**

1. Inspection & Maintenance Log
2. See attached Appendix B “Inspection and Maintenance” from MDEP Stormwater Regulations.
3. See attached “Appendix C” from MDEP Stormwater Regulations for performance standards.
4. Final Site Plan – Pomerleau Street

**INSPECTION SUMMARY**  
**West Brook Subdivision**

| <b><u>Inspection of</u></b>                                                                                                                                                                                  | <b><u>Schedule *</u></b>                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>Roadway<ul style="list-style-type: none"><li>Inspect</li><li>Sweep Paved Areas</li></ul></li></ul>                                                                     | <ul style="list-style-type: none"><li>Twice Annually</li><li>Annually</li></ul>           |
| <ul style="list-style-type: none"><li>Storm Drain and Catch Basins<ul style="list-style-type: none"><li>Inspect (CB Inlets)</li><li>Inspect (CB Sumps)</li><li>Measure Silt &amp; Remove</li></ul></li></ul> | <ul style="list-style-type: none"><li>Monthly</li><li>Annually</li><li>Annually</li></ul> |
| <ul style="list-style-type: none"><li>Sediment Forebay<ul style="list-style-type: none"><li>Inspect</li><li>Remove Litter</li></ul></li></ul>                                                                | <ul style="list-style-type: none"><li>Monthly</li><li>Annually</li></ul>                  |
| <ul style="list-style-type: none"><li>Grassed Underdrain Filter<ul style="list-style-type: none"><li>Inspect</li><li>Remove Litter</li></ul></li></ul>                                                       | <ul style="list-style-type: none"><li>Bi-Annually</li><li>Annually</li></ul>              |

\* After significant rainstorm in addition to regular inspections. Inspections shall be within 3 days of significant rainfall.



## **INSPECTION AND MAINTENANCE LOG**

West Brook Subdivision  
Post Construction Stormwater  
Inspection & Maintenance Log

Date of Inspection: \_\_\_\_\_

Inspection by: \_\_\_\_\_

Purpose of Inspection: Monthly, Yearly, Significant Rainfall (circle one)

- Access Drives and Parking Areas

Description of Conditions:

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Maintenance & Date of Repairs:

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Annual Sweeping (date & Contractors):

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Follow Up Needed:

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- Storm drain and catch basins

Description:

Description of Conditions:

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Maintenance & Date of Repairs:

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Sediment Inspection & Removal:

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Date & Contractor for Sump Cleaning:

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Follow Up Needed:

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- Sediment Forebay  
Description of Conditions:

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Maintenance & Date of Repairs:

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Follow Up Needed:

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- Grassed Underdrained Soil Filter  
Description:

Description of Conditions:

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Evidence of Snow Storage: Y / N

Evidence of Vehicle on Filter: Y / N

Maintenance & Date of Repairs:

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Sediment Inspection & Removal:

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Date & Contractor for Sump Cleaning:

---

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---

Follow Up Needed:

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Inspector Signature



# WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

FOR  
E & R DEVELOPMENT CORP.  
P.O. BOX 444  
BIDDEFORD, MAINE

## PLAN INDEX

|   |                                                          |
|---|----------------------------------------------------------|
| 1 | PRELIMINARY PLAN                                         |
| 2 | EXISTING CONDITIONS & STANDARD BOUNDARY SURVEY PLAN      |
| 3 | PLAN & PROFILE - WINDING CREEK LANE (STA. 0+00 to 5+00)  |
| 4 | PLAN & PROFILE - WINDING CREEK LANE (STA. 5+00 to 10+22) |
| 5 | SITE GRADING & EROSION CONTROL PLAN                      |
| 6 | STANDARD DETAILS                                         |
| 7 | UTILITY DETAILS                                          |
| 8 | EROSION CONTROL DETAILS                                  |
| A | PRE DEVELOPMENT WATERSHED                                |
| B | POST DEVELOPMENT WATERSHED                               |

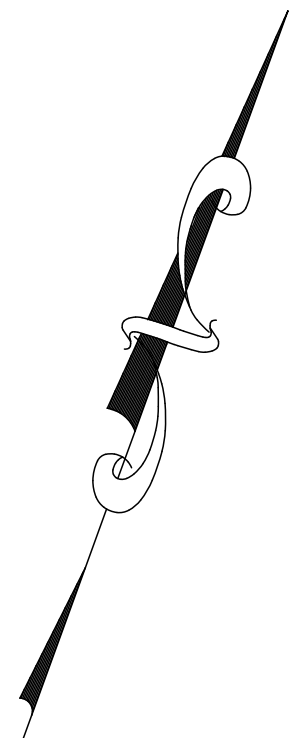


*Berry, Huff, McDonald, Milligan Inc.*  
Engineers, Surveyors

380B Main Street  
Gorham, Maine 04038

Tel. (207) 839-2771  
Fax (207) 839-8250





SCALE: 1" = 2 MILES

1. APPLICANT: E & R DEVELOPMENT CORP.  
P.O BOX 444, BIDDEFORD, ME
2. SURVEYOR: ROBERT C. LIBBY JR., PLS#2190  
BH2M  
380 B MAIN STREET  
GORHAM, ME
3. ENGINEER: CHRISTOPHER MACDONALD, PE#11985  
BH2M  
380B MAIN STREET  
GORHAM, ME
4. ZONE: RESIDENTIAL 1A (R1-A)
5. LOT STANDARDS: MIN. LOT SIZE: 10,000 S.F.  
MIN. STREET FRONTAGE: 100'  
MIN. SETBACKS: FRONT 40'  
SIDE & REAR 10'  
CLUSTER - MIN. LOT SIZE: 7,500 S.F.  
MIN. FRONTAGE - 75'  
MIN. SETBACKS  
FRONT 25'  
SIDE AND REAR 10'  
MIN. DISTANCE BETWEEN BLDGS - 30'  
WAIVER REQUEST-SECTION 16,  
CLUSTER DEVELOPMENTS,  
SECTION C-8
6. PROPOSED USE: RESIDENTIAL SUBDIVISION (CLUSTER)
7. WATER SUPPLY: PUBLIC WATER
8. SEWER: PUBLIC SEWER
9. TAX MAP: MAP 8 LOT 3-1 & P.O. 3

10. PARCEL DEED: BOOK 3458 PAGE 43
11. TOTAL PARCEL: 8.30 ACRES
12. WETLANDS & VERNAL POOLS: MARK HAMPTON  
HAMPTON ASSOCIATES  
PORTLAND, ME
13. ELECTRIC/TELEPHONE: UNDERGROUND
14. EASEMENTS SHALL BE RESERVED FOR PATHS/TRAILS FROM WINDING CREEK TO ACCESS CLIFFORD PARK.
15. ALL CONSTRUCTION AND SITE ALTERATIONS SHALL BE DONE IN ACCORDANCE WITH THE EROSION PREVENTION PROVISIONS OUTLINED IN THE MAINE EROSION CONTROL AND SEDIMENTATION HANDBOOK FOR CONSTRUCTION: BEST MANAGEMENT PRACTICES
16. DRIVEWAY CUTS NEED TO BE BUILT PER CITY DETAIL TO KEEP STREET ASSOCIATED STORMWATER IN THE GUTTER LINE.
17. NO DRIVEWAYS ALLOWED IN TRAIL EASEMENTS AND SHALL NOT BE LOCATED LONG THE SOUTHERN END OF THE HAMMERHEAD TURN AROUND AT THE END OF WINDING CREEK LANE. NO DRIVEWAY SHALL RESTRICT THE FUNCTION OF ANY DRAINAGE EASEMENTS.
18. THE ROADWAY IS PROPOSED TO BE PUBLIC UPON COMPLETION OF CONSTRUCTION AND ACCEPTED BY THE CITY, HOWEVER NO CITY SERVICES WILL BE PROVIDED UNTIL SAID STREET IS ACCEPTED BY THE CITY.
19. THE CONTRACTOR SHALL NOTIFY THE CITY OF BIDDEFORD ENGINEERING DEPARTMENT FOR REQUIRED INSPECTION OF THE ROADWAY.
20. ALL LOT OWNERS WILL BE REQUIRED TO BE A MEMBER OF THE WEST BROOK HOME OWNERS ASSOCIATION RESPONSIBLE FOR MAILBOXES, PLOWING, TRASH REMOVAL, SEWER AND STORMWATER FACILITIES UNTIL SUCH TIME AS THE CITY ACCEPTS THE STREET AND ANY IMPROVEMENTS.

21. ROADWAY RIGHT OF WAY AND ALL NECESSARY EASEMENTS WILL BE DEDICATED TO THE CITY OF BIDDEFORD.
22. FOUNDATION DRAINS SHALL NOT BE OULET TO THE PROPOSED DITCH ALONG THE NORTHERLY SIDE OF WINDING CREEK LANE.
23. DEPARTMENT OF ENVIRONMENTAL PROTECTION PERMITS:
  - 1) STORMWATER PBR
24. NET RESIDENTIAL DENSITY CALCULATION

|                             |                     |
|-----------------------------|---------------------|
| TOTAL PARCEL AREA           | 365,457 S.F.        |
| 1 100 YEAR FLOOD ZONE       | 0 S.F.              |
| 2 WETLANDS                  | 13,489 S.F.         |
| 3 SUSTAINED SLOPES (>33%)   | 10,548 S.F.         |
| 4 VERY POORLY DRAINED SOILS | N/A                 |
| 5 POORLY DRAINED SOILS      | N/A                 |
| 6 RIGHT OF WAY              | 52,105 S.F.         |
|                             | <u>289,315 S.F.</u> |

SPACE STANDARD FOR RESIDENTIAL 1A  
MINIMUM DENSITY- 10,000 S.F.

NET RESIDENTIAL DENSITY:  $\frac{289,315 \text{ S.F.}}{10,000 \text{ S.F.}} = 28.9 \text{ LOTS}$

25. OPEN SPACE: PROPOSED — 121,858 S.F.  
PARCEL AREA — 365,457 S.F.  
% OPEN SPACE — 33.34%  
OPEN SPACE SHALL BE DEEDED TO THE CITY OF BIDEFORD.

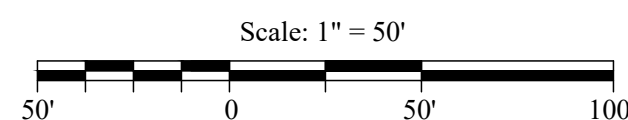
26. LIMITED ACTIVITIES PERMITTED WITHIN WILDLIFE CORRIDOR, SEE DEED RESTRICTIONS.

27. FINAL SITE GRADING PLAN SHALL BE COMPLETED FOR EACH LOT AS PART OF THE BUILDING PERMIT APPLICATION. FINAL GRADING WITHIN THE BUILDING WINDOW SHALL NOT EXCEED 25%.

28. 250' SETBACK IS FROM THE WETLAND ASSOCIATED WITH THE CLOSEST VERNAL POOL LOCATED AT CLIFFORD PARK NORTHERLY OF LOT 11.

29. IF THE DEVELOPER CAN'T PRESERVE SUFFICIENT EXISTING TREES WITHIN R.O.W. THEN UP TO 20- 2 1/2" CAL. TREES WILL BE INSTALLED IN THE R.O.W. AS APPROVED AND DIRECTED BY PUBLIC WORKS DIRECTOR BEFORE ACCEPTANCE OF THE STREET.

30. THE EDGE OF THE WILDLIFE CORRIDOR ON EACH LOT SHALL BE SUITABLY MARKED WITH 12"x18" SIGNS LABELED "WILDLIFE TRAVEL CORRIDOR PRESERVATION PROTECTED" ON GREEN POSTS PRIOR TO THE ISSUANCE OF BUILDING PERMITS.



I CERTIFY THAT THIS SURVEY CONFORMS  
TO THE MAINE BOARD OF LICENSURE  
FOR PROFESSIONAL LAND SURVEYORS  
TECHNICAL STANDARDS OF PRACTICE FOR  
A STANDARD BOUNDARY SURVEY WITH  
THE FOLLOWING EXCEPTIONS:

THIS PLAN REVIEWED AND APPROVED BY THE CITY  
OF BIDEFORD PLANNING BOARD.

DATE \_\_\_\_\_

CHAIR

PRELIMINARY PLAN

WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

|                         |                   |
|-------------------------|-------------------|
| DESIGNED<br>W. Pelkey   | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.          | SCALE<br>As Noted |
| CHECKED<br>R. Libby Jr. | JOB. NO.<br>20217 |

SHEET

1

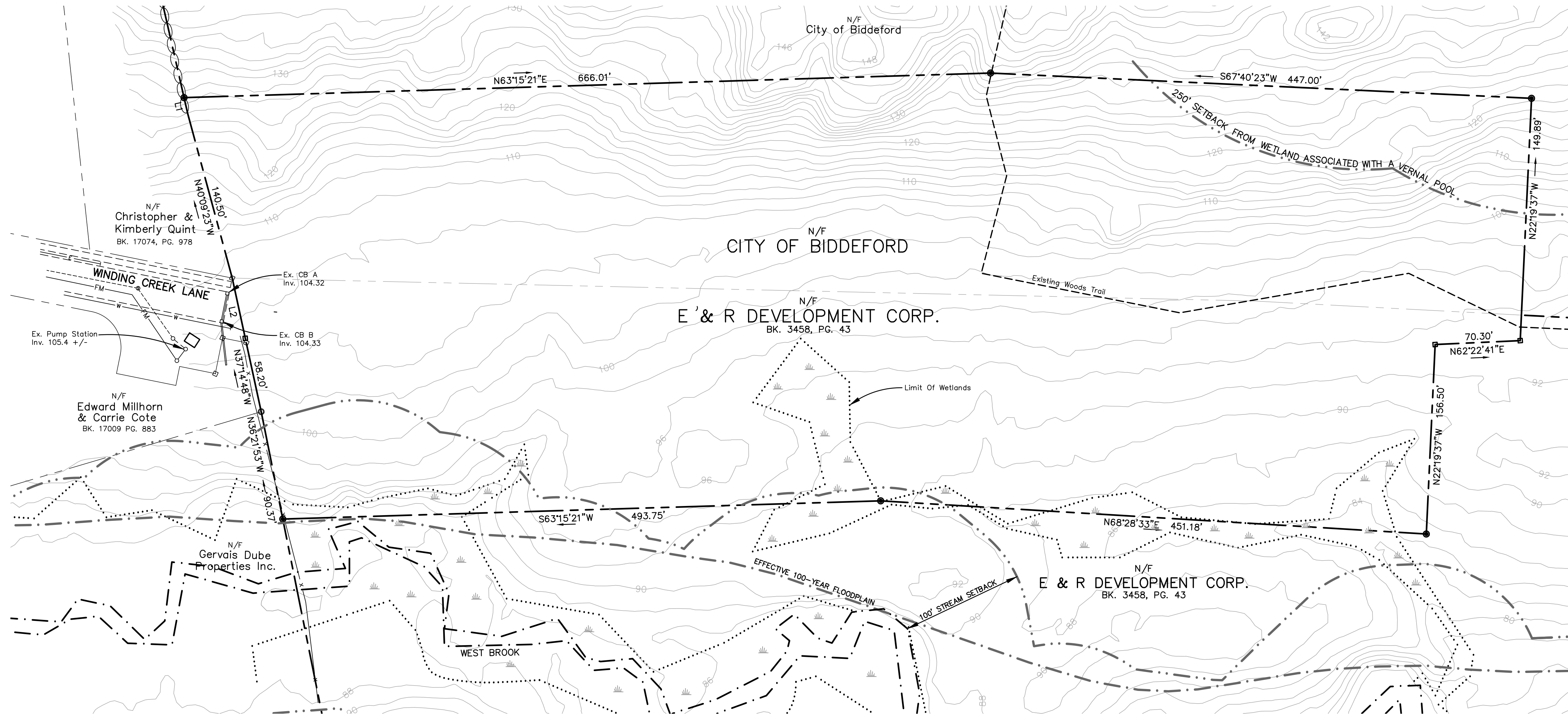
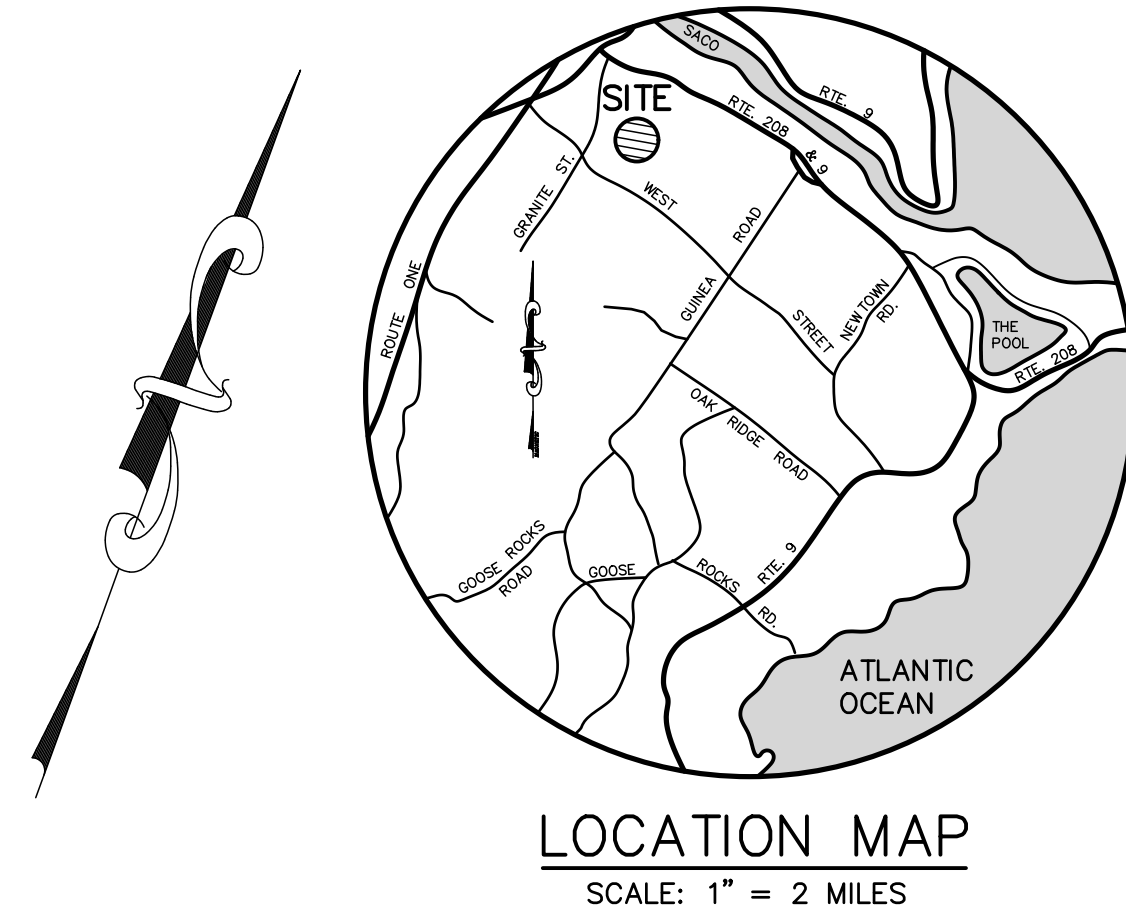
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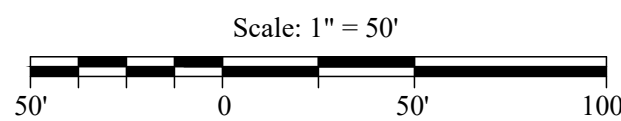
NOTES:

1. OWNER: E & R DEVELOPMENT CORP.  
P.O. BOX 444  
BIDDEFORD, ME
2. SURVEYOR: ROBERT C. LIBBY JR., PLS#2190  
BH2M  
380B MAIN STREET  
GORHAM, ME
3. ZONE: RESIDENTIAL 1A (R1-A)
4. TAX MAP: MAP 8 LOT 3-1 & P.O. 3
5. PARCEL DEED: BOOK 3458 PAGE 43
6. TOTAL PARCEL: 8.390 ACRES
7. WETLAND MAPPING: MARK HAMPTON  
HAMPTON ASSOCIATES  
PORTLAND, ME
8. EASEMENTS SHALL BE RESERVED FOR PATHS/TRAILS FROM WINDING CREEK TO ACCESS CLIFFORD PARK.



LINE DATA  
L1 = S37°51'03"E 13.52'  
L2 = N37°14'48"W 52.26'

| SYMBOL | DESCRIPTION             |
|--------|-------------------------|
|        | STONE WALL              |
|        | WETLANDS                |
|        | PROPERTY LINE           |
|        | ABUTTER'S PROPERTY LINE |
|        | EDGE OF PAVEMENT        |
|        | EXISTING CONTOUR        |
|        | ABOVE GROUND            |
|        | NOW OR FORMERLY         |



I CERTIFY THAT THIS SURVEY CONFORMS TO THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS TECHNICAL STANDARDS OF PRACTICE FOR A STANDARD BOUNDARY SURVEY WITH THE FOLLOWING EXCEPTIONS:

1. NO SURVEYORS REPORT



ROBERT C. LIBBY JR. PLS #2190

| NO. | DATE    | REVISION                                  | DESCRIPTION |
|-----|---------|-------------------------------------------|-------------|
| 1   | 2-9-22  | City Of Biddeford Submission              |             |
| 2   | 2-16-22 | Revised Grading and Drainage              |             |
| 3   | 3-30-22 | Interim Modifications for Planning Review |             |
|     |         |                                           |             |
|     |         |                                           |             |
|     |         |                                           |             |

**BH2M**  
Barry, Huff, McDonald, Milfigan Inc.  
Engineers, Surveyors  
380B Main Street  
Gorham, Maine 04038  
Tel. (207) 839-2771  
www.bh2m.com

FOR  
E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

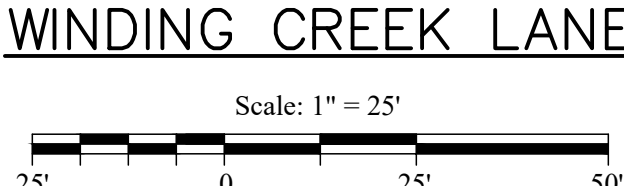
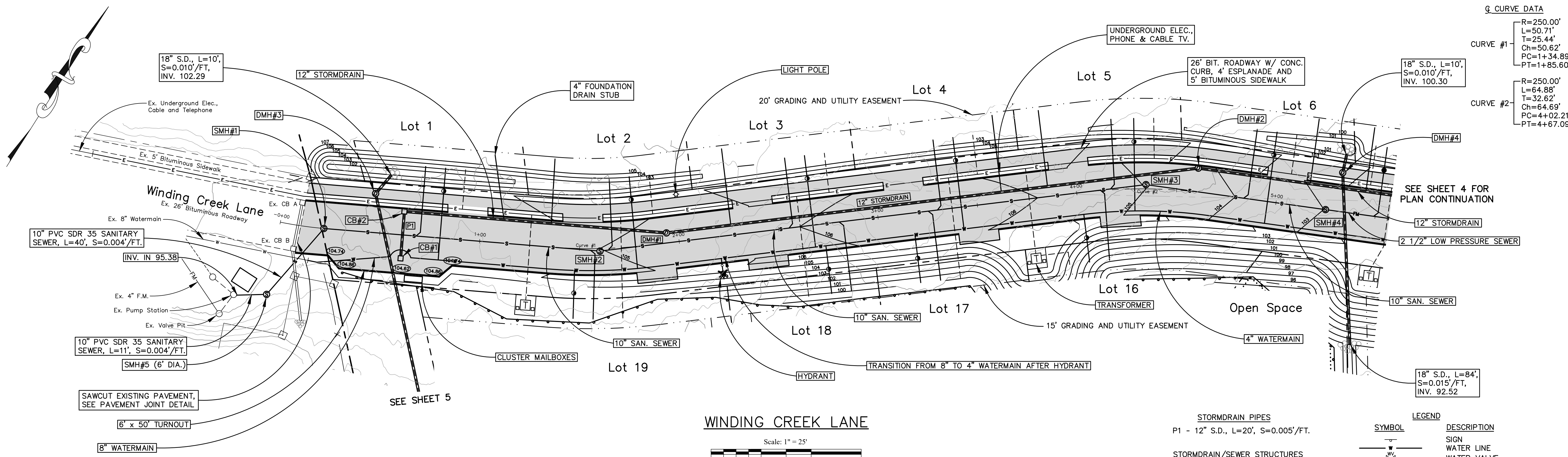
EXISTING CONDITIONS  
WEST BROOK SUBDIVISION  
WINDING CREEK LANE  
BIDDEFORD, MAINE

|                         |                   |
|-------------------------|-------------------|
| DESIGNED<br>W. Pelkey   | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.          | SCALE<br>As Noted |
| CHECKED<br>R. Libby Jr. | JOB. NO.<br>20217 |

SHEET  
2

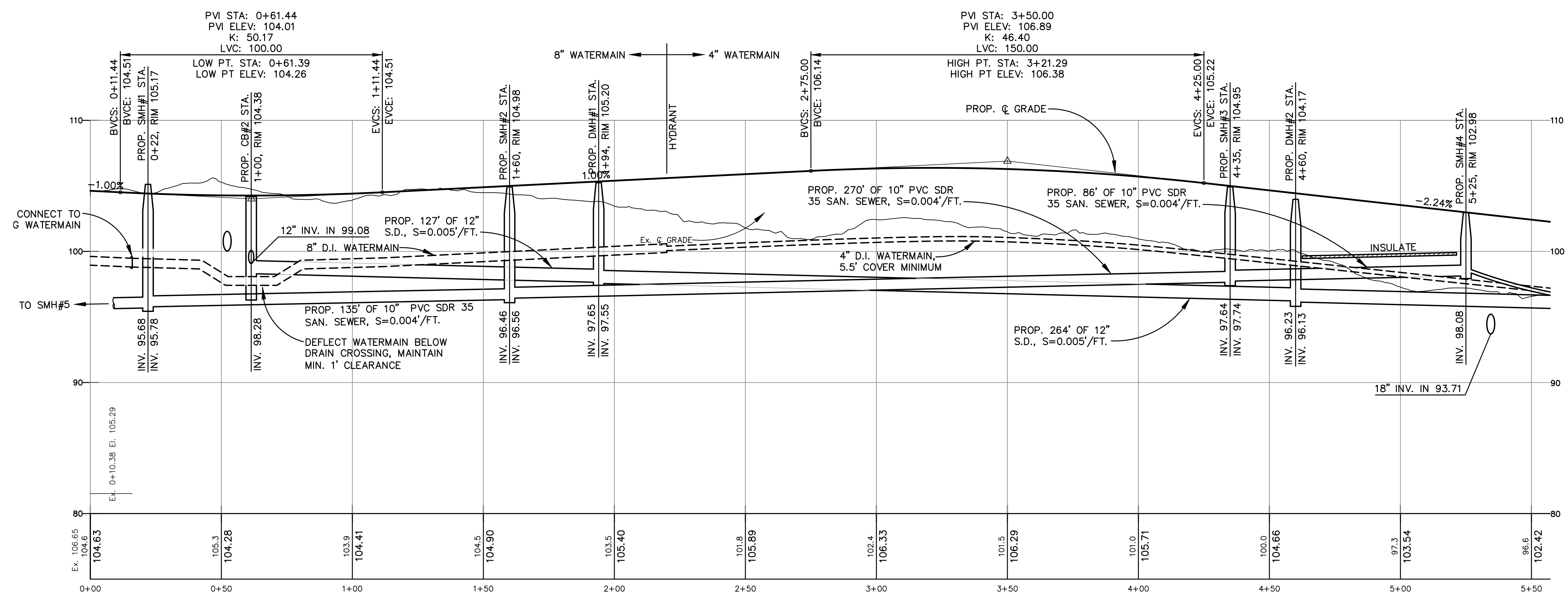
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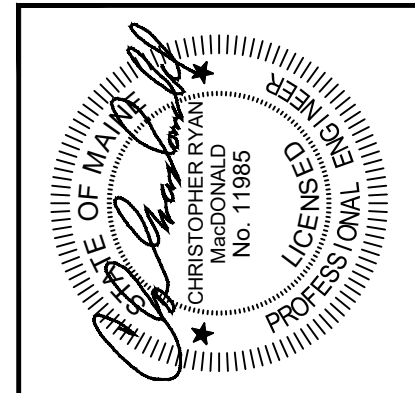
| STORMDRAIN PIPES                   |                                                         |
|------------------------------------|---------------------------------------------------------|
| P1 - 12" S.D., L=20', S=0.005'/FT. |                                                         |
| STORMDRAIN/SEWER STRUCTURES        |                                                         |
| CB#1                               | RIM 104.38<br>INV. 99.18                                |
| SMH#5 (6" DIA.)                    | RIM 105.0±<br>INV. IN 95.52<br>INV. OUT 95.42           |
| DMH#3                              | RIM 105.29<br>18" INV. IN 102.19<br>18" INV. OUT 100.12 |
| DMH#4                              | RIM 103.10<br>18" INV. IN 100.20<br>18" INV. OUT 93.80  |

| SYMBOL   | DESCRIPTION                         |
|----------|-------------------------------------|
| [Symbol] | SIGN                                |
| [Symbol] | WATER LINE                          |
| [Symbol] | WATER VALVE                         |
| [Symbol] | SHUTOFF VALVE (BALL VALVE)          |
| [Symbol] | PRESSURE SEWER                      |
| [Symbol] | SEWER                               |
| [Symbol] | UNDERGROUND ELECTRIC                |
| [Symbol] | SILT FENCE                          |
| [Symbol] | EXISTING CONTOUR                    |
| [Symbol] | PROPOSED CONTOUR                    |
| [Symbol] | TRANSFORMER PAD                     |
| [Symbol] | UTILITY POLE                        |
| [Symbol] | HYDRANT                             |
| [Symbol] | SEWER MANHOLE                       |
| [Symbol] | PROPERTY LINE/RIGHT OF WAY EASEMENT |



PROFILE  
SCALE:  
VERTICAL: 1" = 5'  
HORIZONTAL: 1" = 25'

| NO. | DATE    | REVISION | DESCRIPTION                               |
|-----|---------|----------|-------------------------------------------|
| 1   | 2-5-22  |          | City Of Biddeford Submission              |
| 2   | 2-16-22 |          | Revised Grading and Drainage              |
| 3   | 3-30-22 |          | Interim Modifications for Planning Review |



BH2M

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Tel. (207) 839-2771  
www.bh2m.com

FOR  
E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

WINDING CREEK LANE  
STA. 0+00 to 5+50

WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

|                         |                   |
|-------------------------|-------------------|
| DESIGNED<br>W. Pelkey   | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.          | SCALE<br>As Noted |
| CHECKED<br>C. MacDonald | JOB. NO.<br>20217 |

SHEET

3

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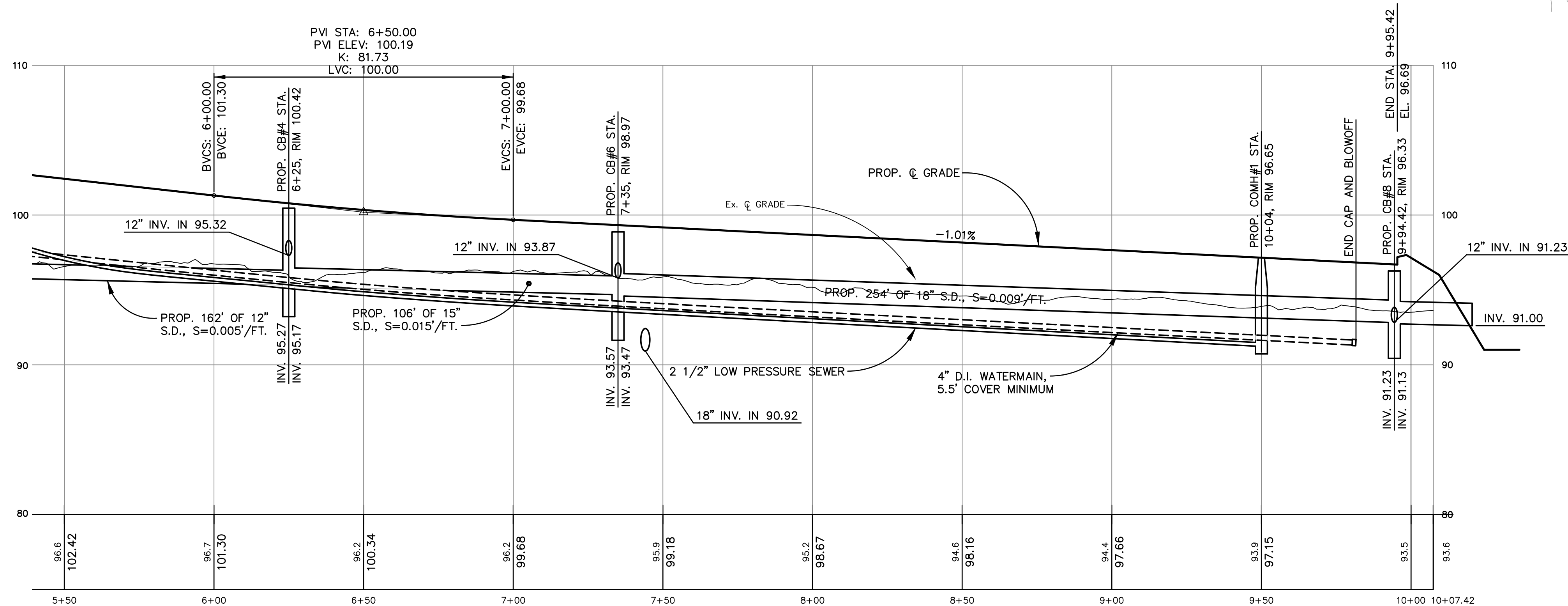
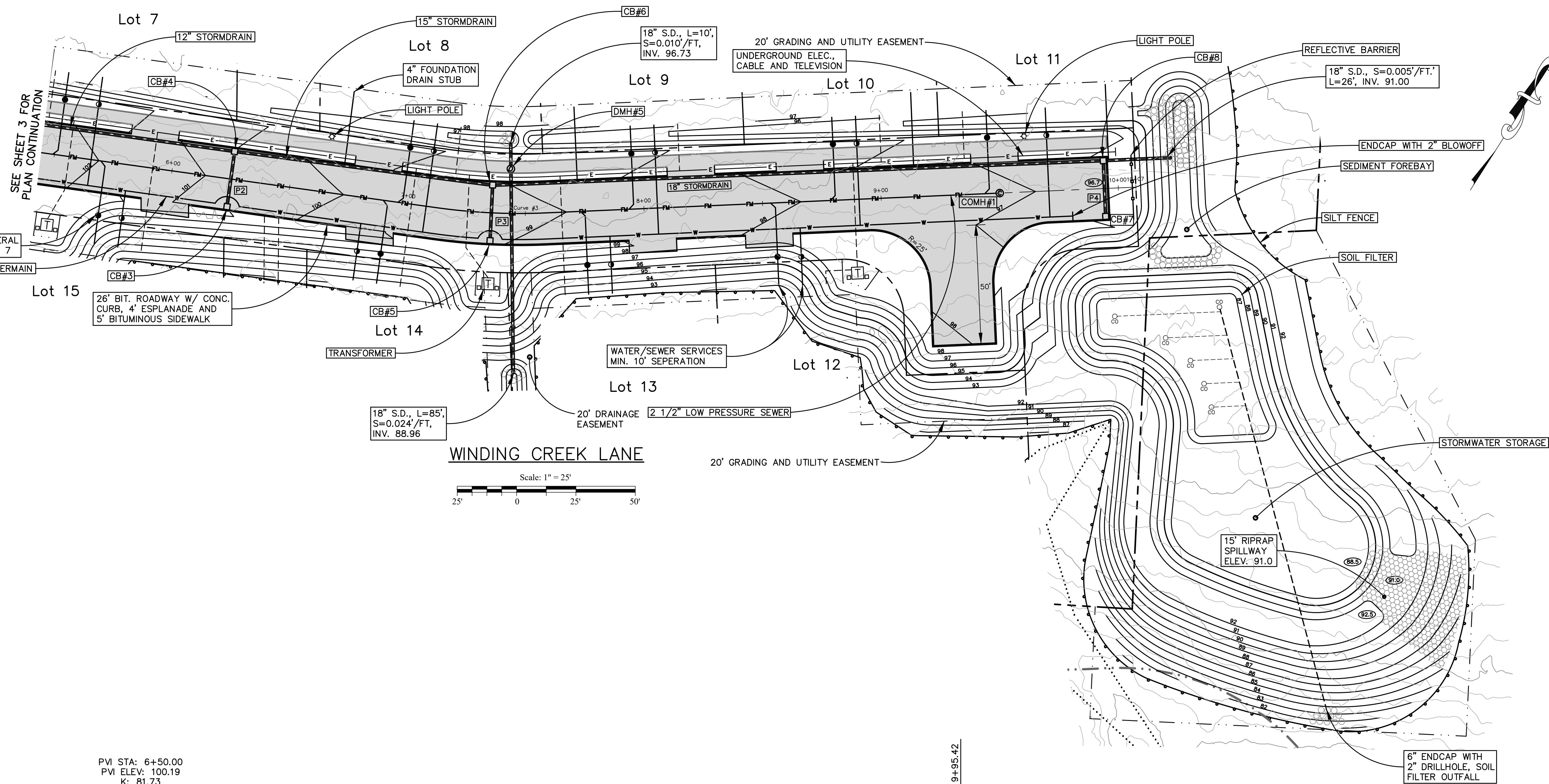


Q CURVE DATA  
R=250.00'  
L=45.49'  
T=22.81'  
Ch=45.43'  
PC=7+12.93  
PT=7+58.42

STORMDRAIN PIPES  
P2 - 12" S.D., L=20', S=0.005'/FT.  
P3 - 12" S.D., L=20', S=0.005'/FT.  
P4 - 12" S.D., L=20', S=0.005'/FT.

STORMDRAIN/SEWER STRUCTURES  
CB#3 - RIM 100.42  
INV. 95.42  
CB#5 - RIM 98.97  
INV. 93.97  
CB#7 - RIM 96.33  
INV. 91.33  
DMH#5 - RIM 99.5  
18" INV. IN 96.63  
18" INV. OUT 91.00

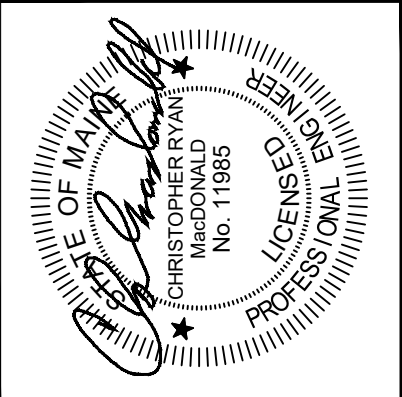
| SYMBOL | DESCRIPTION                |
|--------|----------------------------|
|        | SIGN                       |
|        | WATER LINE                 |
|        | WATER VALVE                |
|        | SHUTOFF VALVE (BALL VALVE) |
|        | PRESSURE SEWER             |
|        | SEWER                      |
|        | UNDERGROUND ELECTRIC       |
|        | SILT FENCE                 |
|        | EXISTING CONTOUR           |
|        | PROPOSED CONTOUR           |
|        | TRANSFORMER PAD            |
|        | UTILITY POLE               |
|        | HYDRANT                    |
|        | SEWER MANHOLE              |
|        | PROPERTY LINE/RIGHT OF WAY |
|        | EASEMENT                   |



PROFILE

SCALE  
VERTICAL: 1" = 5'  
HORIZONTAL: 1" = 25'

| NO. | DATE    | REVISION | DESCRIPTION                               |
|-----|---------|----------|-------------------------------------------|
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Tel. (207) 839-2771  
www.bh2m.com

FOR  
E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

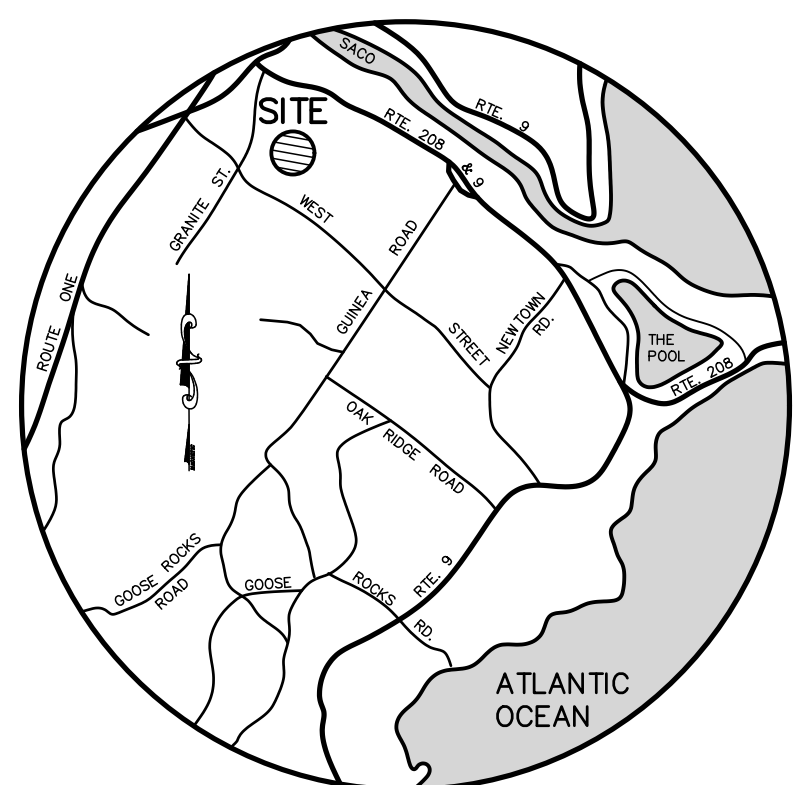
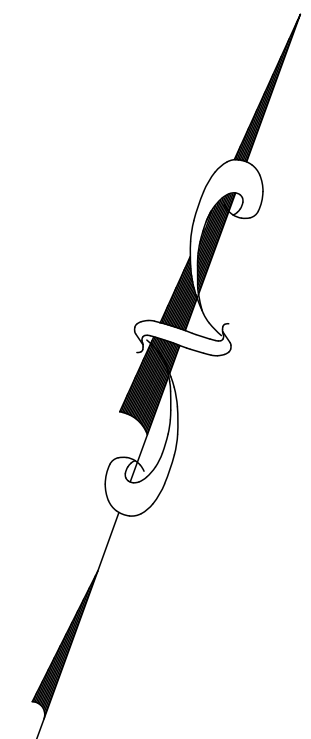
WINDING CREEK LANE  
STA. 5+50 TO 10+00  
WEST BROOK SUBDIVISION  
WINDING CREEK LANE  
BIDDEFORD, MAINE

|                        |                   |
|------------------------|-------------------|
| DESIGNED<br>W. Pelkey  | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.         | SCALE<br>As Noted |
| CHECKED<br>W. Thompson | JOB. NO.<br>20217 |

SHEET  
4

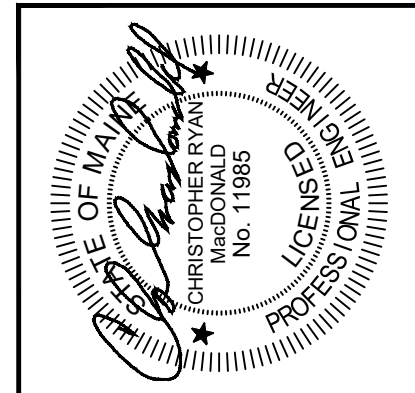
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LOCATION MAP  
SCALE: 1" = 2 MILES

| NO. | DATE    | REVISION | DESCRIPTION                               |
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| 3   | 3-30-22 |          | Interim Modifications for Planning Review |
|     |         |          |                                           |
|     |         |          |                                           |
|     |         |          |                                           |
|     |         |          |                                           |
|     |         |          |                                           |



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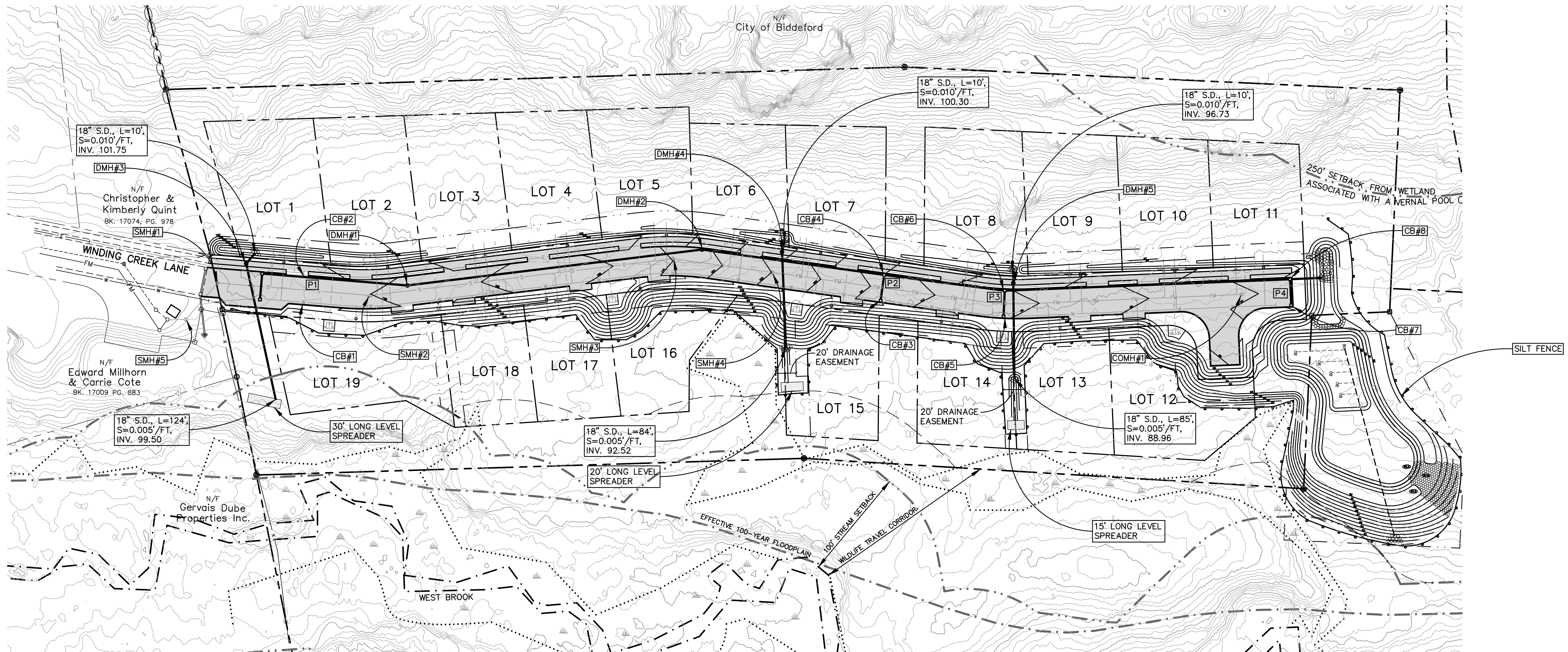
FOR  
E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

SITE GRADING & EROSION  
CONTROL SITE  
WEST BROOK SUBDIVISION  
WINDING CREEK LANE  
BIDDEFORD, MAINE

|                         |                   |
|-------------------------|-------------------|
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| DRAWN<br>Dept.          | SCALE<br>As Noted |
| CHECKED<br>R. Libby Jr. | JOB. NO.<br>20217 |

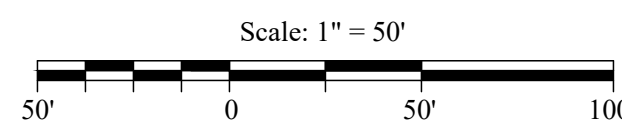
SHEET  
**5**

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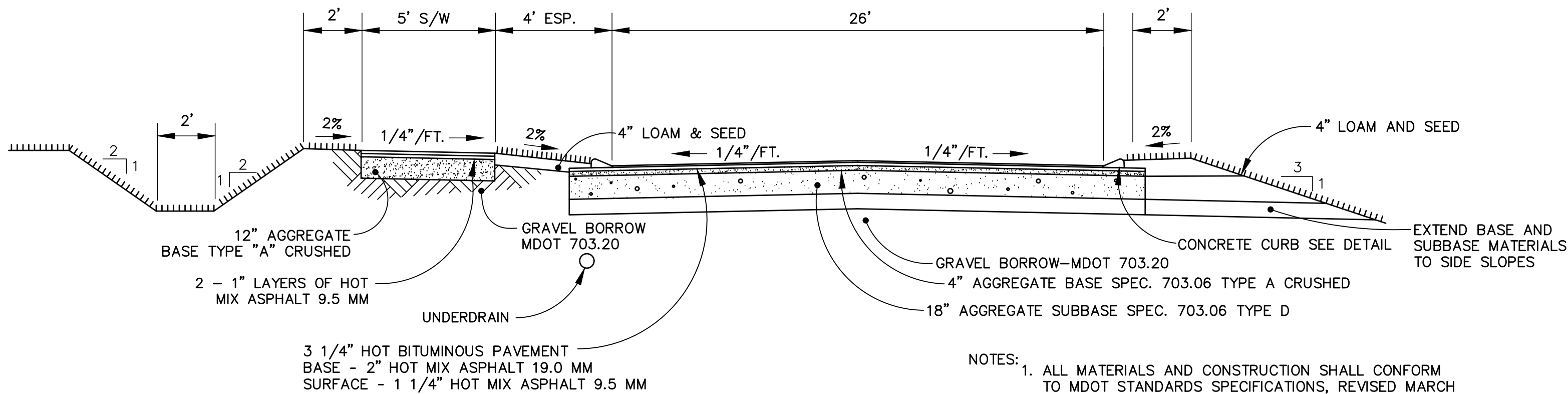
LINE DATA  
L1 = S37°51'03"E 13.52'  
L2 = N37°14'48"W 52.26'

| SYMBOL | DESCRIPTION             |
|--------|-------------------------|
|        | STONE WALL              |
|        | WETLANDS                |
|        | PROPERTY LINE           |
|        | ABUTTER'S PROPERTY LINE |
|        | EDGE OF PAVEMENT        |
|        | EXISTING CONTOUR        |
|        | ABOVE GROUND            |
|        | NOW OR FORMERLY         |



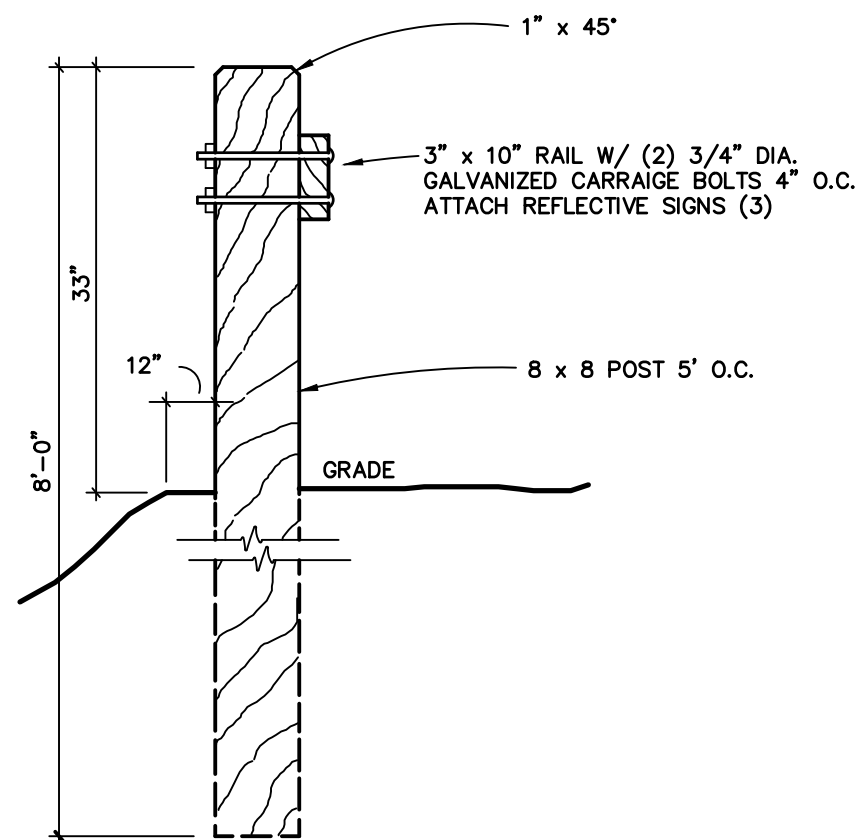
| STORMDRAIN STRUCTURES |                                                         |
|-----------------------|---------------------------------------------------------|
| DMH#3                 | RIM 105.29<br>18" INV. IN 102.19<br>18" INV. OUT 100.12 |
| DMH#4                 | RIM 103.10<br>18" INV. IN 100.20<br>18" INV. OUT 93.80  |
| DMH#5                 | RIM 99.5<br>18" INV. IN 96.63<br>18" INV. OUT 91.00     |



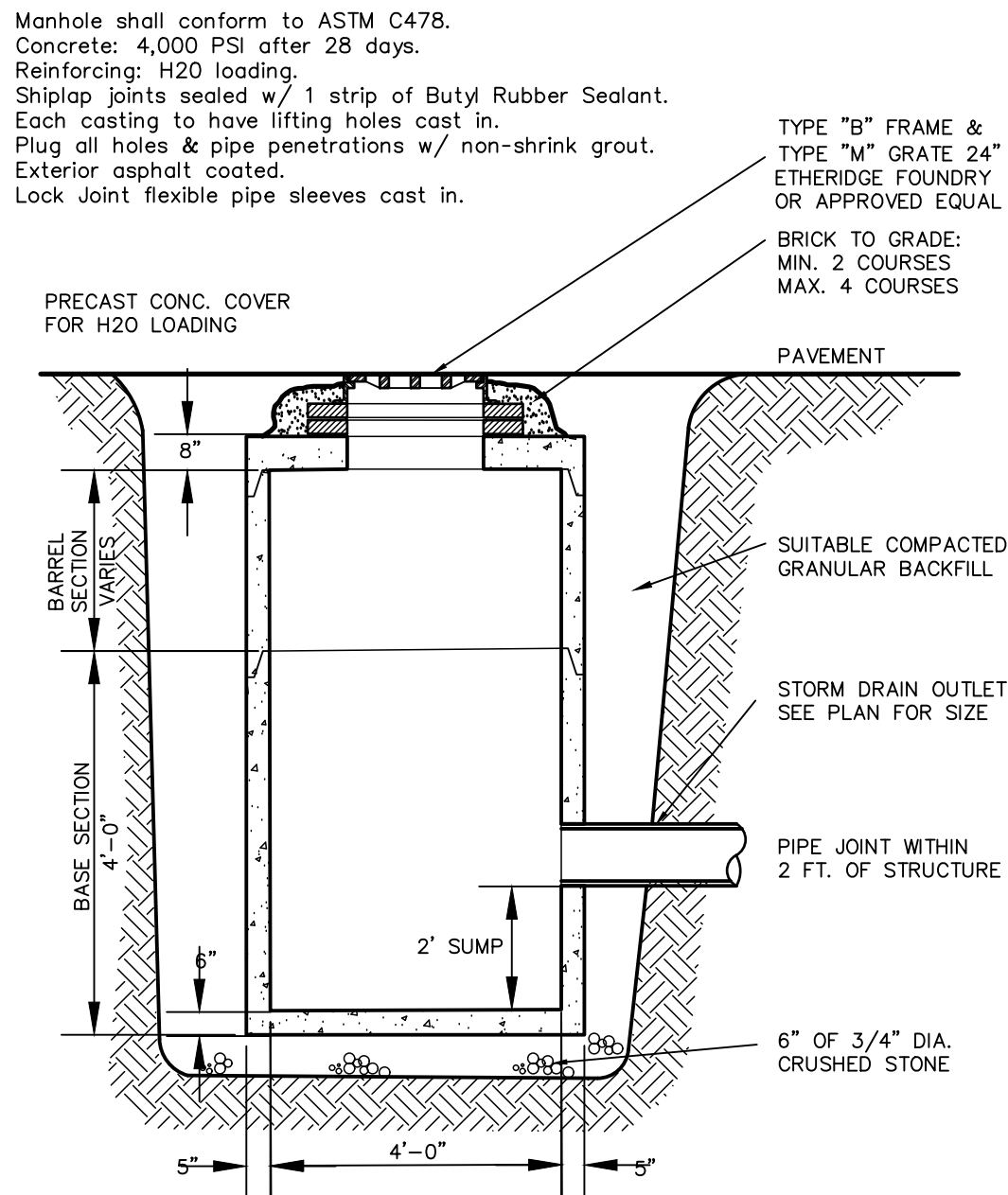


- NOTES:
1. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO MDOT STANDARDS SPECIFICATIONS, REVISED MARCH 2020.
  2. SEE MDOT 401 FOR MATERIALS AND MDOT 413 FOR INSTALLATION.
  3. ALL MATERIALS SHALL BE COMPACTED TO ACHIEVE 95% OF MAXIMUM DENSITY.

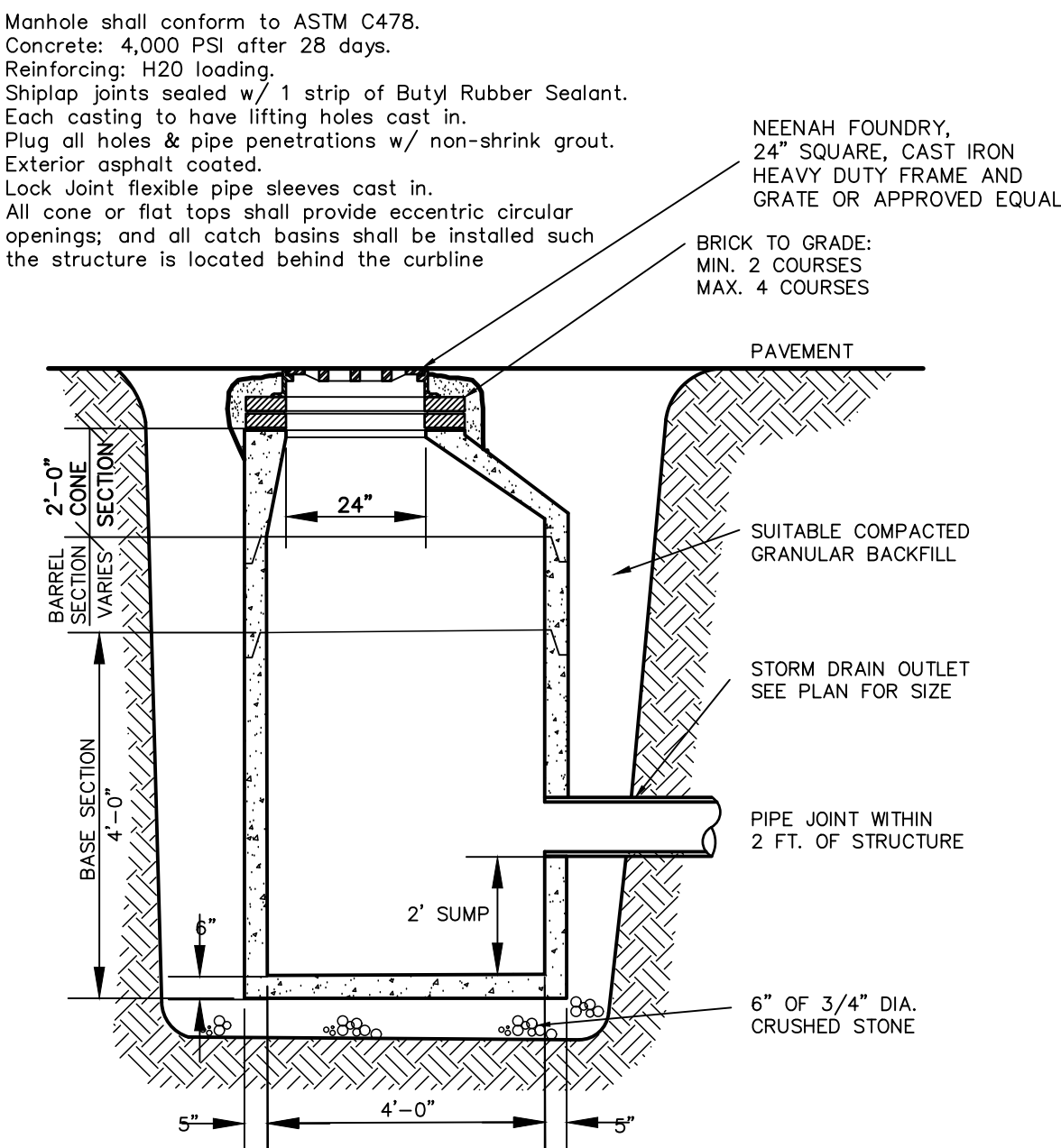
TYPICAL ROADWAY SECTION  
NTS



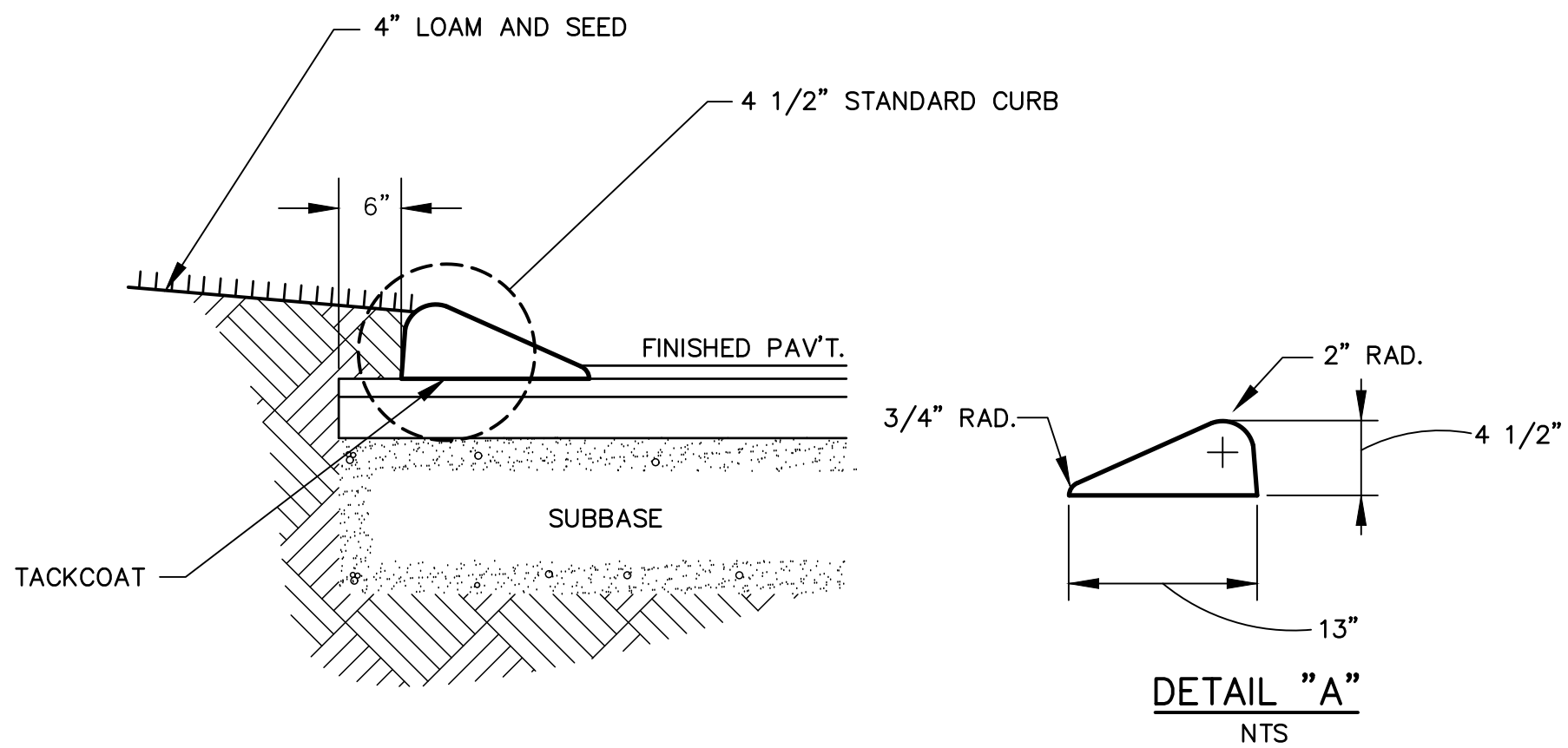
REFLECTIVE BARRIER  
N.T.S.



PRECAST CONCRETE  
CATCH BASIN DETAIL  
N.T.S.



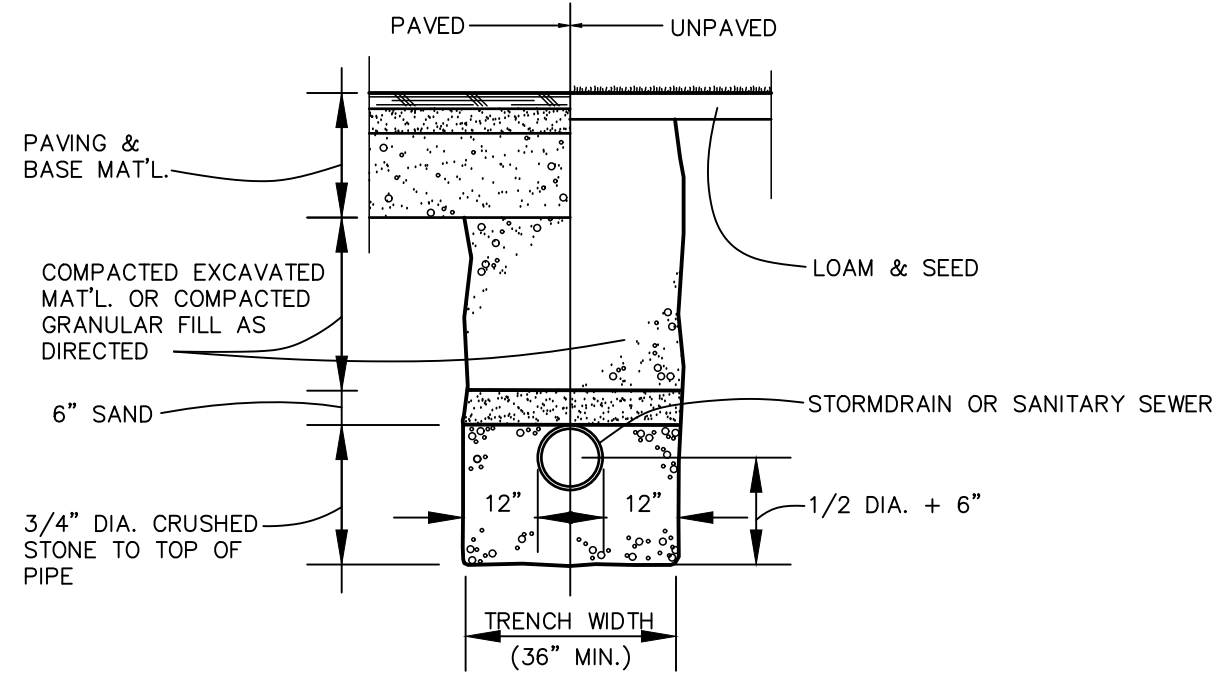
PRECAST CONCRETE  
CATCH BASIN DETAIL  
N.T.S.



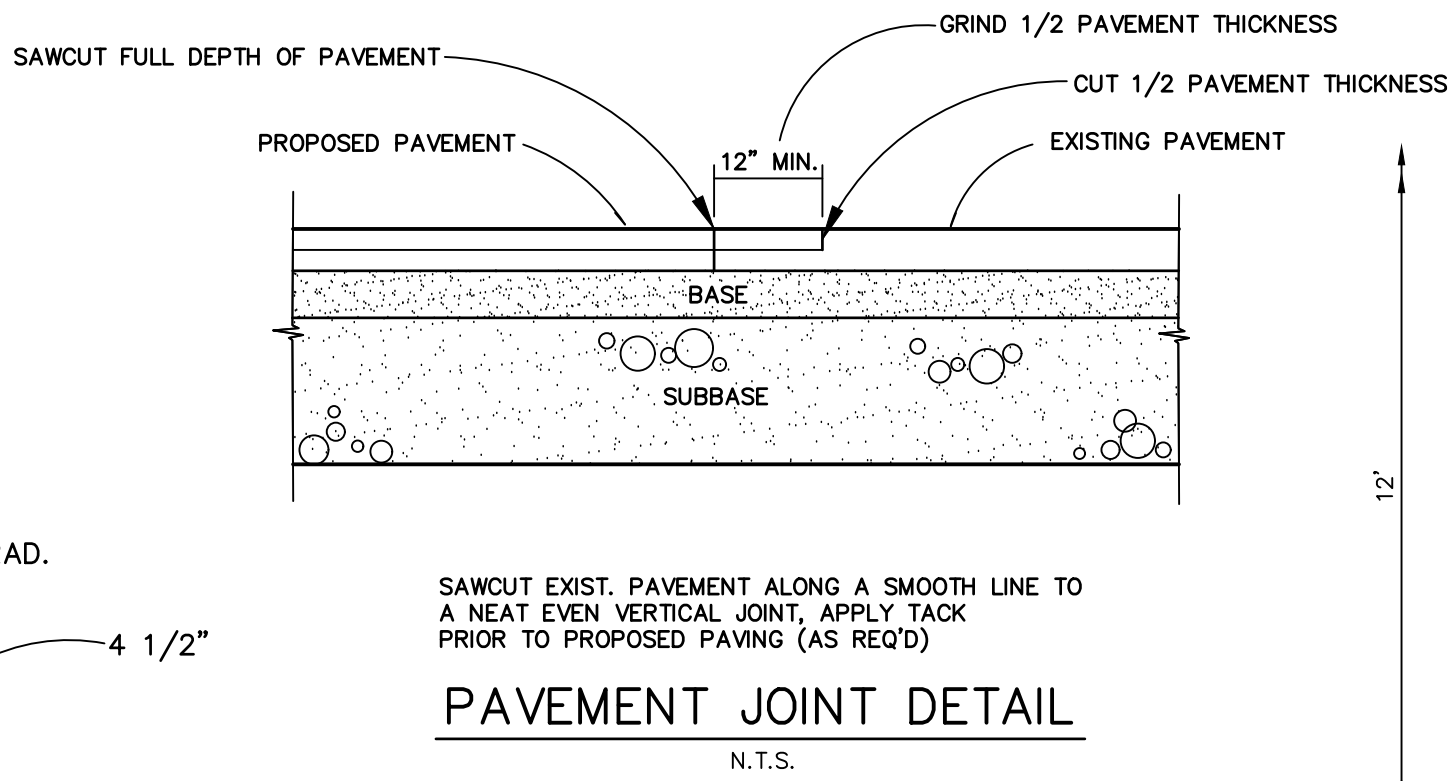
1. 1 LB. FIBER MESH SHALL BE ADDED TO EVERY CUBIC YARD OF CONCRETE. THE CONCRETE WILL CONTAIN THE MAXIMUM AMOUNT OF WATER TO BE OF A CONSISTENCY THAT THE CONCRETE WILL MAINTAIN THE SHAPE OF THE CURB SECTION WITHOUT SUPPORT. THIS MIX ALSO MEETS THE READY MIX REQUIREMENTS OF ASTM C94 AND WILL MEET OR EXCEED 4,000 PSI IN 28 DAYS.
2. THE PAVEMENT SHALL BE THOROUGHLY CLEANED TO REMOVE DUST, DIRT AND OIL BEFORE APPROVED ADHESIVE IS APPLIED PER MANUFACTURERS SPECIFICATIONS.
3. THE FIBER REINFORCED MIX SHALL BE FED INTO THE VIBRATING HOPPER WHERE IT IS COMPACTED INTO THE DESIRED MOLD PROFILE.
4. FRESHLY EXTRUDED CURB SHALL BE LIGHTLY TOUCHED UP WITH A STEEL HAND TROWEL. CONTROL JOINTS SHALL BE TOOLED AS SOON AS POSSIBLE AT 9' INTERVALS. ADDITIONAL CONTROL JOINTS ADDED ON RADIUS AS NECESSARY.
5. THE FINISHED CURB WILL BE COATED WITH AN APPROVED CURING COMPOUND.
6. FOLLOW MANUFACTURERS INSTALLATION INSTRUCTIONS AND TEMPERATURE RESTRICTIONS.

EXTRUDED CONCRETE CAPE COD CURB  
NTS

- NOTES:
1. Trench width shown is payment width for rockexcavation & replacement of unsuitable material.
  2. Do not mechanically compact directly over flexible pipe (e.g. PVC, Polyethylene).
  3. Concrete pipe shall have sand bedding.
  4. Perforations along invert required on storm drain pipes per AASHO standards.



TYPICAL TRENCH DETAIL  
NTS



SAWCUT EXIST. PAVEMENT ALONG A SMOOTH LINE TO A NEAT EVEN VERTICAL JOINT, APPLY TACK PRIOR TO PROPOSED PAVING (AS REQ'D)

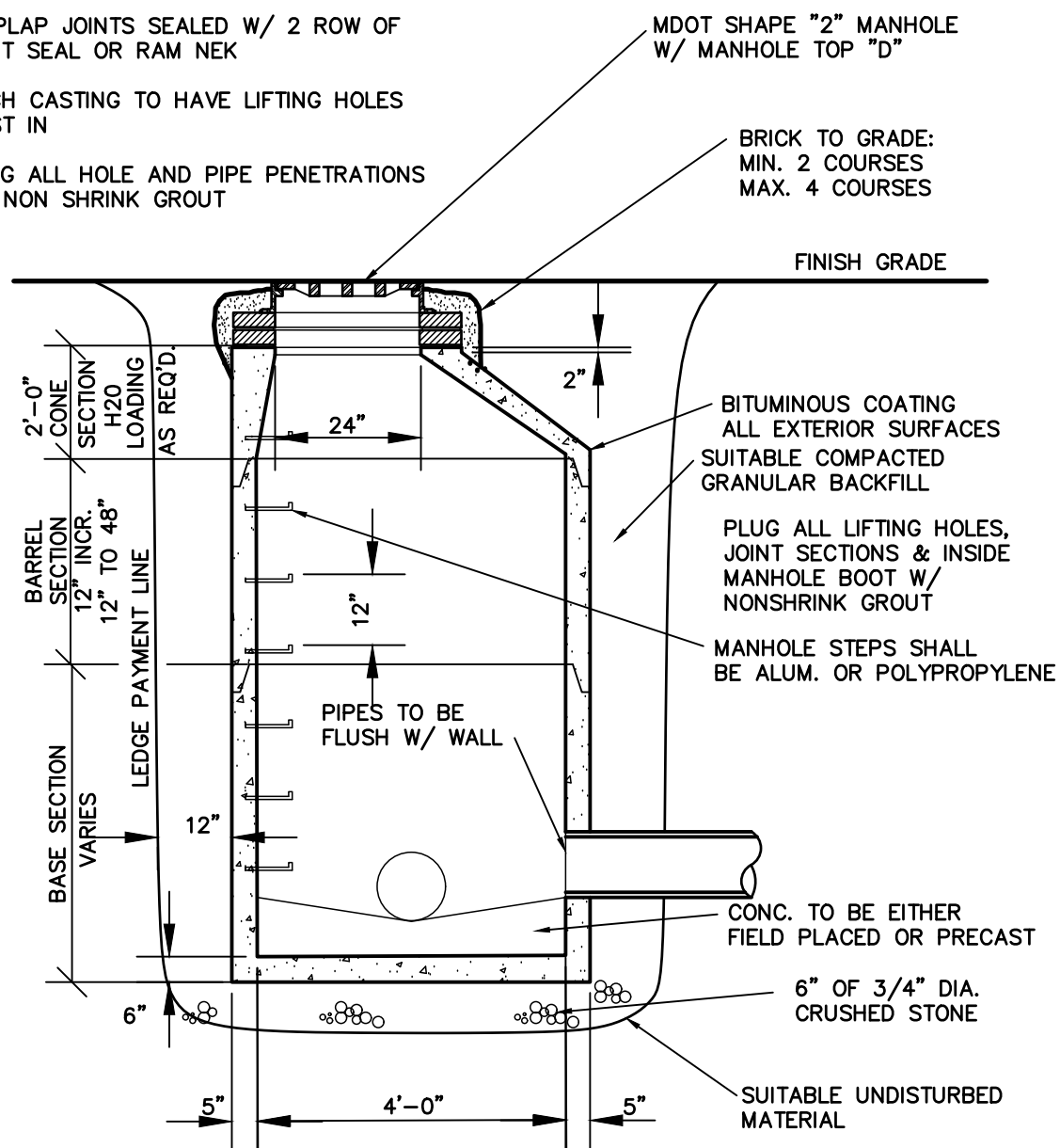
PAVEMENT JOINT DETAIL  
N.T.S.

- NOTES:
- CONCRETE: 4000 PSI AFTER 28 DAYS
- REINFORCING: H-20 LOADING

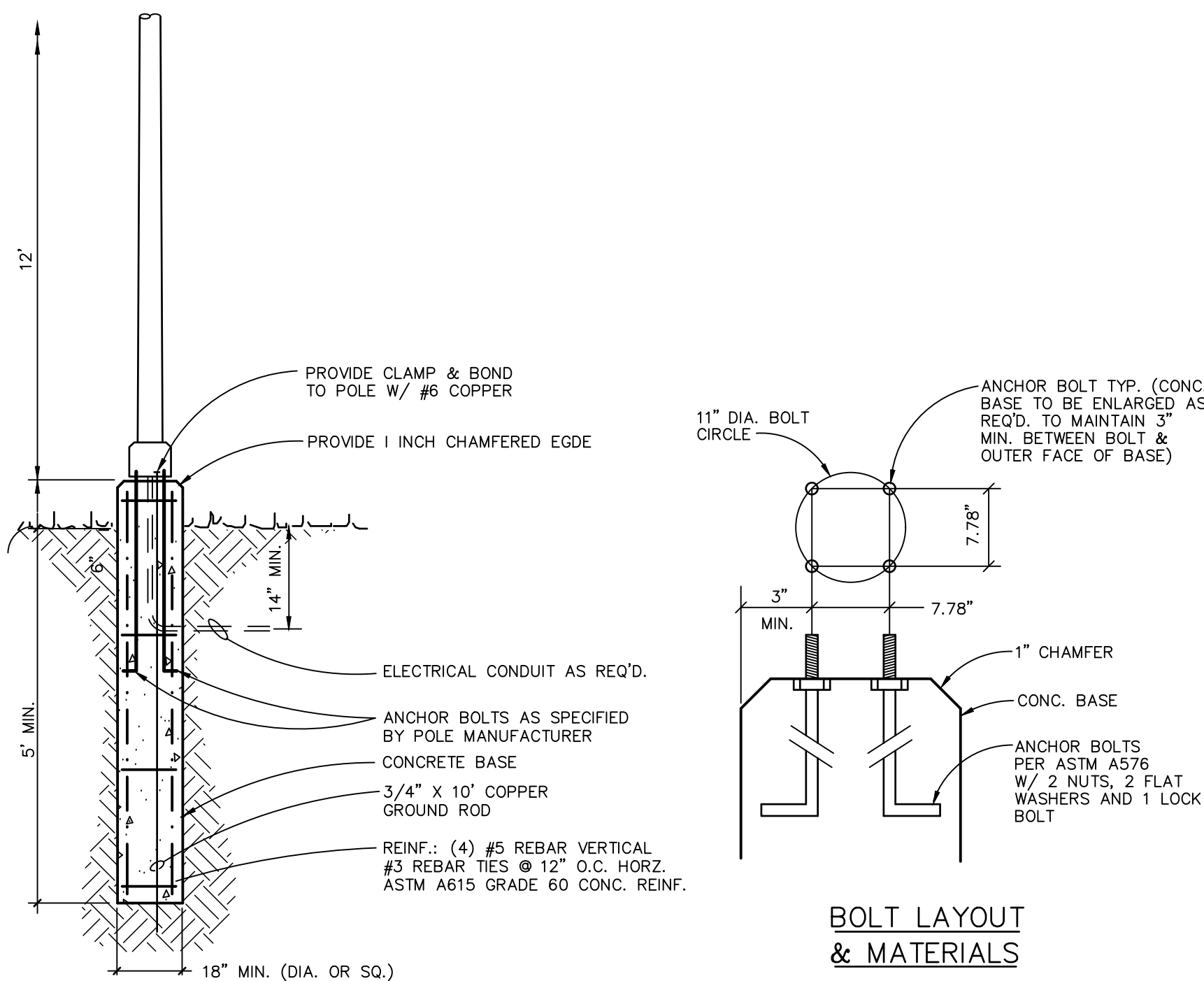
SHIPLAP JOINTS SEALED W/ 2 ROW OF KENT SEAL OR RAM NEK

EACH CASTING TO HAVE LIFTING HOLES CAST IN

PLUG ALL HOLE AND PIPE PENETRATIONS W/ NON SHRINK GROUT

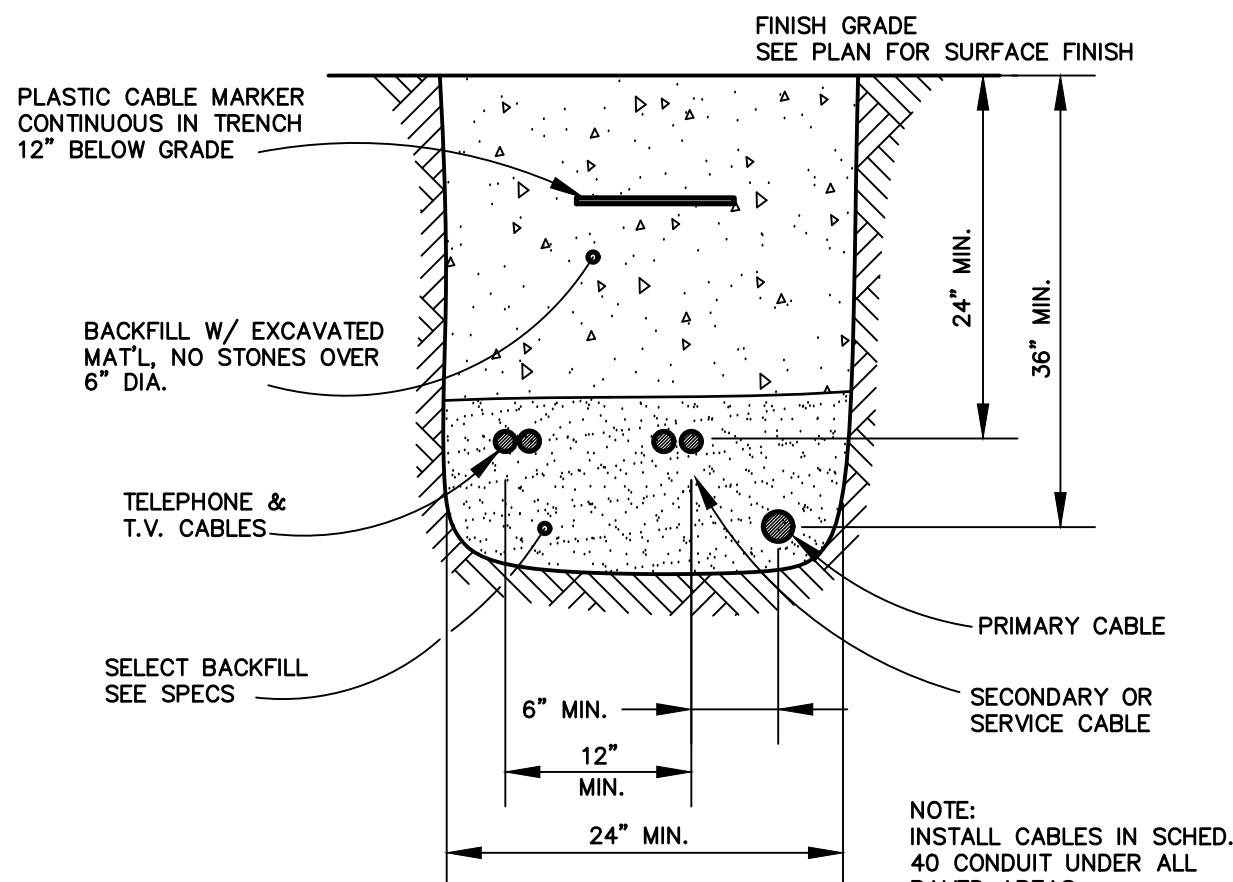


PRECAST CONCRETE  
DRAIN MANHOLE  
N.T.S.



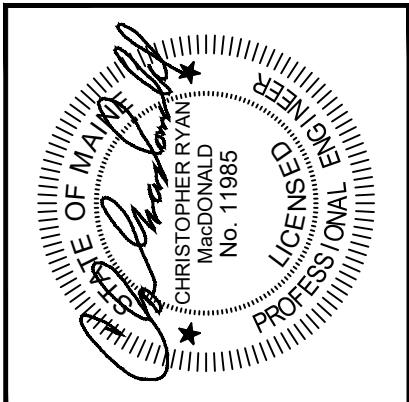
LIGHT POLE DETAIL  
N.T.S.

- NOTE:
- LIGHT POLE AND BASE SHALL MATCH EXISTING LIGHT POLES AND BASES ON WINDING CREEK LANE.



UNDERGROUND CABLE TRENCH  
NTS

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FOR

E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

STANDARD DETAILS

WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

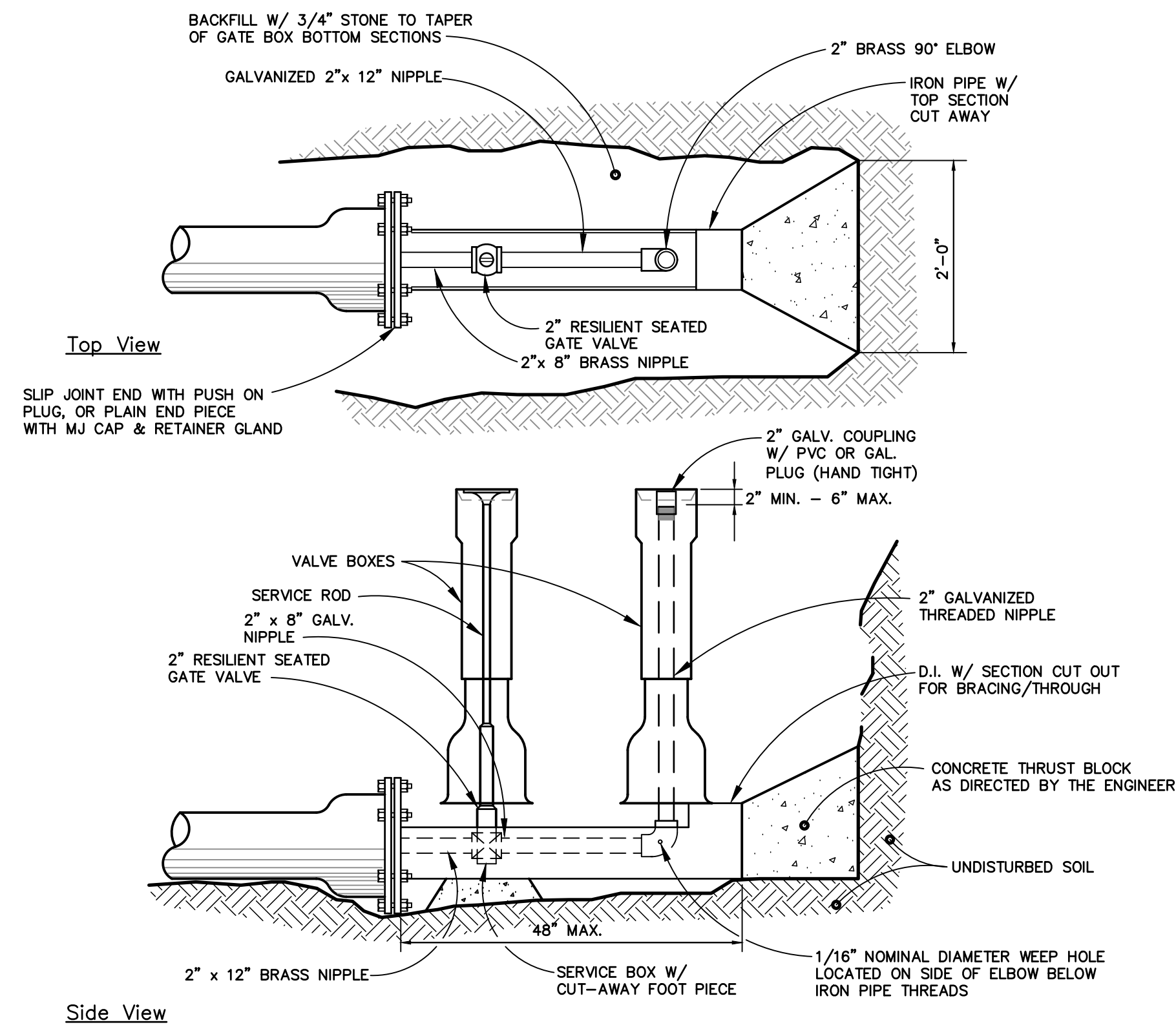
|                         |                   |
|-------------------------|-------------------|
| DESIGNED<br>W. Pelkey   | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.          | SCALE<br>As Noted |
| CHECKED<br>C. MacDonald | JOB. NO.<br>20217 |

SHEET

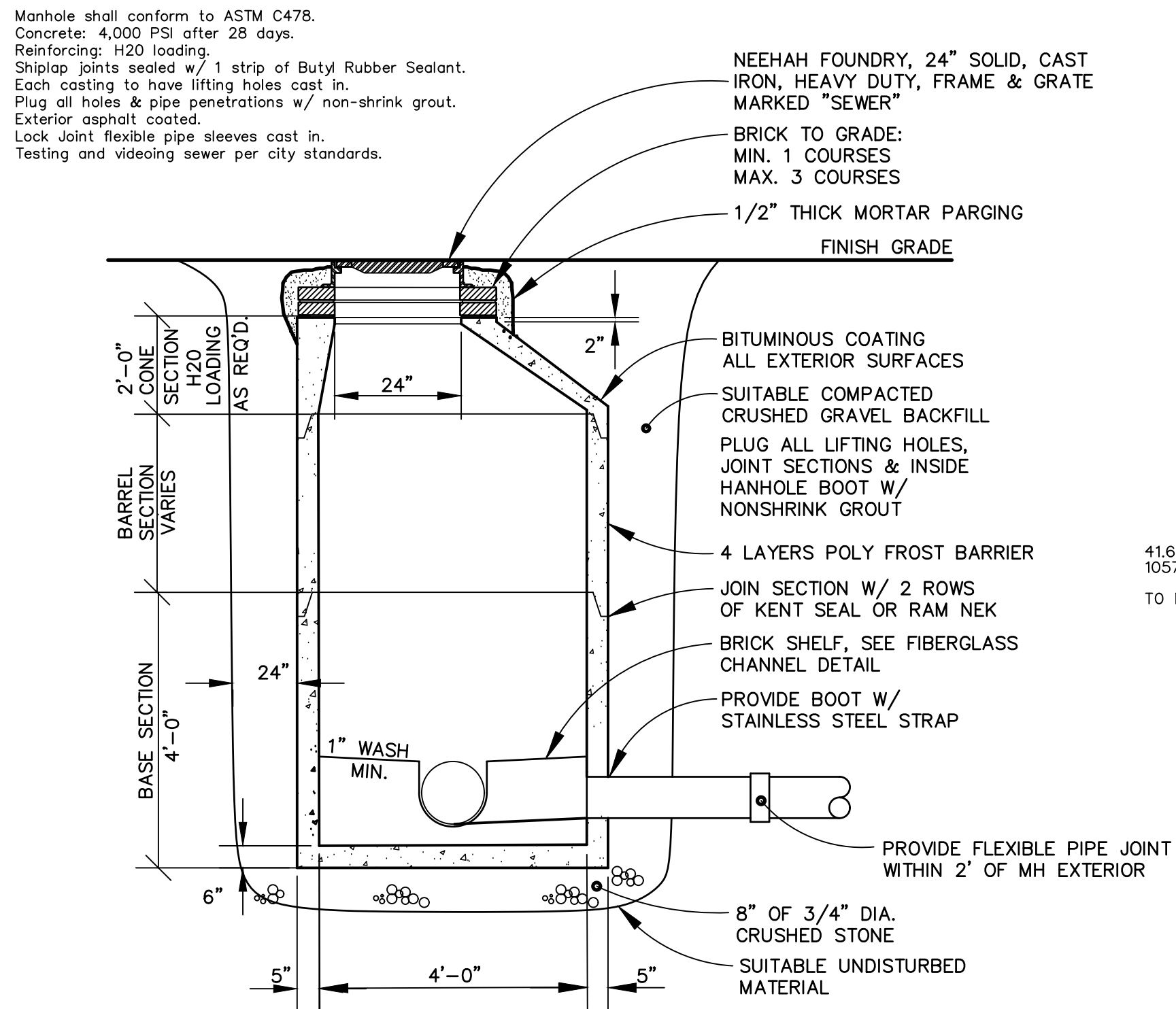
6

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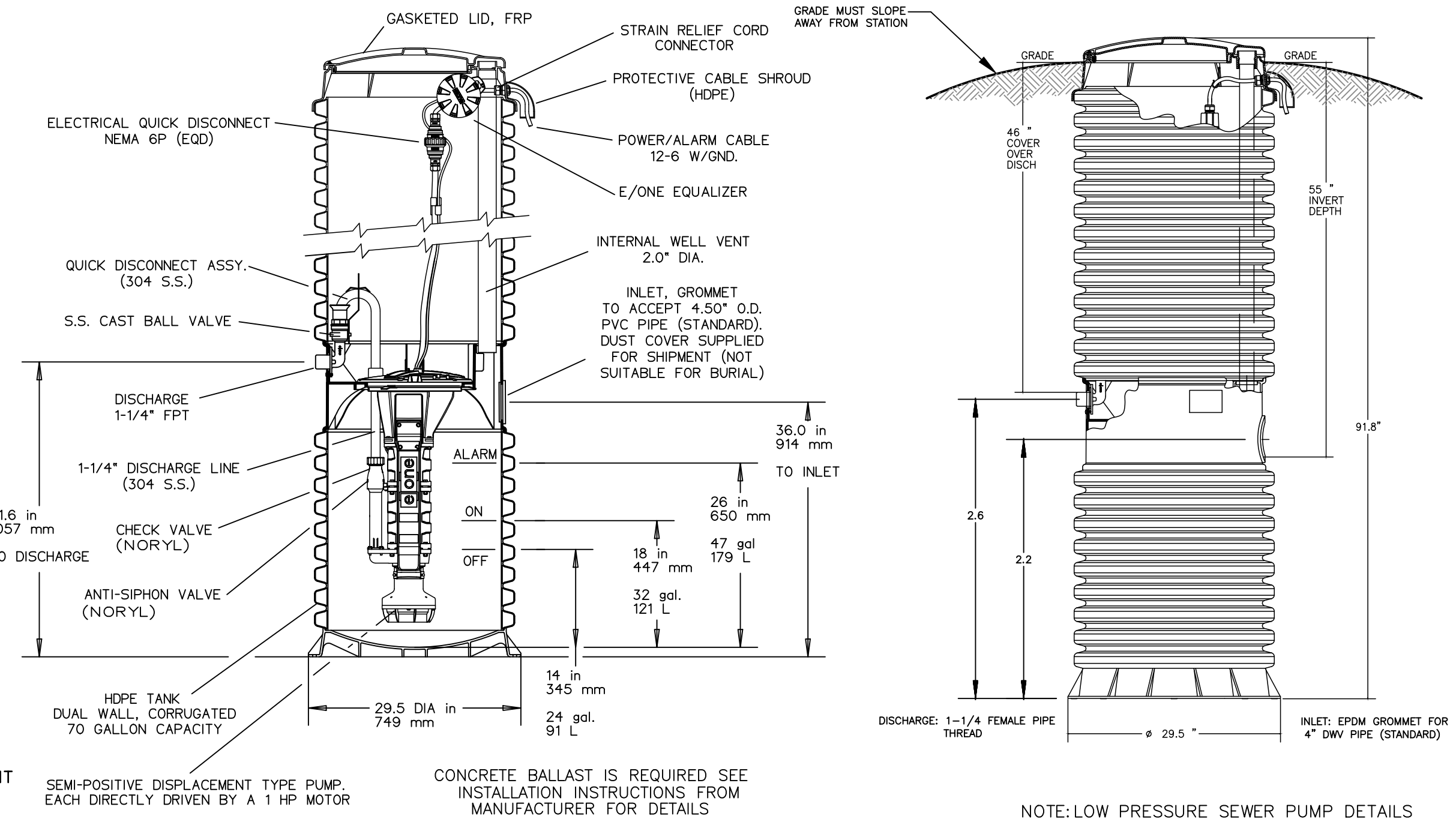




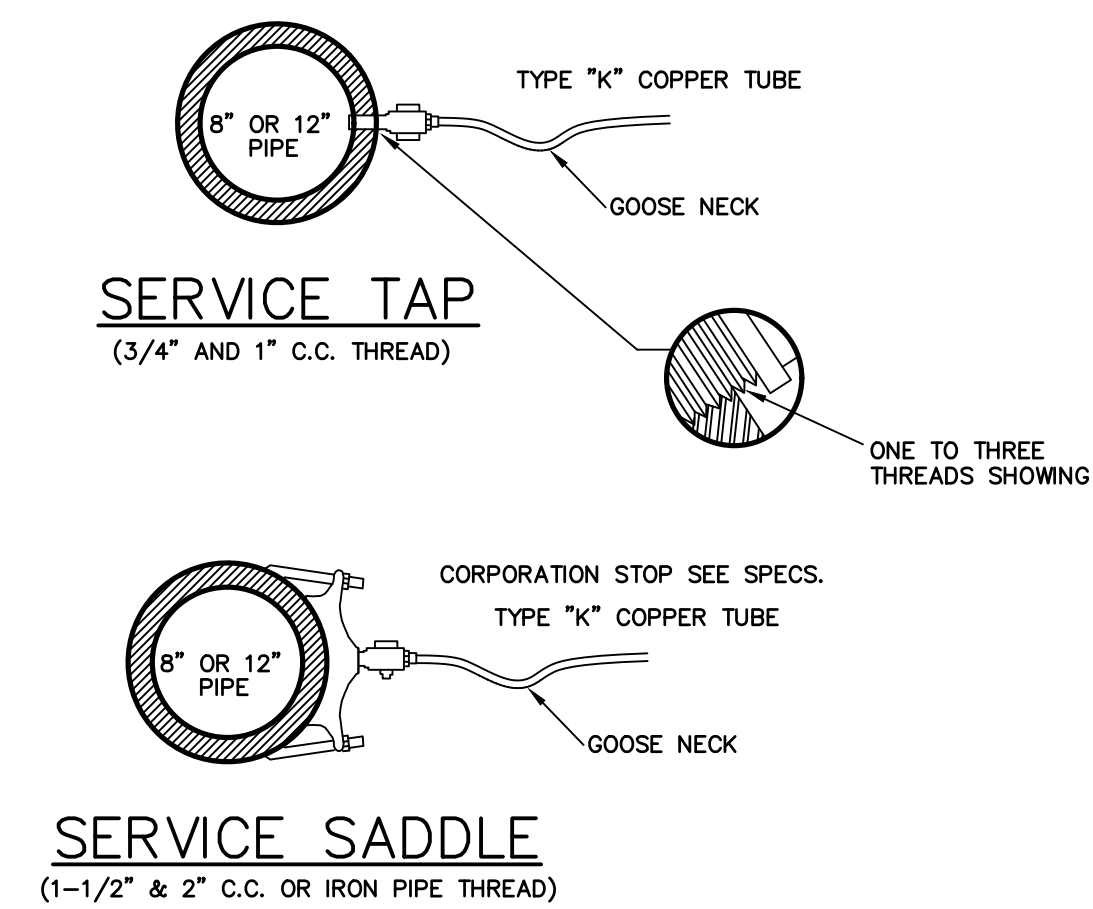
STANDARD 2" WATER BLOW OFF  
N.T.S.



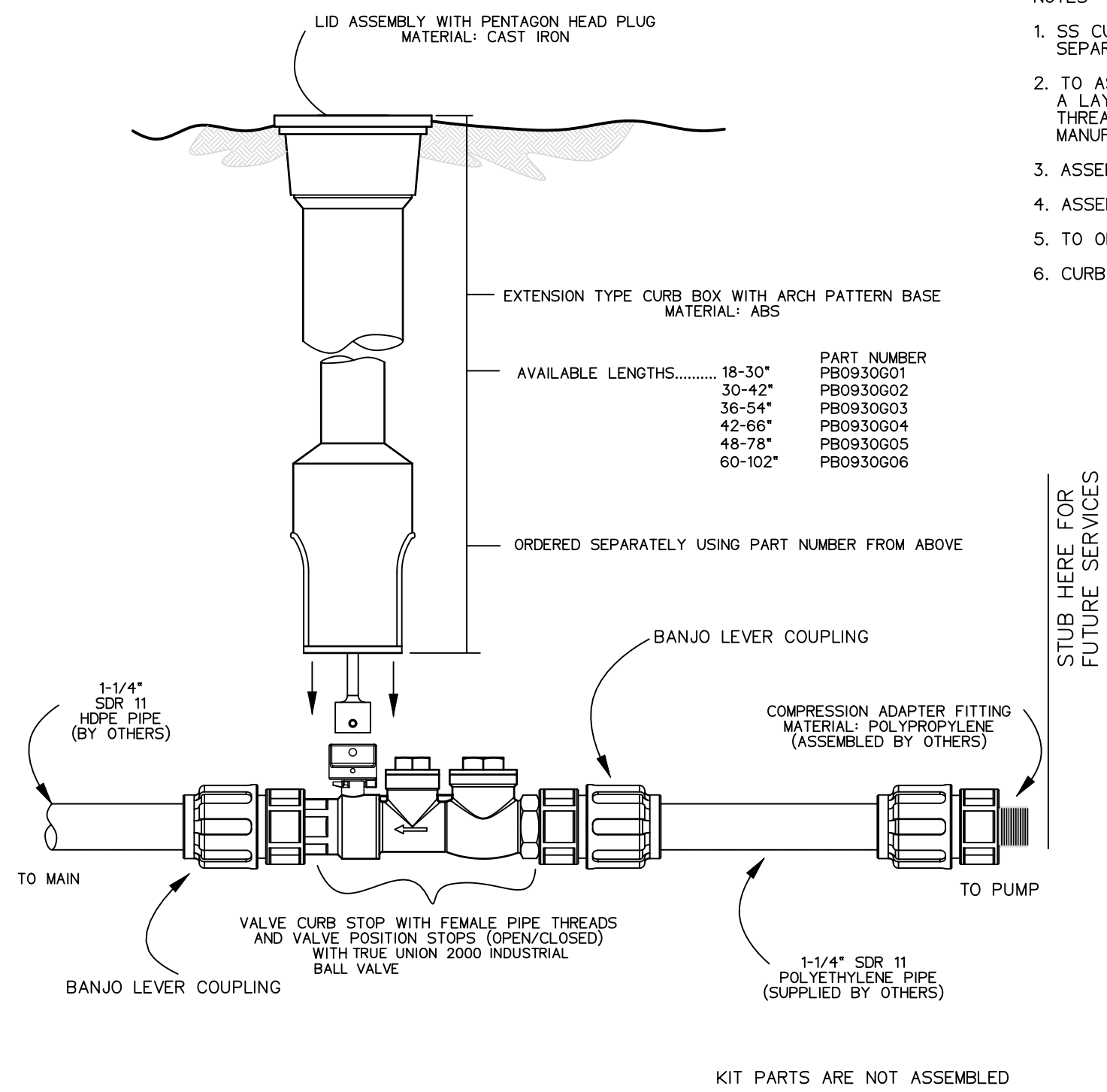
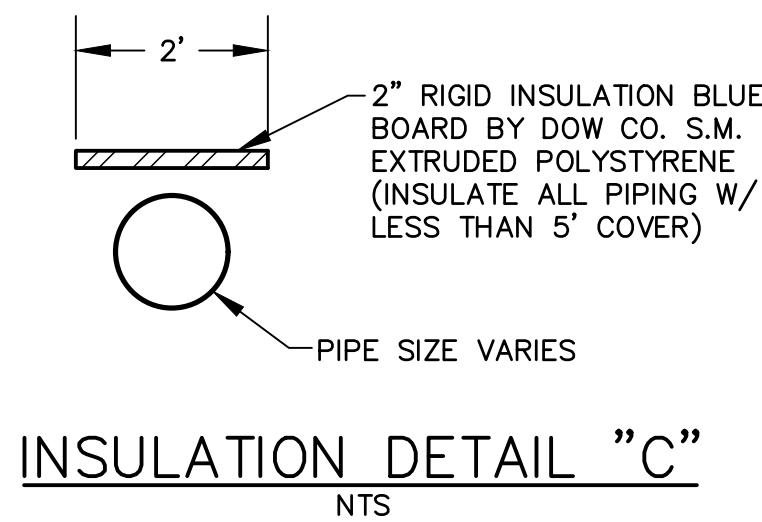
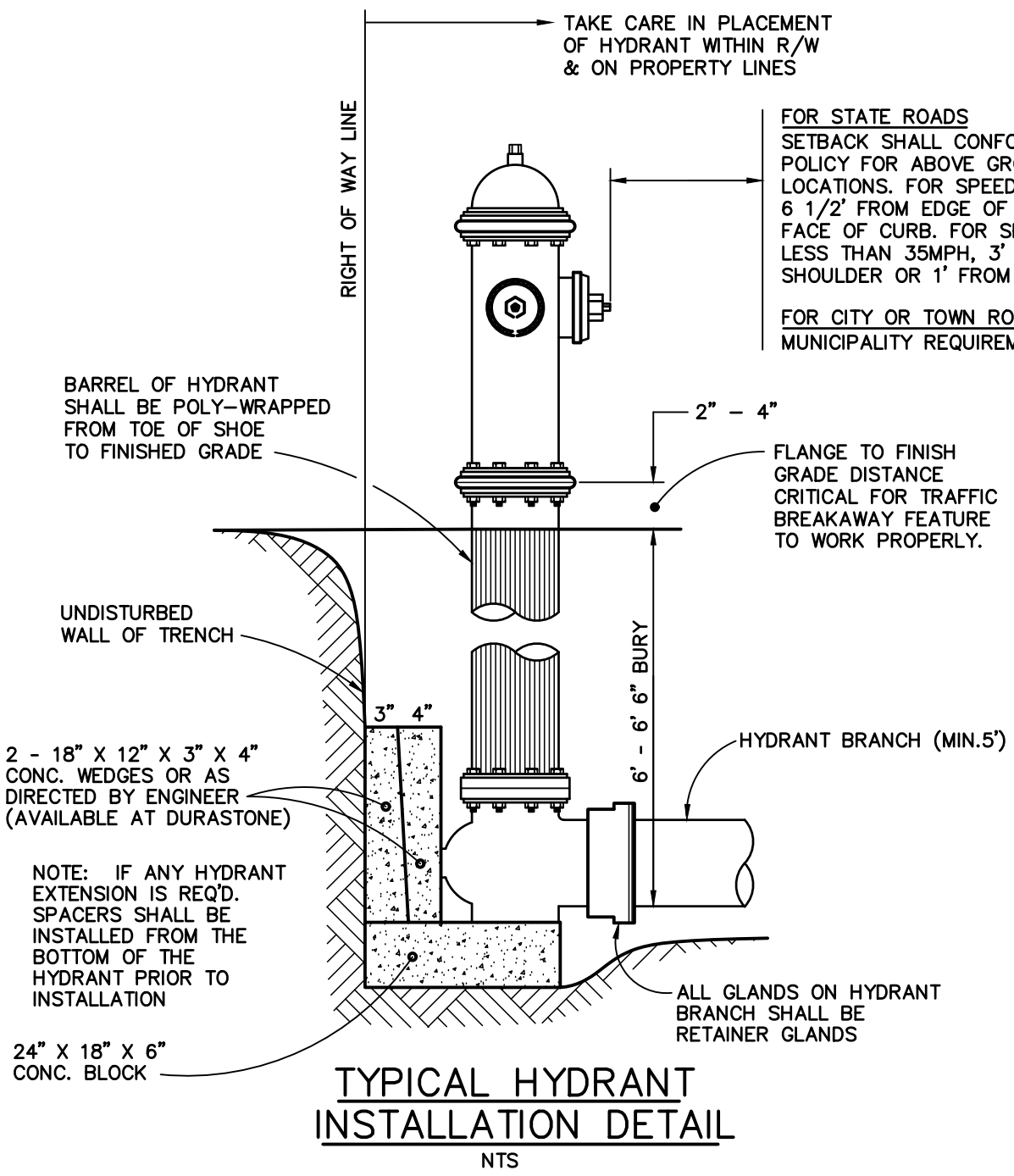
PRECAST CONCRETE  
SANITARY SEWER MANHOLE  
N.T.S.



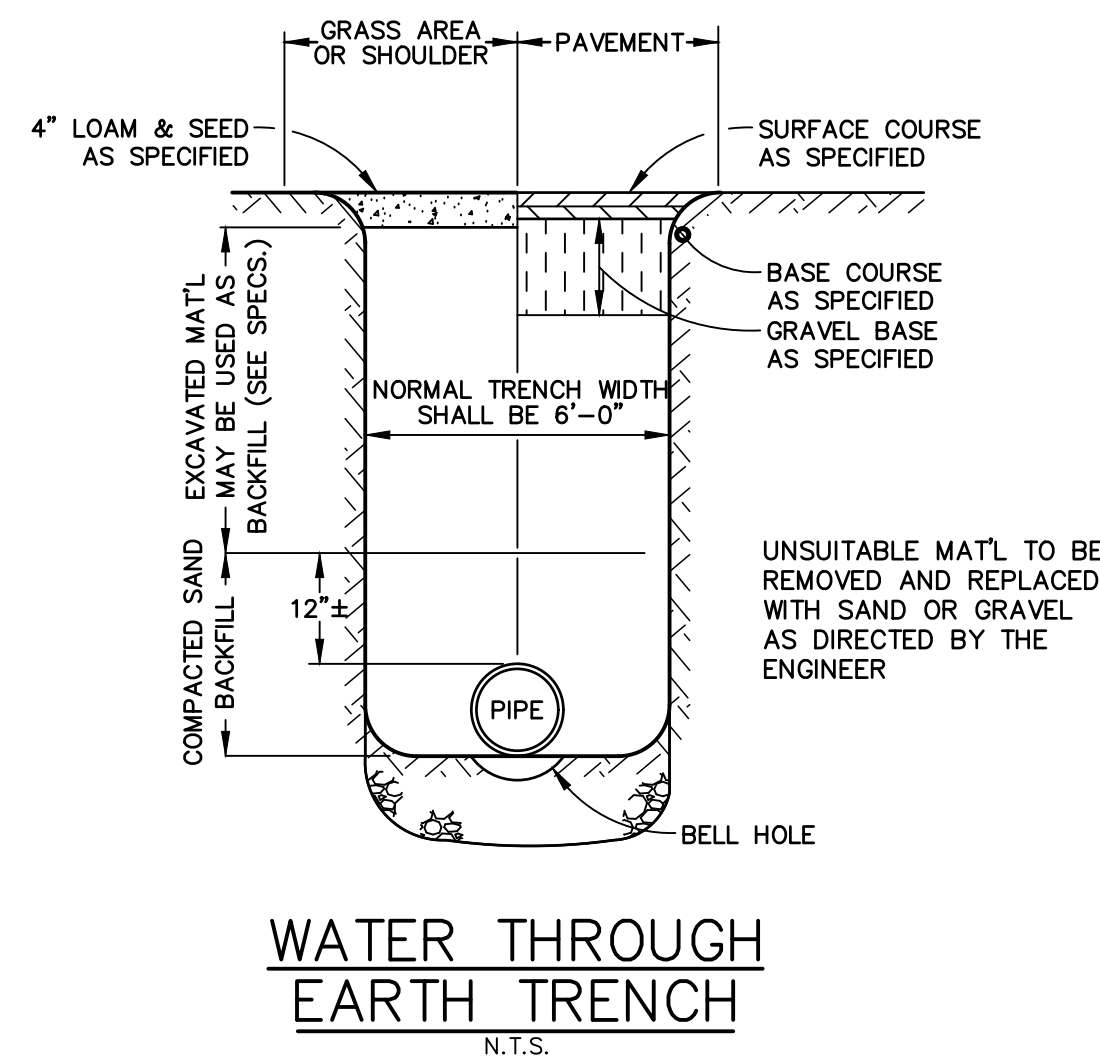
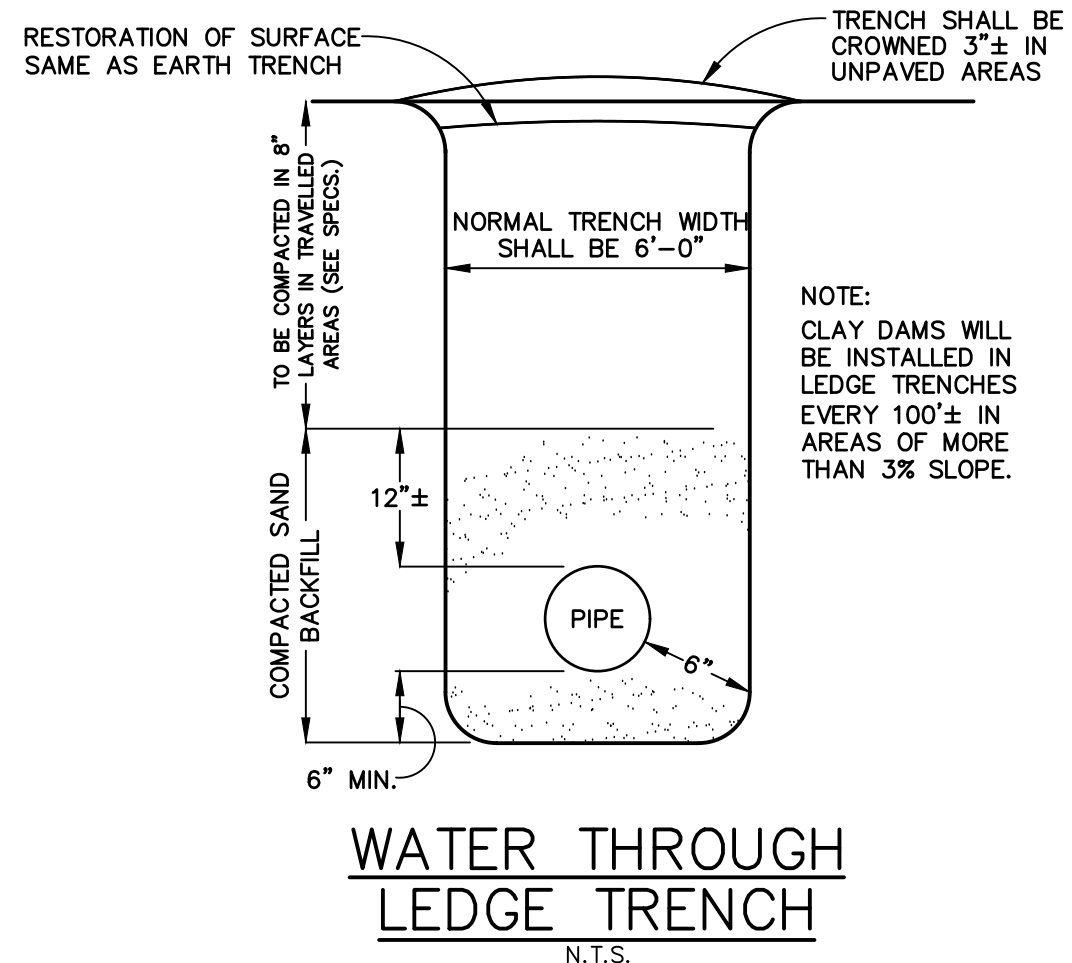
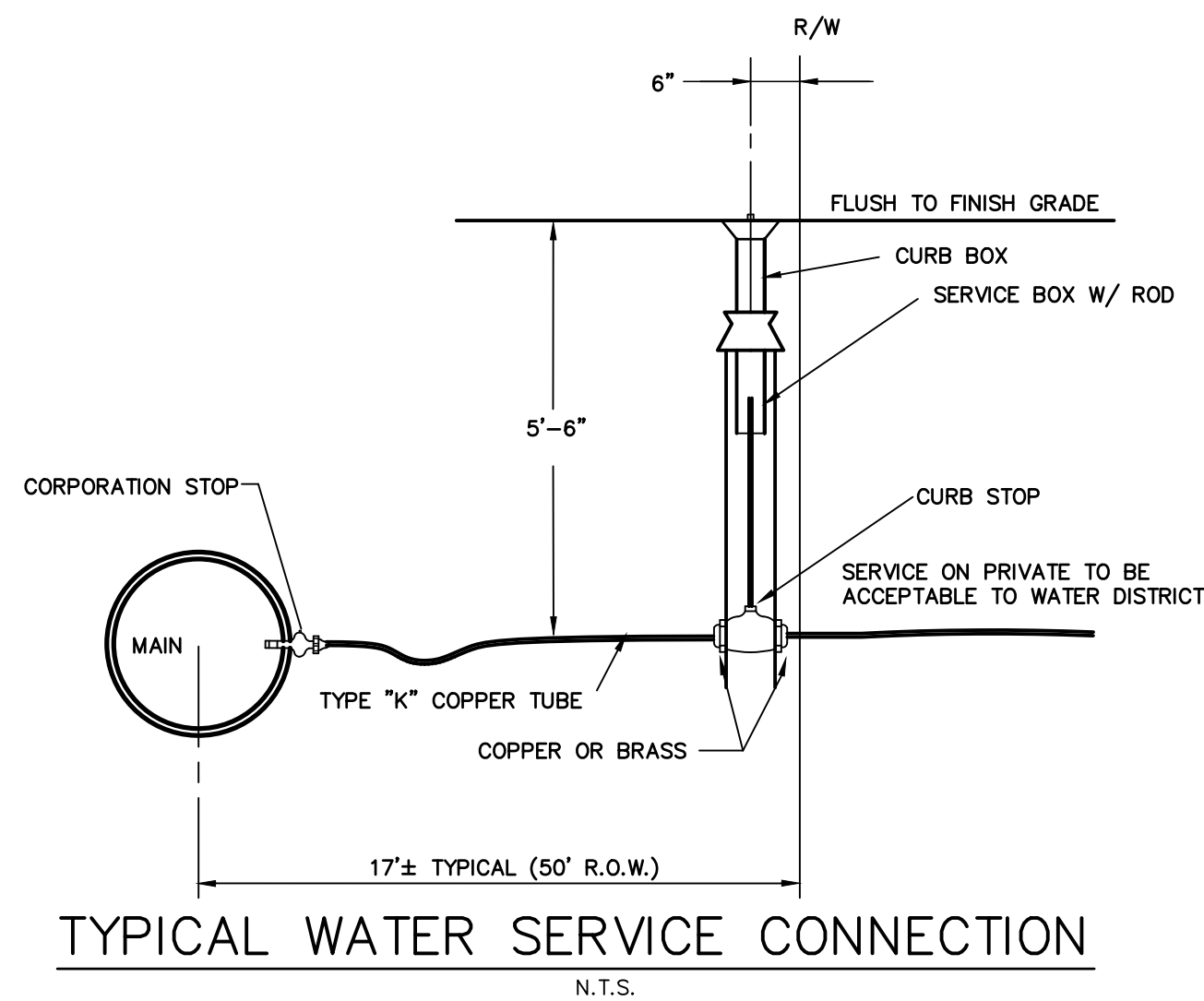
(MODEL DH071-93)  
E ONE LOW PRESSURE SEWER PUMP DETAIL  
NTS



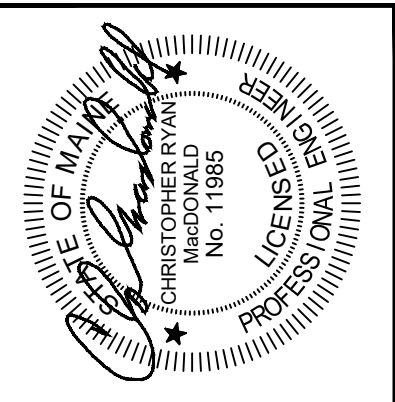
NOTE: SERVICE CONNECTIONS (DIRECT TAPS AND SERVICE CLAMPS) WILL BE INSTALLED SO THAT THE OUTLET IS AT AN ANGLE OF NOT MORE THAN 45° ABOVE THE HORIZONTAL. ALWAYS PUT A BEND OR "GOOSENECK" IN THE SERVICE LINE PRIOR TO CONNECTING TO PROVIDE FLEXIBILITY AND "GIVE" TO COUNTERACT THE EFFECTS OF A LOAD DUE TO SETTLEMENT OR EXPANSION AND/OR CONTRACTION (SEE DETAILS).



1 1/4" SDR 11 HDPE PIPE STAINLESS STEEL  
LOW PRESSURE SEWER LATERAL ASSEMBLY  
NTS



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FOR  
E & R Development Corp.  
P.O. Box 444  
Biddeford, Maine

**UTILITY DETAILS**

WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

|                         |                   |
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| DESIGNED<br>W. Pelkey   | DATE<br>Dec. 2020 |
| DRAWN<br>Dept.          | SCALE<br>As Noted |
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**EROSION AND SEDIMENT CONTROL PLAN**

THIS PLAN HAS BEEN DEVELOPED AS A STRATEGY TO CONTROL SOIL EROSION AND SEDIMENTATION DURING AND AFTER CONSTRUCTION. THIS PLAN IS BASED ON THE STANDARDS AND SPECIFICATIONS FOR EROSION PREVENTION IN DEVELOPING AREAS AS CONTAINED IN THE LATEST EDITION OF THE 2016 MAINE EROSION AND SEDIMENT CONTROL BMPs MANUAL FOR DESIGNERS AND ENGINEERS, AND THE LATEST REVISION TO THE 2014 MAINE EROSION AND SEDIMENT CONTROL FIELD GUIDE FOR CONTRACTORS. SEE MANUALS FOR ADDITIONAL INFORMATION AND DETAILS.

DURING CONSTRUCTION THE DEVELOPER/APPLICANT OR THEIR REPRESENTATIVES WILL BE RESPONSIBLE FOR IMPLEMENTING THE EROSION AND SEDIMENT CONTROL BMPs AS WELL AS ROUTINE INSPECTIONS AND MAINTENANCE OF THE BMPs.

THE PROPOSED LOCATIONS OF SILTATION AND EROSION CONTROL STRUCTURES ARE SHOWN ON THE SITE PLAN.

1. ALL CONSTRUCTION INSPECTIONS SHALL BE CONDUCTED BY SOMEONE WITH KNOWLEDGE OF EROSION AND STORMWATER CONTROL, INCLUDING STANDARDS AND PERMIT CONDITIONS. CONSTRUCTION INSPECTIONS SHALL BE PERFORMED AT LEAST ONCE A WEEK, AND PRIOR TO AND 24 HOURS AFTER A WEATHER EVENT (1 INCH OR MORE IN A 24 HOUR PERIOD). CONSTRUCTION INSPECTION AND CORRECTIVE ACTION DOCUMENTATION RECORDS SHALL BE MAINTAINED FOR A MINIMUM OF 5 YEARS.

2. THE SCOPE OF CONSTRUCTION INSPECTIONS INCLUDE THE EROSION AND SEDIMENTATION CONTROL MEASURES AS WELL AS DISTURBED AREAS, MATERIAL STORAGE AREAS, AND LOCATIONS WHERE VEHICLES ENTER AND EXIT THE SITE.

3. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE DONE IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMPs", DEPARTMENT OF ENVIRONMENTAL PROTECTION, LATEST REVISION.

4. THOSE AREAS UNDERGOING ACTUAL CONSTRUCTION WILL BE LEFT IN AN UNTREATED OR UNVEGETATED CONDITION FOR A MINIMUM TIME. AREAS SHALL BE PERMANENTLY STABILIZED WITHIN 7 DAYS OF FINAL GRADING AND TEMPORARILY STABILIZED WITHIN 7 DAYS OF INITIAL DISTURBANCE OF THE SOIL. IF THE DISTURBANCE IS WITHIN 75 FEET OF A WETLAND OR WATERBODY, THE AREA SHALL BE STABILIZED WITHIN 2 DAYS OR PRIOR TO ANY STORM EVENT, WHICHEVER COMES FIRST.

5. EXCAVATION AND EARTHWORK SHALL BE DONE SUCH THAT NO MORE THAN 1 ACRE OF THE SITE IS WITHOUT STABILIZATION AT ANY ONE TIME.

6. EXPOSED AREA SHOULD BE LIMITED TO THAT WHICH CAN BE MULCHED IN ONE DAY.

7. CONTINUATION OF EARTHWORK OPERATIONS ON ADDITIONAL AREAS SHALL NOT BEGIN UNTIL THE EXPOSED SOIL SURFACE ON THE AREA BEING WORKED HAS BEEN STABILIZED SUCH THAT NO MORE THAN ONE ACRE OF THE SITE IS WITHOUT EROSION CONTROL PROTECTION.

8. SEDIMENT BARRIERS (EROSION CONTROL MIX, STONE CHECK DAMS, STABILIZED CONSTRUCTION ENTRANCE, ETC.) SHOULD BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM. THE CONTRACTOR SHALL MAINTAIN THE STABILIZED CONSTRUCTION ENTRANCE UNTIL ALL DISTURBED AREAS ARE STABILIZED.

9. INSTALL EROSION CONTROL MIX AT TOP OF SLOPES TO FILTER SILT FROM RUNOFF. SEE E.C. MIX DETAIL FOR PROPER INSTALLATION. EROSION CONTROL MIX WILL REMAIN IN PLACE PER NOTE #1. THE USE OF AN EROSION CONTROL MIX BERM IS PROHIBITED AT THE BASE OF SLOPES STEEPER THAN 8X OR WHERE THERE IS FLOWING WATER.

10. ALL EROSION CONTROL STRUCTURES WILL BE INSPECTED, REPLACED, AND/OR REPAIRED EVERY 7 DAYS AND IMMEDIATELY BEFORE AND FOLLOWING ANY SIGNIFICANT RAINFALL (0.5 INCH OR MORE IN A 24-HOUR PERIOD) OR SNOW MELT OR WHEN NO LONGER SERVICEABLE DUE TO SEDIMENT ACCUMULATION OR DECOMPOSITION. IF AN INSPECTION DETERMINES THAT A CORRECTIVE ACTION IS REQUIRED, THE ACTION OR REPAIR SHALL BE STARTED BY THE END OF THE NEXT WORKDAY AND COMPLETED WITHIN SEVEN DAYS OR BEFORE THE NEXT STORM EVENT. SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH STORM EVENT. THEY MUST BE REMOVED WHEN DEPOSITS REACH APPROXIMATELY ONE HALF THE HEIGHT OF THE BARRIER. SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL AREAS UPSLOPE ARE STABILIZED BY TURF. EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS OF PERMANENT STABILIZATION. PERMANENT STABILIZATION IS 90% GRASS CATCH IN VEGETATED AREAS.

11. NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN ONE AND ONE HALF TO ONE (1.5 TO 1).

12. IF FINAL SEEDING OF THE DISTURBED AREAS IS NOT COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST, USE TEMPORARY MULCHING (DORMANT SEEDING MAY BE ATTEMPTED AS WELL) TO PROTECT THE SITE AND DELAY SEEDING UNTIL THE NEXT RECOMMENDED SEEDING PERIOD.

13. TEMPORARY SEEDING OF DISTURBED AREAS THAT HAVE NOT BEEN FINAL GRADDED SHALL BE COMPLETED BY AUG. 15 OR 45 DAYS PRIOR TO THE FIRST KILLING FROST (OCT. 1) TO PROTECT FROM SPRING RUNOFF PROBLEMS.

14. DURING THE CONSTRUCTION PHASE, INTERCEPTED SEDIMENT WILL BE RETURNED TO THE SITE AND REGRADED ONTO OPEN AREAS. POST SEEDING SEDIMENT, IF ANY, WILL BE DISPOSED OF IN AN ACCEPTABLE MANNER.

15. REVEGETATION MEASURES WILL COMMENCE UPON COMPLETION OF CONSTRUCTION EXCEPT AS NOTED ABOVE. ALL DISTURBED AREAS NOT OTHERWISE STABILIZED WILL BE GRADED, SMOOTHED, AND PREPARED FOR FINAL SEEDING AS FOLLOWS:

- FOUR INCHES OF LOAM WILL BE SPREAD OVER DISTURBED AREAS AND SMOOTHED TO A UNIFORM SURFACE.
- APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST. IF SOIL TESTING IS NOT FEASIBLE ON SMALL OR VARIABLE SITES, OR WHERE THINGS ARE CRITICAL, FERTILIZER MAY BE APPLIED AT THE RATE OF 800 POUNDS PER ACRE OF 18.4 POUNDS PER 1000 SQUARE FEET USING 10-20-20 (N-P20S-K20) OR EQUIVALENT. APPLY GROUND LIMESTONE (EQUIVALENT TO 50% CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF 3 TONS PER ACRE (136 LB PER 1,000 SQ. FT.).
- FOLLOWING SEED BED PREPARATION, DITCHES AND BACK SLOPES WILL BE SEEDING TO A MIXTURE OF 47% CREEPING RED FESCUE, 5% RED FESCUE, AND 48% TALL FESCUE. THE LAWN AREA WILL BE SEEDING TO A MIXTURE OF 44% KENTUCKY BLUEGRASS, 44% CREEPING RED FESCUE, AND 12% PERENNIAL RYEGRASS. SEEDING RATE IS 1.03 LBS PER 1000 SQ. FT. LAWN QUALITY SOO MAY BE SUBSTITUTED FOR SEED. SEED MIX SHALL CONTAIN 10% ANNUAL RYE GRASS.
- HAY MULCH AT THE RATE OF 70-80 LBS PER 1000 SQUARE FEET FOR OVER 75% COVERAGE. FOR UNPROTECTED OR WINDY AREAS, ANCHOR MULCH WITH PEG AND TWINE (1 SQ. YD. BLOCK). HYDRAULIC MULCHES MAY ALSO BE USED. APPLIED AT A RATE OF 5 LBS PER 1000 SQUARE FEET FOR PAPER MULCH OR 40 LBS PER 1000 SQUARE FEET OR AS DIRECTED BY THE MANUFACTURER. ON SLOPES GREATER THAN 3:1 EROSION CONTROL MIX MAY BE USED, SEE EROSION CONTROL MIX NOTES BELOW.
- FOR DISTURBED AREAS TO BE MAINTAINED IN POST-CONSTRUCTION AS A MEADOW BUFFER, APPLY NEW ENGLAND CONSERVATION WILDLIFE MIX BY NEW ENGLAND WETLAND PLANTS, INC., OF AMHERST, MASSACHUSETTS OR APPROVED EQUAL.

14. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS ONCE THE SITE IS STABILIZED WITH 90% GRASS CATCH IN VEGETATED AREAS. TEMPORARY EROSION AND SEDIMENT CONTROL BLANKET SHALL BE USED IN ALL DITCHES AND SWALES AS SHOWN IN DETAILS.

15. WETLANDS WILL BE PROTECTED WITH EROSION CONTROL MIX OR SILT FENCE INSTALLED AT THE EDGE FOR THE WETLAND OR THE BOUNDARY OF WETLAND DISTURBANCE. ALL AREAS WITHIN 75 FEET OF A PROTECTED NATURAL RESOURCE MUST BE PROTECTED WITH A DOUBLE ROW OF SEDIMENT BARRIERS DURING WINTER CONSTRUCTION.

16. ALL STORMWATER WILL BE PREVENTED FROM RUNNING INTO STOCKPILES. SEDIMENT BARRIERS WILL BE INSTALLED DOWNGRADIENT OF ALL STOCKPILES.

17. PERMANENT POST-CONSTRUCTION BMPs (VEGETATED SWALES, WET PONDS, ETC.) WILL NOT BE USED TO MANAGE FLOWS DURING CONSTRUCTION WITHOUT SPECIAL PROTECTION AND/OR RESTORATION.

**ADDITIONAL TEMPORARY SEED MIXTURE (FOR PERIODS LESS THAN 12 MONTHS)**

| SEASON                               | SEED                  | RATE          |
|--------------------------------------|-----------------------|---------------|
| SUMMER (5/15 - 8/15)                 | SUDAN GRASS           | 40 LBS/ACRE   |
|                                      | CATS                  | 80 LBS/ACRE   |
| LATE SUMMER/EARLY FALL (8/15 - 9/15) | PERENNIAL RYEGRASS    | 40 LBS/ACRE   |
| FALL (9/15 - 11/1)                   | WINTER RYE            | 112 LBS/ACRE  |
| WINTER (11/1 - 4/1)                  | MULCH W/ DORMANT SEED | 80 LBS/ACRE** |
| SPRING (4/1 - 7/1)                   | CATS                  | 80 LBS/ACRE   |
|                                      | ANNUAL RYEGRASS       | 40 LBS/ACRE   |

\*\*SEED RATE ONLY

**EROSION CONTROL MIX**

EROSION CONTROL MIX (ECM) SHALL MEET THE REQUIREMENTS PROVIDED IN THE LATEST REVISION OF MAINE DEP'S EROSION AND SEDIMENTATION CONTROL BMP MANUAL. ECM IS ACCEPTABLE FOR SLOPES UP TO 3:1 BUT LESS THAN 2:1. ECM SHALL CONSIST OF WELL-GRADED ORGANIC COMPONENT 50 - 100% OF DRY WEIGHT, AND COMPRISED OF FIBROUS AND ELONGATED FRAGMENTS. ECM SHALL BE SPREAD FROM RUNOFF TO PLANT GROWTH OR CONSTRUCTION DEBRIS. ECM SHALL BE EVENLY DISTRIBUTED AND APPLIED AT A THICKNESS OF 2" ON 3:1 SLOPES, WITH AN ADDITIONAL 1/2" PER 20" OF SLOPE FOR A MAXIMUM OF 100" IN LENGTH. SLOPES GREATER THAN 3:1, ECM SHALL BE APPLIED AT THICKNESS OF 4" OR 5" FOR SLOPES GREATER THAN 60" IN LENGTH.

NO SLOPES, EITHER PERMANENT OR TEMPORARY, SHALL BE STEEPER THAN ONE AND ONE HALF TO ONE (1.5:1). EROSION CONTROL MIX IS AN ACCEPTABLE STABILIZATION MEASURE FOR SLOPES UP TO 3:1, WITH LIMITS THAT ARE COVERED BY NOTES ON THIS SHEET. SLOPES BETWEEN 3:1 AND 2:1 SHALL BE STABILIZED WITH EROSION CONTROL BLANKETS, AND ALL SLOPES GREATER THAN 2:1 SHALL BE STABILIZED WITH RIPRAP. SEE SLOPE STABILIZATION DETAIL FOR ADDITIONAL INFORMATION.

**WOOD STAKE (36" MAX.)**

**WITH TRENCHING**

**WITHOUT TRENCHING**

**END POST DETAIL**

1. KEY FABRIC IN A 6"x6" TRENCH W/ BACKFILL.

2. SILT FENCE SHALL BE A 3" FENCE OF 120LB/M (W) REINFORCED BACK OF 6" WIRE MESH, POSTS 6' O.C. MAX OR 200LB/M (W/O REINFORCED POSTS 6' O.C. MAX).

**SILT FENCE DETAIL**

**N.T.S.**

**PIPE INLET/OUTLET PROTECTION**

**N.T.S.**

**STONE CHECK DAM DETAIL**

**N.T.S.**

**EROSION CONTROL DURING CONSTRUCTION**

**WINTER CONSTRUCTION**

1. WINTER CONSTRUCTION PERIOD: NOVEMBER 1 THROUGH APRIL 15

2. OVERWINTER STABILIZATION OF DITCHES AND CHANNELS:

A. ALL STONE-LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. ALL GRASS LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. IF A DITCH OR CHANNEL IS NOT GRASS LINED BY SEPTEMBER 1, THEN ONE OF THE FOLLOWING ACTIONS MUST BE TAKEN TO STABILIZE THE DITCH FOR LATE FALL AND WINTER:

A. INSTALL A SOO LINING IN THE DITCH.

A DITCH MUST BE LINED WITH PROPERLY INSTALLED SOO BY OCTOBER 1. PROPER INSTALLATION INCLUDES: PINNING THE SOO ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOO TO GUARANTEE CONTACT BETWEEN THE SOO AND UNDERLYING SOIL, AND WATERING THE SOO TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL, AND ANCHORING SOO AT THE BASE OF THE DITCH WITH JUTE OR PLASTIC MESH TO PREVENT THE SOO FROM SLOUGHING DURING FLOW CONSTRUCTION. SEE THE PERMANENT VEGETATION BMP SECTION.

B. INSTALL A STONE LINING IN THE DITCH.

A DITCH MUST BE LINED WITH STONE RIPRAP BY NOVEMBER 15. A REGISTERED PROFESSIONAL ENGINEER MUST BE CONSULTED TO DETERMINE THE STONE SIZE AND LAYING THICKNESS NEEDED TO WITHSTAND THE ANTICIPATED FLOW VELOCITIES AND FLOW DEPTHS WITHIN THE DITCH. IF NECESSARY, THE CONTRACTOR MUST REGRADE THE DITCH PRIOR TO PLACING THE STONE LINING SOO TO PREVENT THE STONE LINING FROM REDUCING THE DITCH'S CROSS-SECTIONAL AREA.

3. OVERWINTER STABILIZATION OF DISTURBED SLOPES:

ALL STONE-COVERED SLOPES MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. ALL SLOPES TO BE VEGETATED MUST BE SEEDING AND MULCHED BY SEPTEMBER 1. THE DISTURBED SLOPE MUST BE SEEDING AND MULCHED BY SEPTEMBER 1. IF THE DISTURBED SLOPE IS GREATER THAN 15% TO BE A SLOPE, IF A SLOPE TO BE VEGETATED IS NOT STABILIZED BY SEPTEMBER 1, THEN ONE OF THE FOLLOWING ACTIONS MUST BE TAKEN TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER: STABILIZE THE SOIL WITH TEMPORARY VEGETATION AND EROSION CONTROL MATS. BY OCTOBER 1 THE DISTURBED SLOPE MUST BE SEEDING AND MULCHED AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET AND THEN INSTALL EROSION CONTROL MATS OR ANCHORED MULCH OVER THE SEEDING. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR FAILS TO COVER AT LEAST 75% OF THE SLOPE BY NOVEMBER 1, THEN THE CONTRACTOR WILL COVER THE SLOPE WITH A LAYER OF EROSION CONTROL MIX OR WITH STONE RIPRAP AS DESCRIBED BELOW.

A. STABILIZE THE SOIL WITH SOO:

THE DISTURBED SLOPE MUST BE STABILIZED WITH PROPERLY INSTALLED SOO BY OCTOBER 1. PROPER INSTALLATION INCLUDES: PINNING THE SOO ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOO TO GUARANTEE CONTACT BETWEEN THE SOO AND UNDERLYING SOIL, AND WATERING THE SOO TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL. THE SOO MUST BE LINED WITH STONE RIPRAP OR HAVING GROUNDWATER SEEPS ON THE SOLE FACE.

B. STABILIZE THE SOIL WITH EROSION CONTROL MIX:

EROSION CONTROL MIX MUST BE PROPERLY INSTALLED BY NOVEMBER 15. THE CONTRACTOR WILL NOT USE EROSION CONTROL MIX TO STABILIZE SLOPES HAVING GREATER THAN SOO (2% TO 1) OR HAVING GROUNDWATER SEEPS ON THE SOLE FACE. SEE THE EROSION CONTROL MIX NOTES FOR ADDITIONAL CRITERIA.

C. STABILIZE THE SOIL WITH STONE RIPRAP:

PLACE A LAYER OF STONE RIPRAP ON THE SOLE BY NOVEMBER 15. THE DEVELOPMENT'S OWNER WILL HAVE A REGISTERED PROFESSIONAL ENGINEER TO DETERMINE THE STONE SIZE NEEDED FOR STABILITY ON THE SLOPE AND TO DESIGN A FILTER LAYER FOR UNDERNEATH THE RIPRAP.

4. OVERWINTER STABILIZATION OF DISTURBED SLOPES:

ALL STONE-COVERED SLOPES MUST BE CONSTRUCTED AND STABILIZED BY NOVEMBER 15. ALL SLOPES TO BE VEGETATED MUST BE SEEDING AND MULCHED BY SEPTEMBER 1. IF THE DISTURBED AREAS ARE NOT STABILIZED BY THAT DATE, THEN ONE OF THE FOLLOWING ACTIONS MUST BE TAKEN TO STABILIZE THE SLOPE FOR LATE FALL AND WINTER: STABILIZE THE SOIL WITH TEMPORARY VEGETATION:

BY OCTOBER 1, SEED THE DISTURBED SLOPE WITH WINTER RYE AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET. LIGHTLY MULCH THE SEEDED SLOPE WITH HAY OR STRAW AT 75 POUNDS PER 1000 SQUARE FEET, AND ANCHOR THE MULCH WITH PLASTIC NETTING. MONITOR GROWTH OF THE RYE. IF THE RYE FAILS TO GROW AT LEAST THREE INCHES OR FAILS TO COVER AT LEAST 75% OF THE SLOPE BY NOVEMBER 1, THEN MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED BELOW.

B. STABILIZE THE SOIL WITH SOO:

THE DISTURBED SLOPE MUST BE STABILIZED WITH PROPERLY INSTALLED SOO BY OCTOBER 1. PROPER INSTALLATION INCLUDES: PINNING THE SOO ONTO THE SOIL WITH WIRE PINS, ROLLING THE SOO TO GUARANTEE CONTACT BETWEEN THE SOO AND UNDERLYING SOIL, AND WATERING THE SOO TO PROMOTE ROOT GROWTH INTO THE DISTURBED SOIL.

C. STABILIZE THE SOIL WITH MULCH:

BY NOVEMBER 15, MULCH THE DISTURBED SLOPE 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. IMMEDIATELY AFTER APPLYING THE MULCH, COVER THE MULCH WITH PLASTIC NETTING TO PREVENT THE MULCH FROM MOVING. MULCH THE AREA FOR OVER-WINTER PROTECTION AS DESCRIBED BELOW.

5. MAINTENANCE:

IF AN INSPECTION DETERMINES THAT A CORRECTIVE ACTION IS REQUIRED, THE ACTION OR REPAIR SHALL BE STARTED BY THE END OF THE NEXT WORKDAY AND COMPLETED WITHIN SEVEN DAYS OR BEFORE THE NEXT STORM EVENT. MAINTENANCE MEASURES SHALL BE APPLIED AS NEEDED DURING THE ENTIRE CONSTRUCTION SEASON, ONCE A WEEK AND BEFORE AND AFTER EACH RAINFALL, SNOW STORM OR PERIOD OF THAWING AND RUNOFF. THE SITE CONTRACTOR SHALL PERFORM A VISUAL INSPECTION OF ALL INSTALLED EROSION CONTROL MEASURES AND PERFORM REPAIRS AS NEEDED TO INSURE THEIR CONTINUOUS FUNCTION DURING THE TEMPORARY AND/OR FINAL SEEDING AND MULCHING. THE CONTRACTOR SHALL, IN THE SPRING, INSPECT AND REPAIR ANY DAMAGES AND/OR BARE SPOTS. AN ESTABLISHED VEGETATIVE COVER MEANS A MINIMUM OF 85 TO 90% OF AREAS VEGETATED WITH VIGOROUS GROWTH.

**STABILIZATION SCHEDULE BEFORE WINTER:**

SEPTEMBER 15

ALL DISTURBED AREAS MUST BE SEEDING AND MULCHED.

OCTOBER 1

IF THE SLOPE IS STABILIZED WITH AN EROSION CONTROL BLANKET AND SEEDING, ALL DISTURBED AREAS TO BE PROTECTED WITH AN ANNUAL GRASS MUST BE SEEDING AT A SEEDING RATE OF 3 POUNDS PER 1000 SQUARE FEET AND MULCHED.

NOVEMBER 15

ALL STONE LINED DITCHES AND CHANNELS MUST BE CONSTRUCTED AND STABILIZED. SLOPES THAT ARE COVERED WITH RIPRAP MUST BE CONSTRUCTED BY THAT DATE.

6. DURING WINTER CONSTRUCTION PERIOD ALL SNOW SHALL BE REMOVED FROM AREAS OF SEEDING AND MULCHING PRIOR TO PLACEMENT.

7. AREAS WITHIN 75 FEET OF STREAMS, WETLANDS, AND OTHER PROTECTED NATURAL RESOURCES THAT ARE NOT STABILIZED WITH VEGETATION BY DEC. 1 SHALL BE STABILIZED WITH NETTING. IF WORK CONTINUES IN THIS AREA DURING THE WINTER, A DOUBLE LINE OF SEDIMENT BARRIERS MUST BE USED.

**HOUSEKEEPING**

1. SPILL PREVENTION: CONTROLS MUST BE USED TO PREVENT POLLUTANTS FROM BEING DISCHARGED FROM MATERIALS 1" ON SITE, INCLUDING STORAGE PRACTICES TO MINIMIZE EXPOSURE OF THE MATERIALS TO STORMWATER, AND APPROPRIATE SPILL PREVENTION, CONTAINMENT, AND RESPONSE PLANNING AND IMPLEMENTATION.

2. 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 TOXICITY, FACTOR OTHER RELEVANT FACTORS ACCUMULATE RUNOFF THAT INFILTRATES INTO THE SOIL DICES, BERMS, Sumps, AND OTHER FORMS OF SECONDARY CONTAMINANT THAT PREVENT DISCHARGE TO GROUNDWATER MAY BE USED TO ISOLATE PORTIONS OF THE SITE FOR THE PURPOSES OF STORAGE AND HANDLING OF THESE MATERIALS.

3. 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, ANY OFFSITE TRACKING OF MUD OR SEDIMENT SHALL BE VACUUMED IMMEDIATELY AND PRIOR TO THE NEXT SIGNIFICANT STORM EVENT.

4. DEBRIS AND OTHER MATERIALS: LITTER, CONSTRUCTION DEBRIS, AND CHEMICALS EXPOSED TO STORMWATER MUST BE PREVENTED FROM BECOMING A POLLUTANT SOURCE.

5. TRENCH OR FOUNDATION DE-WATERING: TRENCH DE-WATERING IS THE REMOVAL OF WATER FROM TRENCHES, FOUNDATIONS, COTTER DAMS, PONDERS, AND OTHER AREAS WITHIN THE CONSTRUCTION AREA THAT RETAIN WATER AFTER EXCAVATION. IN MOST CASES THE COLLECTED WATER IS HEAVILY SILETED AND HINDERS CORRECT SAFE CONSTRUCTION PRACTICES. THE COLLECTED WATER MUST BE REMOVED FROM THE SITE THROUGH GRAVITY OR PUMPING, AND 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 COTTERDAM SEDIMENTATION BASIN. AVOID ALLOWING THE WATER TO FLOW OVER DISTURBED AREAS OF THE SITE. EQUIVALENT MEASURES MAY BE TAKEN IF APPROVED BY THE DEPARTMENT.

6. NON-STORMWATER DISCHARGES: IDENTIFY AND PREVENT CONTAMINATION BY NON-STORMWATER DISCHARGES, WHERE ALLOWED NON-STORMWATER DISCHARGES 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:

- DISCHARGES FROM FIREFIGHTING ACTIVITY;
- FIRE HYDRANT FLUSHINGS;
- VEHICLE WASHWATER IF DETERGENTS ARE NOT USED AND WASHING IS LIMITED TO THE EXTERIOR OF VEHICLES (ENGINE, UNDERCARRIAGE AND TRANSMISSION WASHING IS PROHIBITED);
- DUST CONTROL RUNOFF IN ACCORDANCE WITH PERMIT CONDITIONS AND APPENDIX (C)(3) OF MAINE DEP 06-096 CHAPTER 500;
- ROUTINE EXTERNAL BUILDING WASH-DOWN, NOT INCLUDING SURFACE PAINT REMOVAL, THAT DOES NOT INVOLVE DETERGENTS;
- 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;
- UNCONTAMINATED AIR CONDITIONING OR COMPRESSOR CONDENSATE;
- UNCONTAMINATED GROUNDWATER OR SPRING WATER;
- FOUNDATION OR FOOTER DRAIN-WATER WHERE FLOWS ARE NOT CONTAMINATED;
- UNCONTAMINATED EXCAVATION DETERMINING (SEE REQUIREMENTS IN APPENDIX (C5) MAINE DEP 06-096 CHAPTER 500);
- POTABLE WATER SOURCES INCLUDING WATERLINE FLUSHINGS; AND
- LANDSCAPE IRRIGATION.

7. 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 (C6) MAINE DEP 06-096 CHAPTER 500. SPECIFICALLY, THE DEPARTMENTS APPROVAL DOES NOT AUTHORIZE DISCHARGES OF THE FOLLOWING:

- WASTEWATER FROM THE WASHOUT OR CLEANOUT OF CONCRETE, STUCCO, PAINT, FORM RELEASE OILS, CURING COMPOUNDS OR OTHER CONSTRUCTION MATERIALS;
- FUELS, OILS OR OTHER POLLUTANTS USED IN VEHICLE AND EQUIPMENT OPERATION AND MAINTENANCE;
- SOAPS, SOLVENTS, OR DETERGENTS USED IN VEHICLE AND EQUIPMENT WASHING; AND
- TOXIC OR HAZARDOUS SUBSTANCES FROM A SPILL OR OTHER RELEASE.

8. ADDITIONAL REQUIREMENTS: ADDITIONAL REQUIREMENTS MAY BE APPLIED ON A SITE-SPECIFIC BASIS.

**GRASSED UNDERDRAIN SOIL FILTER NOTES**

**REFERENCES**

1. MAINE STORMWATER BEST MANAGEMENT PRACTICES (BMP), VOLUME III BMP TECHNICAL DESIGN MANUAL, CHAPTER 7 FILTRATION BMPs (LATEST REVISION).

**CONSTRUCTION METHODS**

1. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MATERIALS, INSTALLATION, MEANS, METHODS, AND SCHEDULING.

2. ALL WORK SHALL BE IN CONFORMANCE WITH THE PROJECT PLANS AND BMPs REFERENCED ABOVE.

3. THE SOIL FILTER MEDIA AND VEGETATION SHALL NOT BE INSTALLED UNTIL THE AREA THAT DRAINS TO THE FILTER HAS BEEN PERMANENTLY STABILIZED WITH PAVEMENT OR OTHER STRUCTURES, 90% VEGETATION COVER OR PERMANENT STABILIZATION.

**DE-WATERING PLAN**

1. DURING CONSTRUCTION OF THE SITE AND VEGETATED SOIL FILTER, THE CONTRACTOR SHALL BE PREPARED TO IMPLEMENT A DE-WATERING PLAN IN ANTICIPATION OF HEAVY RAIN EVENTS.

2. THE AREA OF THE BASIN MAY BE EXCAVATED IN PREPARATION OF THE INSTALLATION OF THE UNDERDRAIN AND MAY BE USED FOR A SEDIMENT TRAP FOR THE SITE DURING CONSTRUCTION. AFTER EXCAVATION OF THE BASIN, THE OUTLET STRUCTURE AND PIPING SYSTEM SHALL BE INSTALLED AT THE APPROPRIATE ELEVATION AND PROTECTED WITH A SEDIMENT BARRIER. THE BASIN IS TO BE USED AS A SEDIMENT TRAP, THE SIDES OF THE EMBANKMENTS MUST BE MULCHED AND MAINTAINED TO PREVENT EROSION.

**SOIL MEDIA**

1. THE SOIL MEDIA SHALL CONSIST OF SILTY SANDY SOIL OR SOIL MIXTURE COMBINED WITH 20% TO 25% BY VOLUME (NO LESS THAN 10% BY DRY WEIGHT) OF MODERATELY SHREDDED BARK OR WOOD FIBER MULCH.

2. THE SOIL FILTER MEDIA SAND SHALL MEET THE GRADATION IN TABLE 7-2 (MOOT 703.01) WITH ADDITIONAL FINES ADDED IF NECESSARY.

3. THE RESULTING SOIL FILTER MEDIA SHALL HAVE 8X TO 12X BY WEIGHT PASSING THE #200 SIEVE AND SHALL HAVE A CLAY CONTENT OF LESS THAN 2%.

4. THE COARSE GRAVEL MATERIAL SHALL MEET THE GRADATION OF TABLE 7.1 (MOOT 703.22 UNDERDRAIN, TYPE B).

5. THE FILTER MEDIA SHALL BE LIGHTLY COMPACTED BY SATURATING THE MEDIA IN 6" TO 9" LIFTS AND SHALL HAVE A PERMEABILITY OF 2.4 IN/IN TO 4 IN/IN.

6. THE CLAY CONTENT SHALL BE < 2%.

**CONSTRUCTION**

1. SOIL FILTER MEDIA, COARSE GRAVEL, AND UNDERDRAIN BEDDING MATERIAL SHALL BE COMPACTED TO BETWEEN 90% AND 92% STANDARD PROCTOR.

2. PERFORATED UNDERDRAIN PIPE SHALL BE 4" AND 6" SCHEDULE 40 OR SDR 35 PVC PIPE. SPACED 8 FEET AND 4 FEET ON CENTER AS SHOWN ON PLANS.

3. TRIBUTARY AREAS SHALL BE STABILIZED PRIOR TO INSTALLATION OF THE SOIL FILTER MEDIA MIXTURE AND UNDERDRAIN. STABILIZED IS DEFINED AS PAVED IF IN A PARKING AREA OR ROADWAY AND 90% GRASS CATCH IF IN A VEGETATED AREA.

4. OUTFLOW OF THE VEGETATED SOIL FILTER SHALL BE CONTROLLED BY A 2" PLASTIC TYPE 3-6 BALL VALVE WITH TYPE #15 BALL VALVE HANDLE EXTENSION (AVAILABLE FROM E.J. PRESCOTT OR EQUIVALENT). A THREE-PIECE VALVE BOX (AVAILABLE FROM E.J. PRESCOTT OR EQUIVALENT) SHALL BE INSTALLED OVER THE VALVE.

5. ALL EQUIPMENT USED WITHIN THE LIMITS OF THE VEGETATED SOIL FILTER SHALL BE LOW GROUND PRESSURE VEHICLES (LESS THAN 2.0 PSI) WHEN FULLY LOADED.

6. IF VEGETATION IS NOT ESTABLISHED WITHIN THE FIRST YEAR, THE CONTRACTOR SHALL INSTALL A 2-3 INCH LAYER OF RE-SEED/MULCH.

7. THE SURFACE OF THE VEGETATED SOIL FILTER SHALL BE PLANTED WITH A GRASS SPECIES THAT IS TOLERANT OF FREQUENT INUNDATION AND WELL-DRAINED SOILS. UPON SEEDING, THE SURFACES SHALL BE MULCHED WITH HAY OR AN EROSION CONTROL BLANKET BUT SHALL NOT BE FERTILIZED. AN APPROPRIATE SEED MIXTURE SHOULD CONTAIN THE FOLLOWING OR BE AN EQUIVALENT CONSERVATION TYPE MIX:

**TABLE 7-1 UNDERDRAIN SPECS. MOOT #703.22**

| SEWE SIZE         | S.B. WEIGHT |
|-------------------|-------------|
| UNDERDRAIN TYPE B |             |
| 1"                | 80-100      |
| 1 1/2"            | 75-100      |
| 2"                | 60-100      |
| 3"                | 50-100      |
| 4"                | 40-100      |
| 6"                | 30-100      |
| 8"                | 20-100      |
| 10"               | 15-100      |
| 12"               | 10-100      |
| 14"               | 5-100       |
| 16"               | 5-100       |

**TABLE 7-2 AGGREGATE SPECS. MOOT #703.01**

| SEWE SIZE         | S.B. WEIGHT |
|-------------------|-------------|
| UNDERDRAIN TYPE C |             |
| 1"                | 80-100      |
| 1 1/2"            | 75-100      |
| 2"                | 60-100      |
| 3"                | 50-100      |
| 4"                | 40-100      |
| 6"                | 30-100      |
| 8"                | 20-100      |
| 10"               | 15-100      |
| 12"               | 10-100      |
| 14"               | 5-100       |
| 16"               | 5-100       |

**TABLE 7-4 COARSE LOAMY SAND SIEVE ANALYSIS SPECIFICATION**

| SEWE SIZE | % PASSING BY WEIGHT |
|-----------|---------------------|
| #10       | 100                 |
| #20       | 100                 |
| #40       | 100                 |
| #60       | 100                 |
| #80       | 100                 |
| #100      | 100                 |
| #150      | 100                 |
| #200      | 100                 |
| #250      | 100                 |
| #300      | 100                 |
| #350      | 100                 |
| #400      | 100                 |
| #450      | 100                 |
| #500      | 100                 |
| #550      | 100                 |
| #600      | 100                 |
| #650      | 100                 |
| #700      | 100                 |
| #750      | 100                 |
| #800      | 100                 |
| #850      | 100                 |
| #900      | 100                 |
| #950      | 100                 |
| #1000     | 100                 |
| #1050     | 100                 |
| #1100     | 100                 |
| #1150     | 100                 |
| #1200     | 100                 |
| #1250     | 100                 |
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| #1400     | 100                 |
| #1450     | 100                 |
| #1500     | 100                 |
| #1550     | 100                 |
| #1600     | 100                 |
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| #1750     | 100                 |
| #1800     | 100                 |
| #1850     | 100                 |
| #1900     | 100                 |
| #1950     | 100                 |
| #2000     | 100                 |
| #2050     | 100                 |
| #2100     | 100                 |
| #2150     | 100                 |
| #2200     | 100                 |
| #2250     | 100                 |
| #2300     | 100                 |
| #2350     | 100                 |
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| #2700     | 100                 |
| #2750     | 100                 |
| #2800     | 100                 |
| #2850     | 100                 |
| #2900     | 100                 |
| #2950     | 100                 |
| #3000     | 100                 |
| #3050     | 100                 |
| #3100     | 100                 |
| #3150     | 100                 |
| #3200     | 100                 |
| #3250     | 100                 |
| #3300     | 100                 |
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| #3900     | 100                 |
| #3950     | 100                 |
| #4000     | 100                 |
| #4050     | 100                 |
| #4100     | 100                 |
| #4150     | 100                 |
| #4200     | 100                 |
| #4250     | 100                 |
| #4300     | 100                 |
| #4350     | 100                 |
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| #4950     | 100                 |
| #5000     | 100                 |
| #5050     | 100                 |
| #5100     | 100                 |
| #5150     | 100                 |
| #5200     | 100                 |
| #5250     | 100                 |
| #5300     | 100                 |
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| #5850     | 100                 |
| #5900     | 100                 |
| #5950     | 100                 |
| #6000     | 100                 |
| #6050     | 100                 |
| #6100     | 100                 |
| #6150     | 100                 |
| #6200     | 100                 |
| #6250     | 100                 |



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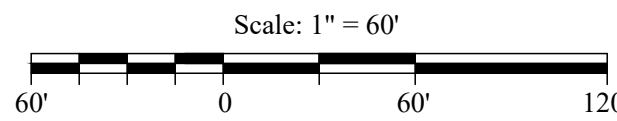
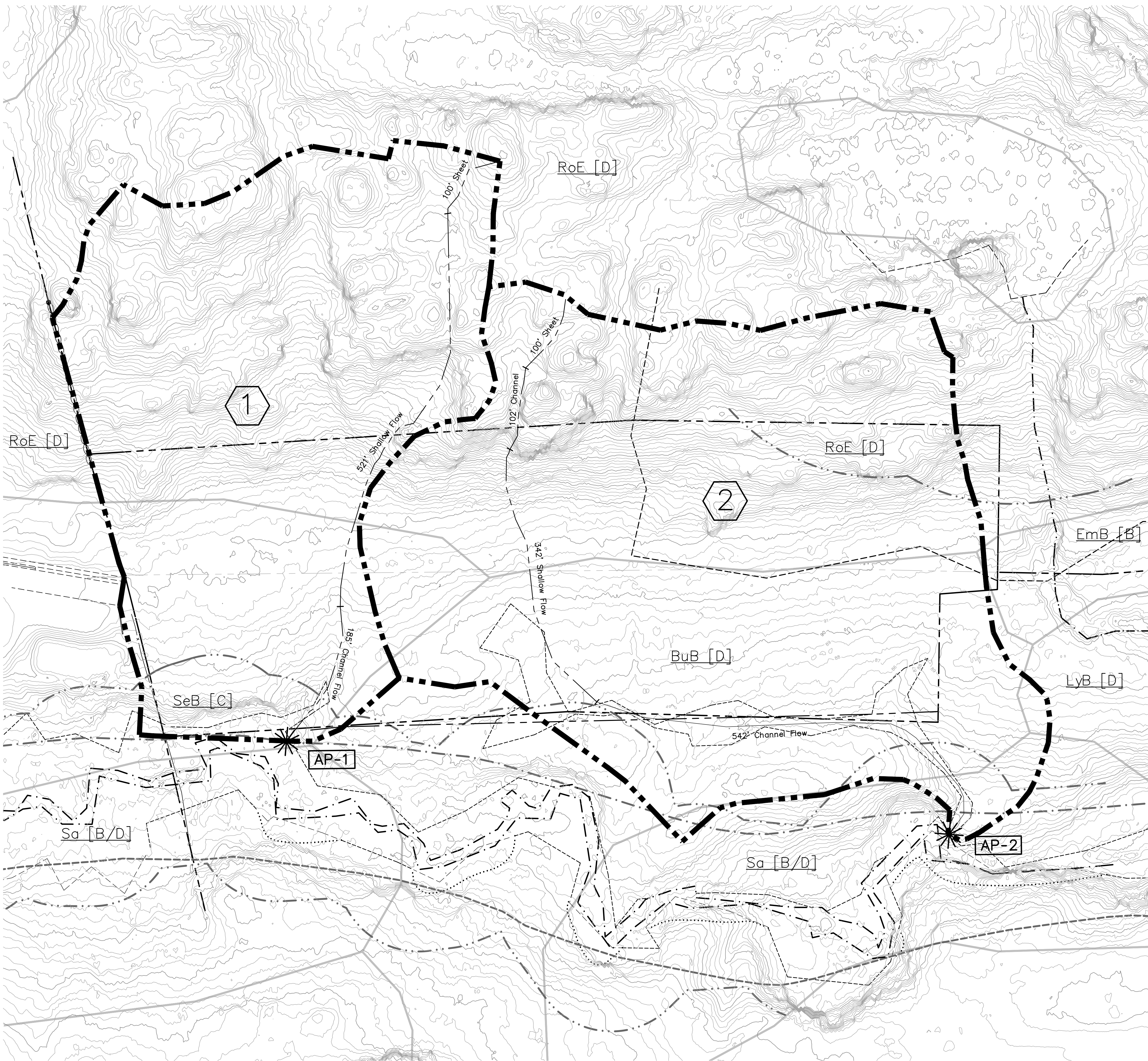
| PRE DEVELOPMENT FLOWS |             |              |              |
|-----------------------|-------------|--------------|--------------|
| ANALYSIS POINT        | 2 YR. STORM | 10 YR. STORM | 25 YR. STORM |
| AP-1                  | 6.07 CFS    | 12.93 CFS    | 18.96 CFS    |
| AP-2                  | 9.10 CFS    | 18.85 CFS    | 27.40 CFS    |

| SYMBOL | DESCRIPTION                 |
|--------|-----------------------------|
|        | DRAINAGE SUB AREA           |
|        | DRAINAGE AREA BOUNDARY      |
|        | TIME OF CONCENTRATION ROUTE |

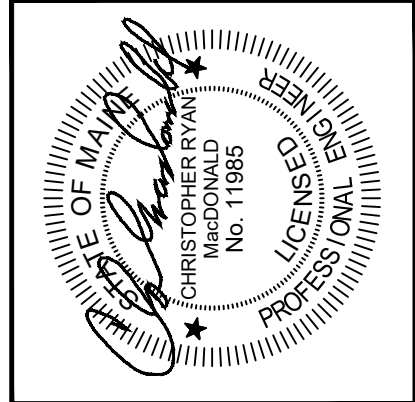
| SOILS LEGEND |                     |
|--------------|---------------------|
| SYMBOL       | DESCRIPTION         |
|              | SOIL BOUNDARY LINES |
|              | LIMIT OF WETLANDS   |

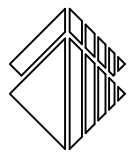
| HYDROLOGIC SOIL GROUP* |                                     |       |
|------------------------|-------------------------------------|-------|
| SYMBOL                 | SOIL                                | GROUP |
| BuB                    | BUXTON SILT LOAM (3-8%)             | D     |
| EmB                    | ELMWOOD FINE SANDY LOAM (0-8%)      | B     |
| LyB                    | LYMAN-ROCK OUTCROP COMPLEX (3-8%)   | D     |
| RoE                    | ROCK OUTCROP-LYMAN COMPLEX (15-80%) | D     |
| Sa                     | SACO MUCKY SILT LOAM                | B/D   |
| SeB                    | SCIO SILT LOAM (3-8%)               | C     |

\* SOILS INFORMATION PROVIDED BY NRCS FROM USDA WEB SOIL SURVEY  
FOR YORK COUNTY, MAINE, SURVEY AREA DATA VERSION 20, DATED AUGUST 31, 2021.



| NO. | DATE    | REVISION | DESCRIPTION                  |
|-----|---------|----------|------------------------------|
| 1   | 2-16-22 |          | Revised Grading and Drainage |
|     |         |          |                              |
|     |         |          |                              |
|     |         |          |                              |
|     |         |          |                              |
|     |         |          |                              |



**BH2M**

Barry, Huff, MacDonald, Milfigan Inc.  
Engineers, Surveyors

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Gorham, Maine 04038

Tel. (207) 839-2771  
www.bh2m.com

FOR

E & R Development Corp.  
260 Main Street  
Biddeford, Maine

PRE DEVELOPMENT  
STORMWATER PLAN

WEST BROOK SUBDIVISION

WINDING CREEK LANE  
BIDDEFORD, MAINE

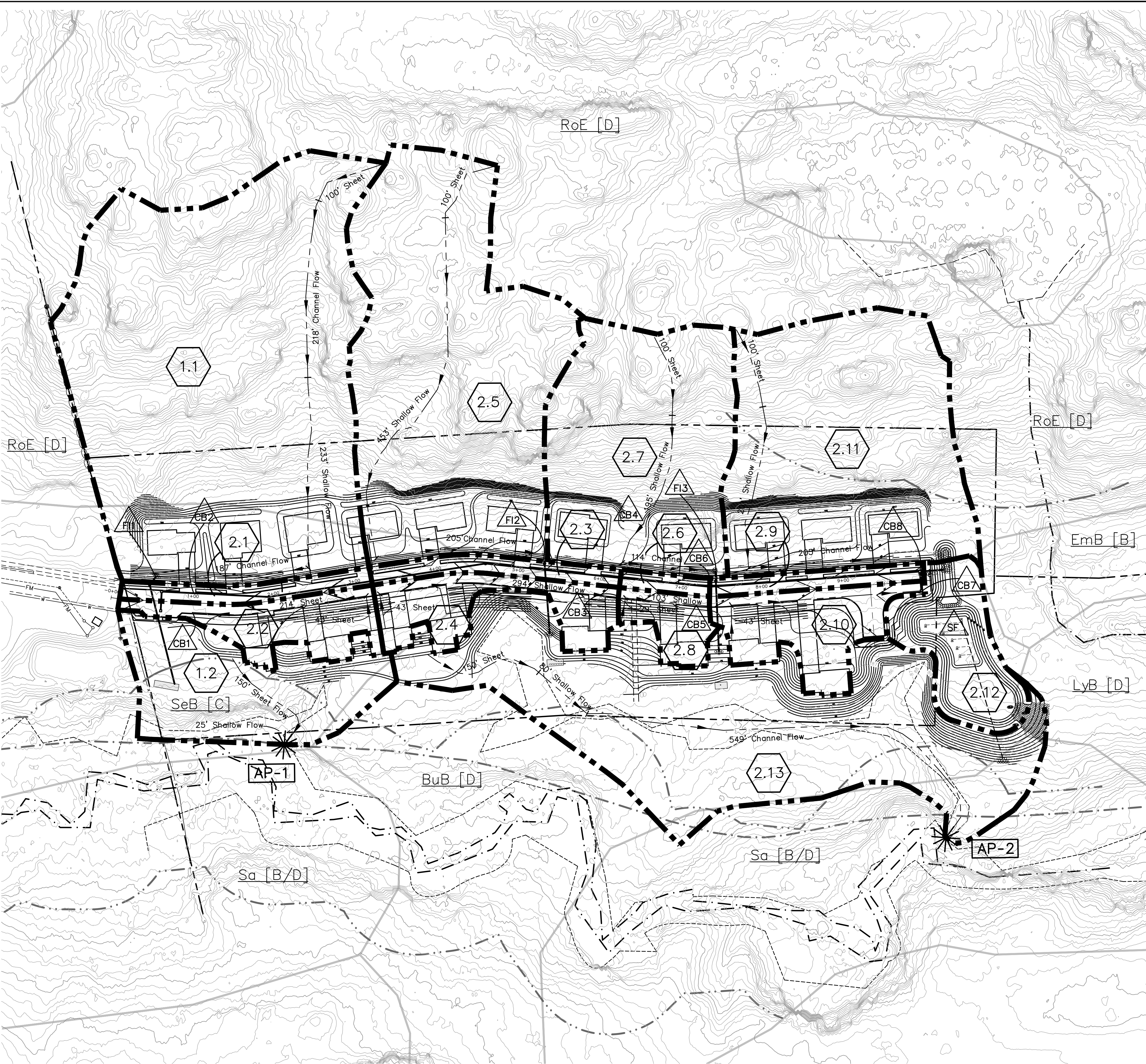
|                          |                       |
|--------------------------|-----------------------|
| DESIGNED<br>C. MacDonald | DATE<br>February 2022 |
| DRAWN<br>Staff           | SCALE<br>1" = 60'     |
| CHECKED<br>C. MacDonald  | JOB. NO.<br>20217     |

SHEET

A

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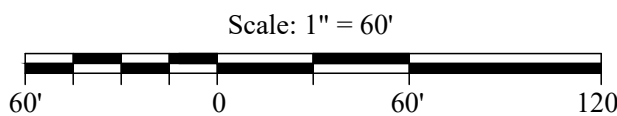
| POST DEVELOPMENT FLOWS |             |              |              |
|------------------------|-------------|--------------|--------------|
| ANALYSIS POINT         | 2 YR. STORM | 10 YR. STORM | 25 YR. STORM |
| AP-1                   | 4.11 CFS    | 8.37 CFS     | 12.08 CFS    |
| AP-2                   | 6.72 CFS    | 13.46 CFS    | 26.52 CFS    |

| SYMBOL | DESCRIPTION                 |
|--------|-----------------------------|
| 1      | DRAINAGE SUB AREA           |
| ---    | DRAINAGE AREA BOUNDARY      |
| ---    | TIME OF CONCENTRATION ROUTE |

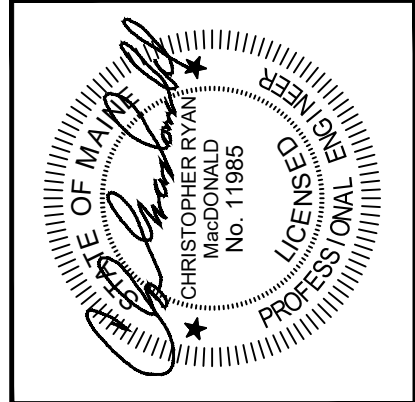
| SOILS LEGEND |                     |
|--------------|---------------------|
| SYMBOL       | DESCRIPTION         |
| ---          | SOIL BOUNDARY LINES |
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| HYDROLOGIC SOIL GROUP* |                                     |       |
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| SYMBOL                 | SOIL                                | GROUP |
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| RoE                    | ROCK OUTCROP-LYMAN COMPLEX (15-80%) | D     |
| Sa                     | SACO MUCKY SILT LOAM                | B/D   |
| SeB                    | SCIO SILT LOAM (3-8%)               | C     |

\* SOILS INFORMATION PROVIDED BY NRCS FROM USDA WEB SOIL SURVEY FOR YORK COUNTY, MAINE, SURVEY AREA DATA VERSION 20, DATED AUGUST 31, 2021.



| NO. | DATE    | REVISION | DESCRIPTION                  |
|-----|---------|----------|------------------------------|
| 1   | 2-16-22 |          | Revised Grading and Drainage |



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FOR

E & R Development Corp.  
260 Main Street  
Biddeford, Maine

POST DEVELOPMENT  
STORMWATER PLAN  
WEST BROOK SUBDIVISION  
WINDING CREEK LANE  
BIDDEFORD, MAINE

|                          |                       |
|--------------------------|-----------------------|
| DESIGNED<br>C. MacDonald | DATE<br>February 2022 |
| DRAWN<br>Staff           | SCALE<br>1" = 60'     |
| CHECKED<br>C. MacDonald  | JOB. NO.<br>20217     |

SHEET

B

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# **Site Design Associates**

## **Consulting Engineering and Land Planning**

March 4, 2022

Mr. Greg Tansley  
Via email

**RE: West Brook Subdivision  
Winding Creek Lane**

Dear Greg;

Per your request Site Design Associates has undertaken a review of the plans and documentation submitted in support of a preliminary subdivision application for the referenced project.

Our review was based on preliminary civil engineering plans dated 02-16-22, and the stormwater management report for the project. Based on the disturbed area of over one acre proposed, the project will require a stormwater PBR from DEP. We reviewed the stormwater quantity and quality analysis provided in the context of the city land use code and standard engineering practice.

We are aware that the plans are preliminary, and may not contain the detail one would expect in the final documents. Our comments include some items that may be closer associated with final documentation, in order for the applicant to consider them prior to the final plan submission. Several of our comments are suggestions related to the sewer, storm drainage, and roadway infrastructure, and may not be in accordance with city policy. Obviously, we defer to city staff in those situations if they occur.

Based on our review we offer the following comments for your, the planning board's, and the applicant's consideration:

### **A. Stormwater Management**

The report and drainage plans indicate that subsequent to development, the post development stormwater runoff rates for the 2, 10, and 25 year storms will be less than the existing rates of runoff at the analysis points. Additionally, an underdrained soil filter has been designed to enhance the stormwater runoff quality. The stormwater quality calculations were prepared based on the developer selling the lots to others for the home construction.

Several comments related to the stormwater analysis follow below. When these have been addressed, we will continue with our review of the stormwater management information.

### **B. Drainage Plans and Calculations**

23 Whitney Way Topsham, Maine 04086  
Phone: (207) 449-4275 email: [info@sitedesignassociates.biz](mailto:info@sitedesignassociates.biz)



1. The analysis utilizes a maximum length of 150 ft. for the time of concentration sheet flow component. Based on the topography, we do not believe this reflects the conditions in the field, and suggest a maximum of 100 ft. would be more appropriate.
2. The models for the field inlets, FI 1-3, estimate the headwater depths generated in the downgradient drain manholes. The analysis of the headwater depths should be at the inlet ends of the pipes into the drain manholes, to determine the ponding depths and any potential impacts on the proposed road.
3. The model indicates that the treatment and detention basin spillway will be activated in the 10 and 25 year storm events. Since this spillway is located in an area of the basin with an 8 ft. embankment height, it would be more appropriate to route the stormwater through a structure and outlet pipe, or relocate the principal spillway to an alternate area of the basin.
4. A treatment plan should be provided which depicts the various areas to be treated, and which includes the treatment calculations.
5. A stormwater Inspection and Maintenance plan was submitted. We have not yet had the opportunity to review that in detail, but will do so during our final review to ensure compliance with DEP and city requirements. We do note that the plan is not particularly clear on who is responsible for maintenance of the stormwater management facilities located outside the road right of way. It appears that there are stormwater facilities on the existing portion of Winding Creek Lane; however, we are unaware of who is responsible for maintenance.

It is common that an easement is granted to the municipality to permit road runoff from the street to outlet to the facilities, and the facilities are maintained by the homeowners association. In that case, a maintenance agreement between the city and the homeowners association is executed, with the agreement including provisions to allow the city to maintain the facilities and bill the association, if the association fails to maintain the facilities in accordance with the approved inspection and maintenance plan.

### **C. Drawings**

1. Sheet 1 – Preliminary Subdivision Plan
  - a. Based on the project boundaries shown on this plan, it is apparent that a portion of the stormwater management facilities are located outside of the project boundaries, and a portion located within the project boundaries. Should the project boundaries encompass the entire stormwater management system which serves the development?
  - b. We recommend that since the road is to be offered for public acceptance, a note be provided which prohibits foundation drain outlets in the road ditch in the right of way. This reduces the potential for damage due to periodic maintenance by the city.
  - c. The detail referred to in note 16 should be provided on the drawings.

- d. Note 17 should be expanded to prohibit driveways off any portion of a turnaround.
- e. In regards to note 20, as we noted previously, we recommend that the homeowners association be responsible for the maintenance of the stormwater management facilities.
- f. Drainage easements 30 ft. in width should be shown between lots 13 and 14, 15 and the open space, 18 and 19, and on lot 15 for the level spreader.
- g. Is the wildlife corridor shown on the plan a no disturb area?
- h. Have the permit requirements been determined per note 22?

2. Sheet 2 – Existing Conditions Plan

- a. What is the source of the topographic information? The topography for the proposed road, drainage, and stormwater management facilities should be based on ground survey. Based on information shown on Sheet 3, the existing grade at Sta 0+10.38 differs from the contour information by approximately 15 inches, which indicates that the contours may not be the result of a field survey.
- b. What are the horizontal and vertical datums?
- c. Existing stormdrain inverts and rim elevations should be shown.

3. Sheets 3, 4, and 5 – Plan/Profiles/Grading

- a. Underdrains should be provided in all areas where the subgrade will be in a cut section and the location shown on the roadway typical section.
- b. Spot grades should be provided on the ends of the turnaround and at the mail box turnout.
- c. A detail showing typical driveway grading should be provided. Given the potential grades for some of the drives, it would be preferable to maintain a gutter at the edge of the travel way to minimize water from the road sheeting down the drives and onto private property.
- d. Chapter 62 requires insulation over storm drains where cover is less than 4 ft.
- e. Does the existing pump station have the capacity for the additional sewage from the development?
- f. The plans reflect a 10 inch diameter sewer main at a slope of 0.004 ft/ft. Will the flow rate be sufficient to maintain a cleansing velocity in the sewer main? It appears this may be the last development on the road. If so, a smaller sewer main diameter would increase the velocity in the pipe if necessary.
- g. Lots 7-15 will be served by low pressure sewer pumps and force mains. Is this acceptable to the city? The sewer pumps are shown in the road right of way. We recommend that they be moved onto the lots, assuming they will be private lift stations.
- h. The plans show the use of extruded slip form concrete curb along the road. It has been our experience that in a development of this nature, it is best to

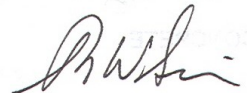
establish the driveway locations as part of the approval process, to avoid the need to alter curb after it has been installed. The curb is an integral part of the stormwater management system, and will likely be installed before the house lot construction is complete. Altering that type of curb tends to be difficult after it is installed. Driveway culverts with a minimum diameter of 15 inches should also be shown where required.

- i. Because extruded curb tip downs at the driveway locations can be thin if they are simply shaved off, some municipalities are requiring the installation of granite tip downs to prevent the damage to the concrete tip downs. There also are alternative details for installing the tip downs deeper to provide strength.
- j. Given the major grade differences between the road and lots in some areas, and the depth of the ditch on the north side of the road, we suggest that inverts for the sewer services and pump stations be determined and shown on the drawings to verify adequate cover.
- k. Will lots 17, 18, or 19 require pump stations?
- l. Will Maine Water require that the water main be installed under the travel way, rather than in the esplanade? Any water main maintenance required in the esplanade would likely result in damage to the sidewalk, curb, and road.
- m. We recommend that DMH 3, 4, and 6 be moved to the north of the sidewalk rather than located in the walk.
- n. Is any street lighting proposed?
- o. We are curious why the ditch northerly of the road is somewhat deeper than necessary.
- p. A sawcut and butt joint should be called for where the new pavement will meet the existing.
- q. The profile shows a cut of 15-18 inches where the new road meets the existing road.
- r. Cascade type grates should be specified for CB 3-6.
- s. CB 6 should be shown adjacent to the curb.
- t. The turnaround should be dimensioned.
- u. The underground electric and cable should be located outside the travel way.
- v. Riprap inlet and outlet aprons should be shown at the culvert inlets and outlets.
- w. It appears the stormdrain pipes into and out of CB 7 and 8 could be lowered a bit. As shown, it may be difficult to fabricate the structures and provide the required brick/risers and frames.
- x. The reflective barrier at the end of the road should be shown.
- y. The riprap shown at the basin spillway should be extended for the full length of the slope inside and outside the basin. The thickness and size should be specified. A level spreader should be provided at the base of the riprap embankment slope.
- z. How will the basin be accessed for maintenance?
- aa. Cleanouts should be shown on the ends of all the underdrains and at the bend, and a detail provided.

- bb. The turnaround radii should be increased to 25 ft.
- 4. Sheets 6 and 8 - Details C-302 – Site Civil Details 1
  - a. Typical Roadway Section
    - Show underdrain on the typical section to be installed where subgrade is in cut sections.
    - Aggregate subbase course should have a maximum stone size of 3 inches per chapter 62.
    - Update MDOT specification reference.
    - How was the 26 ft travel way width determined? Is it to match the existing width?
    - Specify 95% compaction for all materials.
    - The typical section should include a note that all fill below the subgrade should be gravel borrow extended to the side slopes. This will provide proper road subdrainage. Otherwise, underdrain would be required for the length of the road.
  - b. Precast Catch Basin Detail
    - Provide a detail with a cone as well, which is preferred when possible.
    - A stainless steel band and boot should be called for at the pipe connection. (for the drain manhole as well)
  - c. Pavement Joint Detail
    - Call for grinding the surface course of existing pavement.
  - d. Stormwater Basin
    - Provide forebay details
    - Provide a typical embankment section
    - Provide riprap spillway details

We do not believe that these comments, which are generally technical in nature, will significantly impact the overall design concept, and that they could be satisfactorily addressed at the time of the final plan submission, if the planning board and you concur. If you have any questions, or require additional information, please do not hesitate to contact me.

Sincerely,  
Site Design Associates



Tom Saucier, P.E.  
President



WILLIAM A. THOMPSON  
ROBERT C. LIBBY, Jr.  
WALTER E. PELKEY  
ANDREW S. MORRELL  
STEVEN J. BLAKE

Berry, Huff, McDonald, Milligan Inc.  
*Engineers, Surveyors*

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Gorham, Maine 04038      [www.bh2m.com](http://www.bh2m.com)

March 17, 2022

Greg Tansley  
Biddeford City Planner  
P.O. Box 586  
Biddeford, Maine 04005

Re:    West Brook Subdivision  
      Winding Creek Lane  
      Response to Site Design Associates 3/4/22 Comments

Dear Greg;

We have reviewed the comments from Tom Saucier of Site Design Associates dated March 4, 2022, provided via email on March 10, 2022, and offer the following initial responses. We plan to revise the submission materials as noted and follow up with a final response to comments. We have included the original comment (*italics*) and our responses (**bold**).

A. *Stormwater Management*

*The report and drainage plans indicate that subsequent to development, the post development stormwater runoff rates for the 2, 10, and 25 year storms will be less than the existing rates of runoff at the analysis points. Additionally, an underdrained soil filter has been designed to enhance the stormwater runoff quality. The stormwater quality calculations were prepared based on the developer selling the lots to others for the home construction.*

*Several comments related to the stormwater analysis follow below. When these have been addressed, we will continue with our review of the stormwater management information.*

**RESPONSE:** Thank you for these detailed initial comments. We will work to provide a revised stormwater analysis that addresses these.

B. *Drainage Plans and Calculations*

1. *The analysis utilizes a maximum length of 150 ft. for the time of concentration sheet flow component. Based on the topography, we do not believe this reflects the conditions in the field, and suggest a maximum of 100 ft. would be more appropriate.*

**RESPONSE:** We will revise stormwater analysis to consider a shorter sheet flow distance as suggested.

2. *The models for the field inlets, FI 1-3, estimate the headwater depths generated in the downgradient drain manholes. The analysis of the headwater depths should be at the inlet ends of the pipes into the drain manholes, to determine the ponding depths and any potential impacts on the proposed road.*

**RESPONSE:** Inlet conditions at the culvert entrances along the swale will be assessed.

3. *The model indicates that the treatment and detention basin spillway will be activated in the 10 and 25 year storm events. Since this spillway is located in an area of the basin with an 8 ft. embankment height, it would be more appropriate to route the stormwater through a structure and outlet pipe, or relocate the principal spillway to an alternate area of the basin.*

**RESPONSE:** The spillway will be revised to be positioned in a location of a less steep, shorter vertical drop section of the embankment.

4. *A treatment plan should be provided which depicts the various areas to be treated, and which includes the treatment calculations.*

**RESPONSE:** A treatment plan will be provided in subsequent revisions, showing hatched areas of proposed areas to be treated.

5. *A stormwater Inspection and Maintenance plan was submitted. We have not yet had the opportunity to review that in detail, but will do so during our final review to ensure compliance with DEP and city requirements. We do note that the plan is not particularly clear on who is responsible for maintenance of the stormwater management facilities located outside the road right of way. It appears that there are stormwater facilities on the existing portion of Winding Creek Lane; however, we are unaware of who is responsible for maintenance.*

*It is common that an easement is granted to the municipality to permit road runoff from the street to outlet to the facilities, and the facilities are maintained by the homeowners association. In that case, a maintenance agreement between the city and the homeowners association is executed, with the agreement including provisions to allow the city to maintain the facilities and bill the association, if the association fails to maintain the facilities in accordance with the approved inspection and maintenance plan.*

**RESPONSE:** The road and its drainage facilities are proposed to be accepted by the City. This includes the swale along the uphill side of the road and the field inlets, cross culverts, and level spreaders. Easements are proposed in the areas outside of the ROW for access by the City. A homeowners association will be formed to maintain these systems in the interim between when construction is completed and the City accepts the road.

C. Drawings

1. Sheet 1 – Preliminary Subdivision Plan

- a. *Based on the project boundaries shown on this plan, it is apparent that a portion of the stormwater management facilities are located outside of the project boundaries, and a portion located within the project boundaries. Should the project boundaries encompass the entire stormwater management system which serves the development?*

**RESPONSE:** The limits of the project have been the subject of negotiation between the applicants and the City, involving land swaps and donations of significant portions of previously held parcels. Per the conditions of the land swaps, areas outside the project boundaries were allowed to be utilized for stormwater facilities. Easements for the limits of the stormwater facilities will be retained per the conditions of the land swap.

- b. *We recommend that since the road is to be offered for public acceptance, a note be provided which prohibits foundation drain outlets in the road ditch in the right of way. This reduces the potential for damage due to periodic maintenance by the city.*

**RESPONSE:** A note to this effect will be included in revised plans.

- c. *The detail referred to in note 16 should be provided on the drawings.*

**RESPONSE:** A detail of typical driveway sections, showing grading detail for maintaining a gutter line along the driveways will be provided.

- d. *Note 17 should be expanded to prohibit driveways off any portion of a turnaround.*

**RESPONSE:** A note to this effect will be included in revised plans.

- e. *In regards to note 20, as we noted previously, we recommend that the homeowners association be responsible for the maintenance of the stormwater management facilities.*

**RESPONSE:** Stormwater management facilities are proposed to be accepted by the City when accepting the road. A homeowner's association will assume responsibility in the interim between construction completion and the City's acceptance of the road.

- f. *Drainage easements 30 ft. in width should be shown between lots 13 and 14, 15 and the open space, 18 and 19, and on lot 15 for the level spreader.*

**RESPONSE:** Drainage easements 20' in width are shown for the areas noted. This will allow access to the drainage structures without



encumbering the developable window of the lots. The City Code does not specify a minimum width, per section 66-75 being repealed.

- g. *Is the wildlife corridor shown on the plan a no disturb area?*

**RESPONSE:** Yes, this area will be marked with signage. No disturbance without approval from the City.

- h. *Have the permit requirements been determined per note 22?*

**RESPONSE:** We understand that a Maine DEP Stormwater PBR will be required based on the extents of impacts currently proposed. This will be applied for alongside a revised submission to the City Planning Board.

2. *Sheet 2 – Existing Conditions Plan*

- a. *What is the source of the topographic information? The topography for the proposed road, drainage, and stormwater management facilities should be based on ground survey. Based on information shown on Sheet 3, the existing grade at Sta 0+10.38 differs from the contour information by approximately 15 inches, which indicates that the contours may not be the result of a field survey.*

**RESPONSE:** The contours for this preliminary submission were based on LiDAR information available from the Maine office of GIS. Additional field survey has been conducted and ground topography will be updated in subsequent revisions to the plans.

- b. *What are the horizontal and vertical datums?*

**RESPONSE:** Horizontal Datum will be set to Maine State Plane West NAD 83, and Vertical Datum to NAVD 88.

- c. *Existing stormdrain inverts and rim elevations should be shown.*

**RESPONSE:** These will be provided in revised plans.

3. *Sheets 3, 4, and 5 – Plan/Profiles/Grading*

- a. *Underdrains should be provided in all areas where the subgrade will be in a cut section and the location shown on the roadway typical section.*

**RESPONSE:** These conditions will be assessed and underdrains will be specified. Given the proposed swale along the uphill, northern side of the road and the fill sections along the downhill, southern side of the road, we expect these areas of underdrain to be limited.

- b. *Spot grades should be provided on the ends of the turnaround and at the mail box turnout.*

**RESPONSE:** Spot grades will be provided in revisions of the plans.

- c. *A detail showing typical driveway grading should be provided. Given the potential grades for some of the drives, it would be preferable to maintain a gutter at the edge of the travel way to minimize water from the road sheeting down the drives and onto private property.*

**RESPONSE:** As noted above in the comment about note 16 from the Preliminary Plan, a typical detail will be provided for grading of driveway entrances.

- d. *Chapter 62 requires insulation over storm drains where cover is less than 4ft.*

**RESPONSE:** This condition will be assessed, and insulation will be shown where minimum cover cannot be achieved.

- e. *Does the existing pump station have the capacity for the additional sewage from the development?*

**RESPONSE:** In the planning stages of this proposed subdivision, the City Engineer was consulted on wastewater capacities. The pump station was analyzed and determined to have capacity.

- f. *Plans reflect a 10 inch diameter sewer main at a slope of 0.004 ft/ft. Will the flow rate be sufficient to maintain a cleansing velocity in the sewer main? It appears this may be the last development on the road. If so, a smaller sewer main diameter would increase the velocity in the pipe if necessary.*

**RESPONSE:** Per the above response to item “e”, this section of sewer was consulted on with the City Engineer. At their suggestion, we are showing a flatter pipe with a larger diameter than typical for the wastewater flows anticipated to provide as much gravity sewer along the road as possible.

- g. *Lots 7-15 will be served by low pressure sewer pumps and force mains. Is this acceptable to the city? The sewer pumps are shown in the road right of way. We recommend that they be moved onto the lots, assuming they will be private lift stations.*

**RESPONSE:** As a point of clarification, the low pressure pump stations are not proposed to be installed at the time of road construction, but will be installed by future homeowners at the time of lot development. The project currently proposes to install the sewer lateral assemblies as shown on the utility details. These will act as a stub for future low pressure sewer connections, and include a curb stop assembly. The plans show a curb box associated with the curb stop for the low pressure sewer system to be located within the ROW for use by the City.

- h. *The plans show the use of extruded slip form concrete curb along the road. It has been our experience that in a development of this nature, it is best to establish the driveway locations as part of the approval process, to avoid the need to alter curb after it has been installed. The curb is an integral part of the stormwater management system, and will likely be installed before the house lot construction is complete. Altering that type of curb tends to be difficult after it is installed. Driveway culverts with a minimum diameter of 15 inches should also be shown where required.*

**RESPONSE: Driveway aprons will be shown in updated plans.**

- i. *Because extruded curb tip downs at the driveway locations can be thin if they are simply shaved off, some municipalities are requiring the installation of granite tip downs to prevent the damage to the concrete tip downs. There also are alternative details for installing the tip downs deeperto provide strength.*

**RESPONSE: We will evaluate this condition and provide additional detail to alleviate. Slip form concrete could still be used in this application by deflecting the full depth curb at driveway aprons.**

- j. *Given the major grade differences between the road and lots in some areas, and the depth of the ditch on the north side of the road, we suggest that inverts for the sewer services and pump stations be determined and shown on the drawings to verify adequate cover.*

**RESPONSE: These inverts and crossings will be evaluated and detailed in updated plans.**

- k. *Will lots 17, 18, or 19 require pump stations?*

**RESPONSE: These lots along the downhill side of the road are conceptually designed to have fill placed to elevate the lots. We assume that the front of the lots will grade back towards the street, and finished floor elevations will be high enough to provide gravity flow to the sewer.**

- l. *Will Maine Water require that the water main be installed under the travel way, rather than in the esplanade? Any water main maintenance required in the esplanade would likely result in damage to the sidewalk, curb, and road.*

**RESPONSE: Water main and underground electric locations will be swapped in revised versions of the project to show underground electric in the esplanade and water main along the southern side of the proposed road. Transformers are proposed to remain along the southern side of the road as to not interfere with sidewalk and swale locations.**

- m. *We recommend that DMH 3, 4, and 6 be moved to the north of the sidewalk rather than located in the walk.*

**RESPONSE:** Given the limited room on the northern side of the ROW with utilities proposed in the esplanade and storm drains located along the curb line, drain manholes located under the sidewalk appears to be the most appropriate location. As these drain manholes are proposed to have solid covers, there should not be accessibility issues for pedestrians using the sidewalk.

- n. *Is any street lighting proposed?*

**RESPONSE:** Proposed street lights will include one at approximately station 6+50 and one at the proposed roadway turnaround. Style will match the lighting used at McKenney Drive project completed by the applicant.

- o. *We are curious why the ditch northerly of the road is somewhat deeper than necessary.*

**RESPONSE:** The ditch is proposed to drain to 18" culvert entrances. Given the need to provide cover over the culverts, a deeper swale is required. A section of swale has been previously shown dropping grade against a rising road grade, providing a deeper than typical section to better align with proposed lot boundaries on the southern side of the road.

- p. *A sawcut and butt joint should be called for where the new pavement will meet the existing.*

**RESPONSE:** The pavement joint detail will be revised to specify saw cutting and a call out will be provided

- q. *The profile shows a cut of 15-18 inches where the new road meets the existing road.*

**RESPONSE:** This will be resolved with updated topography detailing the existing grades at the current end of Winding Creek Lane.

- r. *Cascade type grates should be specified for CB 3-6.*

**RESPONSE:** Updated versions of the plans will show cascade grates for catch basins along running grades of the road. Low points and end of road areas will continue to show conventional grates.

- s. *CB 6 should be shown adjacent to the curb.*

**RESPONSE:** This CB will be adjusted in the area of the curve to be flush with curb.

- t. *The turnaround should be dimensioned.*

**RESPONSE: Dimensions for the turnaround will be provided.**

- u. *The underground electric and cable should be located outside the travel way.*

**RESPONSE: Water and electric main locations will be swapped to show underground electric located in the esplanade and water main located along the southern side of the road.**

- v. *Riprap inlet and outlet aprons should be shown at the culvert inlets and outlets.*

**RESPONSE: Riprap will be shown at the culvert inlets along the swale, and outlets are shown with level spreaders.**

- w. *It appears the stormdrain pipes into and out of CB 7 and 8 could be lowered a bit. As shown, it may be difficult to fabricate the structures and provide the required brick/risers and frames.*

**RESPONSE: The proposed condition of these CB's will be evaluated and adjusted to provide additional cover for more conventional structures.**

- x. *The reflective barrier at the end of the road should be shown.*

**RESPONSE: The barrier will be shown in revised plans.**

- y. *The riprap shown at the basin spillway should be extended for the full length of the slope inside and outside the basin. The thickness and size should be specified. A level spreader should be provided at the base of the riprap embankment slope.*

**RESPONSE: The spillway for the basin will show these additional details as well as revised location based on above recommendations.**

- z. *How will the basin be accessed for maintenance?*

**RESPONSE: The embankment crest is proposed as 8' wide allowing for access around the perimeter. Revised grading will be shown at the area of the turn around to provide access from the end of the road to the basin embankment.**

- aa. *Cleanouts should be shown on the ends of all the underdrains and at the bend, and a detail provided.*

**RESPONSE: Cleanouts and details will be provided.**

- bb. *The turnaround radii should be increased to 25 ft.*

**RESPONSE: The curb radii will be revised.**

4. *Sheets 6 and 8 - Details C-302 – Site Civil Details 1*

a. *Typical Roadway Section*

- *Show underdrain on the typical section to be installed where subgrade is in cut sections.*

**RESPONSE:** The detail will be updated to show underdrain information. Extents of underdrains will be shown in the plans.

- *Aggregate subbase course should have a maximum stone size of 3 inches per chapter 62.*

**RESPONSE:** We understand that there is a discrepancy between the current Maine DOT material specifications for Type A base and Type D subbase, and Section 62-130 of the City Code. We ask that the City Engineer review this section of the code as it seems that the intention is to use Maine DOT specification materials as “equivalent”. The main discrepancy between DOT and City Code is DOT showing Type A must pass a 2” sieve and Type D must pass a 6” sieve, where City Code states ¾” and 3” respectively. Providing Maine DOT specification material will ensure a better supply without having to result in a custom gradation to conform to City Code.

- *Update MDOT specification reference.*

**RESPONSE:** The detail will reference the Standard Specifications of March 2020.

- *How was the 26 ft travel way width determined? Is it to match the existing width?*

**RESPONSE:** The road has been designed in conformance with section 62-109(1), specifying that a minimum lane width for a curbed road is 13’ wide, or 26’ total for two lanes. This also matches the existing width of Winding Creek Lane.

- *Specify 95% compaction for all materials.*

**RESPONSE:** A note will be provided in the updated detail.

- *The typical section should include a note that all fill below the subgrade should be gravel borrow extended to the side slopes. This will provide proper road subdrainage. Otherwise, underdrain would be required for the length of the road.*

**RESPONSE:** Base and subbase material extents will be revised to extend to the side slopes.

b. *Precast Catch Basin Detail*

- *Provide a detail with a cone as well, which is preferred when possible.*

**RESPONSE:** An alternative detail will be provided, and flat top structures will only be specified where less than 3' of pipe cover is anticipated.

- *A stainless steel band and boot should be called for at the pipeconnection. (for the drain manhole as well)*

**RESPONSE:** The detail will be updated to include a boot and stainless steel strap.

*Pavement Joint Detail*

- *Call for grinding the surface course of existing pavement.*

**RESPONSE:** The detail will be updated to call out gridding of pavement

c. *Stormwater Basin*

- *Provide forebay details*

**RESPONSE:** Forebay details will be provided.

- *Provide a typical embankment section*

**RESPONSE:** Typical embankment section will be provided.

- *Provide riprap spillway details*

**RESPONSE:** A riprap spillway detail will be provided.

Thank you for providing making these comments available for our initial review. We trust that these initial responses will help provide an understanding to our approach in alleviating these concerns for the project. We look forward to completing plan revisions and submitting a revised submission package for final review.

Sincerely,



Christopher MacDonald, P.E.  
Civil Engineer