CITY OF DOVER

DOVER CONSERVATION COMMISSION – AGENDA

Meeting Type: Regular Meeting
Meeting Location: City Council Conference Room - 288 Central Avenue Dover NH
Meeting Date: Monday, September 9, 2024
Meeting Time: **5:30 pm**

1. **CALL TO ORDER AND ROLL CALL**

2. **CITIZEN'S FORUM**

3. **APPROVAL OF THE PRIOR MEETING MINUTES** – August 12, 2024

4. **OLD BUSINESS**

5. **NEW BUSINESS**
   - **A.** City of Dover Conditional Use Permit for Del Sol Dover, LLC, Assessor's Map G, Lot 2-1, zoned CM, located at the end of Crosby Road. Proposal is to create a three-lot subdivision which will be accessed from an extension of Crosby Road with associated drainage and grading creating 4,861 square feet of permanent impact to the 50-foot wetland buffer.
   - **B.** City of Dover Conditional Use Permit for Del Sol Dover, LLC, Assessor's Map G, Lot 2-1, zoned CM, located at the end of Crosby Road. Proposal is to construct a 9,600 square foot warehouse building with associated parking and utility and drainage improvements creating 786.5 square feet of permanent impact to the 50-foot wetland buffer.
   - **C.** NHDES Standard Dredge and Fill Wetlands Permit for Jenny L. Lang, Assessor's Map L, Lot 95-1L, zoned R-20, located at 15 Landing Way. Proposal is to construct a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed wood pier, a 3' x 40' gangway and a 10' x 30' float totaling 96 square feet of permanent impact to the previously developed 100' Tidal Buffer Zone and 900 square feet of permanent impact to tidal wetlands.
   - **D.** New Meadows Rapid Ecological Assessment
   - **E.** Additional Volunteer Opportunities – Planning Board and Cocheco River Local Advisory Committee
   - **F.** Conservation and Open Space Chapter Update

6. **REPORT FROM THE CHAIR**
   - **A.** Review of Correspondence Received From NH Department of Environmental Services

7. **OTHER BUSINESS**
   - **A.** Update from Forest Management Subcommittee

8. **ADJOURNMENT**

CITY OF DOVER

DOVER CONSERVATION COMMISSION – MINUTES

Meeting Type:	Regular Meeting
Meeting Location:	City Council Conference Room - 288 Central Avenue, Dover, NH
Meeting Date:	Monday, August 12, 2024
Meeting Time:	**5:30 pm**

MEMBERS PRESENT: Bill Hunt (Chair), Steve Fellows (Vice Chair), Robert Atwood (Secretary), Kristen Murphy, Brianna Group
Absent (Excused): Amy Kramer Perry, Abigail Lyon, Russ Warnock (Alternate)
Absent (Unexcused): Jake Geddes
STAFF PRESENT: Jackson Kaspari – Resilience Manager
OTHERS PRESENT: Councilor Williams, John DesRoches, Steve Haight, Mike Parsont, Luke Taylor, Jay Aube, Steve Riker, Heath Todd, Richard Hackeman

1. CALL TO ORDER AND ROLL CALL
The meeting was convened at 5:30 PM.

2. CITIZENS' FORUM
The Chair gave instructions for Citizens' forum
None

3. APPROVAL OF THE PRIOR MEETING MINUTES- July 8, 2024
S. Fellows moved to approve the minutes of July 8 as submitted. K. Murphy seconded. Vote: U/A. with B. Group abstaining

The Chair announced a new alternate member of the Commission, Brianna Group.

4. OLD BUSINESS:
None

5. NEW BUSINESS:
A. City of Dover Conditional Use Permit for Our Place, Inc., Assessor's Map H, Lot 6-4, zoned R-20, located at 105 Durham Road. Proposal is to remove an existing gravel lot and revegetate the majority of the area creating 7,800 square feet of impact while reducing the impervious area by 4,000 square feet in the 50-foot wetland buffer.

Richard Hackeman, Altus Engineering represented and presented the item. He explained the request before the Commission.

Discussion and clarification of information occurred regarding: change of use and vegetation.

S. Fellows moved to endorse the proposal as presented. R. Atwood seconded. Vote: U/A.

B. City of Dover Conditional Use Permit and NHDES Minimum Expedited Wetlands Permit for Andrew Koellmer, Assessor's Map L, Lot 14-L, zoned R-20, located at 59 Spur Road. Proposal is to construct an addition to a residential home, creating 256 square feet of permanent impact to the Conservation District. These applications are additionally contingent upon the approval of a Lot Line Adjustment by the Dover Planning Board.

DRAFT

Steve Haight, CivilWorks represented and presented the item. He explained the request before the Commission.

Discussion and clarification of information occurred regarding: topography, substance of the request and location of the well.

J. Kaspari clarified some procedural aspects and timeline of the application.

S. Fellows moved to endorse the proposal as presented contingent on the approval of the lot line adjustment. B. Group seconded. Vote: U/A.

C. City of Dover Conditional Use Permits and NHDES Standard Dredge and Fill Wetlands Permit for Heath J. Todd Trustee, Heath J. Todd Revocable Trust, Assessor's Map M, Lot 104, zoned R-40, located off of Back Road. Proposal is to create an access drive to the developable portion of the lot where a single home and accessory structures are to be built, permanently impacting 8,880 square feet of wetlands and 29,176 square feet of the 50-foot wetland buffer. There are also 151 square feet of temporary impact to wetlands. Additionally, 1,110 square feet of permanent impact and 73 square feet of temporary impact are proposed to the Conservation District associated with a patio path, patio and access to a proposed tidal docking structure.

Mike Parsont represented and presented the item. He explained the request before the Commission highlighting the location and attributes of the property, six wetland crossings to get to the property and two more additional crossings, explanations of the crossings and plans for them, explanation of the development of the property, and wetland and buffer impacts.

Discussion and clarification of information occurred regarding: access road, request tonight is for the road, not any structures, road maintenance, road layout, impact from previous owners to be restored, and where land has and hasn't been cleared.

J. Kaspari noted the applicant has been in touch with staff since early on in the process. NHDES applications and permits have been submitted.

Commission member noted that generally it is not ideal to have a roadway through forest and crossing wetlands, but given the challenges of this site, that it's previously been disturbed, and the structures aren't adding impacts, this appears to be the least impactful way to accomplish the goal.

S. Fellows moved to endorse the proposal as presented. R. Atwood seconded. Vote: U/A.

DRAFT

D. NHDES Standard Dredge and Fill Wetlands Permit for Heath J. Todd Trustee, Heath J. Todd Revocable Trust, Assessor's Map M, Lot 104, zoned R-40, located off of Back Road.
Proposal is to install a 200-foot-long tidal docking structure with a 400 square foot float area.

Luke Taylor represented and presented the item. He explained the request before the Commission highlighting impacts, various research done and agencies contacted to confirm the request will not result in various impacts.

Discussion and clarification of information occurred regarding: process for installation, vegetation, water depth, and NHDES permit submittal.

S. Fellows moved to endorse the proposal as presented. R. Atwood seconded. Vote: U/A.

E. City of Dover Conditional Use Permit and NHDES Minor Impact Wetland Permit for Edward J. & Lydia N. Williams, Assessor's Map L, Lot 44, zoned R-20, located at 167 Spur Road.
Proposal is to re-develop the lot including the demolition of the existing structures, constriction of a new home and reconfiguration of other site elements creating 2,798 square feet of permanent impact and 3,316 square feet of temporary impact to the Conservation District. Within the Conservation District area there is also 4,790 square feet of impact to the 50 foot wetland buffer and 226 square feet of permanent impact to wetlands.

Steve Riker represented and presented the item. He noted the 226 sq ft of impact is temporary, not permanent as written in the agenda. He explained the request before the Commission highlighting the location and attributes of the parcel, development proposal for the property, ZBA approvals for setbacks, property wetland zones, further details of the proposed project, grading/retaining walls, and impervious surfaces.

Discussion and clarification of information occurred regarding: shed location and property lines, parcel size, demolition process, and FEMA timeline.

One member appreciated the work done to move the structure away from the wetlands, though is concerned that there is no buffer. Other members agreed, it is not an ideal situation, but it's the reality of the lot as it's laid out.

S. Fellows moved to endorse the CUP and the Minor Impact Wetland Permit as presented. R. Atwood seconded. Vote: U/A.

F. Urban Forestry Fellowship Presentation
John DesRoches, Fellow is wrapping up his fellowship next week. He gave a slide presentation of his summer fellowship.

DRAFT

G. Conservation Fund Request for Appraisal Services – Not to Exceed $13,000

J. Kaspari explained the request from Open Lands Committee for funds for an appraisal of approximately 40ac. He further described attributes of the land parcel.

S. Fellows moved to approve the transfer of funds for the purposes of conducting this appraisal not to exceed $13,000. B. Group seconded. Vote: U/A.

H. Conservation and Open Space Chapter Update

J. Kaspari gave a brief update and timeline.

6. REPORT FROM THE CHAIR

A. Review of Correspondence Received from NH Department of Environmental Services

J. Kaspari gave an update on a Sixth St after-the-fact item which has been addressed and a Spur Rd item which is still ongoing with DES looking for additional information.

J. Kaspari noted receipt of notice for timber harvest in the Bellamy and Cocheco Wildlife Management Areas.

7. OTHER BUSINESS

A. Update from Forest Management Subcommittee

Topics discussed:

- Pocket forest potential near Whittier
- Tree plantings, ash trees and public education

Update on recent tree plantings

8. ADJOURNMENT

S. Fellows moved to adjourn. B. Group seconded. Vote: U/A
The meeting was adjourned at 7:08 PM.

DRAFT

CIVILWORKS NEW ENGLAND

181 WATSON ROAD
P.O. BOX 1166
DOVER, NH 03821-1166
PHONE: 603.749.0443 FAX: 603.749.7348

August 5, 2024

City of Dover
288 Central Ave
Dover, NH 03820

Attn: Donna Benton, Director of Planning & Community Development

Subject: Minor Subdivision, Site Plan Review & Conditional Use Permit Applications
Crosby Road Extension - Tax Map G, Lot 2-1
Civilworks New England Reference No. 18043C

Dear Ms. Benton:

On behalf of our client, Del Sol Dover, LLC, we are pleased to submit the following application(s) and associated materials for review by the Planning Board. Attached are seven (7) copies of associated material items 1-9 listed below, and two (2) copies of the Drainage Report. All materials will be provided electronically (PDF) to the Planning Department:

1) Cover Letter
2) Subdivision Application, Checklist, Fee Schedule
3) Conditional Use Permit Application, Fee Schedule
4) Owner / Applicant Authorization Letter
5) Project Narrative
6) Conditional Use Permit Narrative
7) Stormwater Management Narrative
8) Stormwater Inspection and Maintenance Plan
9) Subdivision Plan Set with Road & Drainage Design
10) Drainage Report w/Supporting Documents & Plans

We look forward to representing these applications at the Planning Board meeting on August 27, 2024. Please do not hesitate to contact our office should you have any questions.

Sincerely,

CIVILWORKS NEW ENGLAND

Stephen J Haight, PE

City of Dover, New Hampshire
MINOR SUBDIVISION APPLICATION

[Revision Date: July 1, 2021]

Office Use Only	Project #:		Date Received:	
	Amount Paid:		Time Received:	

APPLICANT AND OWNER INFORMATION

Name of Applicant: Del Sol Dover, LLC Telephone # 603-749-2800

Address of Applicant: 340 Central Avenue, Suite 202 Dover, NH 03820

Name of Property Owner (*if different from applicant*): SAME Telephone #_____

Address of Property Owner: _____

E-Mail Address: _____

PROPERTY INFORMATION

Address of Property: Crosby Road

Assessor's Map # G Lot(s) # 2-1

Zoning District(s) CM Overlay District(s) Dover Conservation District

Size of Parcel: 906,049 sf (20.80 ac) Property Deed: Book 5075 Page: 142

Existing Use of Property: Vacant, Industrial Park

SUBDIVISION INFORMATION

Existing Number of Lots: 1 Proposed Number of Lots: 3

TDR Relief sought (Check All That Apply): □ Lot Size □ Frontage □ Setback □ 30' Buffer □ Purchase ____ units

Describe Proposed Use or Activity that requires TDR; describe any impacts and document mitigation:

N/A

Circle one for each category:

Water: City / Well (circle one) How far is city water from the property? at Crosby Road

Sewer: City / Septic (circle one) How far is city sewer from the property? at Crosby Road

Highway Access City Street / State Highway (circle one) | Roadway Public or Private Road (circle one)

Refuse removal: Public / Private (circle one) | Estimated Length of Proposed Road: 615 feet

Estimated value of construction: $738,000 New impervious area (in s.f.): 20,818

WAIVER REQUESTS

Subdivision Regulations section(s) to be waived: None

Justification for waiver request(s) (*attach additional sheets as needed*): _____

_____

SURVEYOR INFORMATION

Name of Surveyor and Company (Licensed in N.H.) Kevin McEneaney - McEneaney Survey Associates

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-742-0911

Professional License #: NH LLS #661 E-mail address: kevin@surveynh.com

ENGINEER INFORMATION

Name of Engineer and Company (Licensed in N.H.) Stephen J. Haight, PE - Civilworks New England

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-749-0443

Professional License #: NH PE #7978 E-mail address: shaight@civilworksne.com

LANDSCAPE ARCHITECT INFORMATION

Name of Landscape Architect and Company (Licensed in N.H.) N/A

Address _____ Telephone #: _____

Professional License #: _____ E-mail address: _____

SOIL SCIENTIST INFORMATION

Name of Soil Scientist and Company (Licensed in N.H.) Bruce A. Gilday, CSS, CWS - BAG Land Consultants

Address 43 Rockingham Street Concord, NH 03301 Telephone #: 603-228-5775

Professional License #: NH CSS#012, NH CWS#088 E-mail address: bagilday@comcast.net

CONSERVATION EASEMENT HOLDER

Name of Easement Holder: N/A Telephone #_____

Address Easement Holder: _____

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. Furthermore, I/We submit that the existing conditions sheet of the plan represents the lot in question, and that no alteration of the site shall take place during Planning Board review up to and including the pre-construction meeting. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (*if different from owner*): _____ Date: _____

Signature of Agent: _____ Date: _____

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 8/5/24

AUTHORIZATION TO COMPLETE THE PROJECT ON SUBJECT PROPERTY

I, and my successors, hereby authorize the City of Dover and its assigns to enter my property for the purpose of completing the site work as required by the approved plan should the letter or credit or other surety be called. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (*if different from owner*): _____ Date: _____

CERTIFICATION OF FEES

I, and my successors, hereby certify that I understand that the City of Dover collects impact fees, utility investment fees and inspection fees for projects developed in Dover. Said fees must be paid before a Certificate of Occupancy can be obtained for a structure, unless a different payment schedule is agreed to by the applicant and the City prior to approvals being issued by the Dover Planning Board. Additionally, should the property be in "Current Use" it will be subject to the Land Use Change Tax.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (*if different from owner*): _____ Date: _____

CERTIFICATION OF PUBLIC ROADWAY ACCEPTANCE

I, and my successors, hereby certify that I understand that the acceptance of a roadway as a public road is an action of the City Council in its sole and complete discretion. In order for the City Council to consider accepting a road as public, it must be free of encumbrances. No roadway with private utility easements shall be accepted as a public road by the City unless the easements are expunged prior to the transfer of land to the City. License agreements for any and all private utilities within the right of way may be granted by the City upon acceptance of the unencumbered roadway consistent with applicable state law.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (*if different from owner*): _____ Date: _____

CITY OF DOVER SUBDIVISION
LIST OF ABUTTERS

Pursuant to RSA 676:4, the State Law of New Hampshire, the City of Dover is required to notify the applicant, abutters (including holders of conservation easements), and any professional whose seal is on the plan, of the public hearing by certified mail, return receipt requested. Staff will provide the abutter information, while the applicant must provide accurate contact information for the owner, applicant and professional agents representing the project.

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS
G	2-1	Del Sol Dover, LLC	340 Central Avenue, Suite 202 Dover, NH 03820

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS
Kevin McEneaney, LLS	McEneaney Survey Associates	P.O. Box 1166 Dover, NH 03821
Stephen J. Haight, PE	Civilworks New England	P.O. Box 1166 Dover, NH 03821
Bruce A. Gilday, CWS	BAG Land Consultants	43 Rockingham Street Concord, NH 03301

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

PLANNING BOARD FEE SCHEDULE/INVOICE

(Revised July 24, 2023)

Below are the fees associated with plan review and are subject to a nonrefundable application fee to cover administrative expenses. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover".

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):

- ☑ SUBDIVISION Application fee $200.00 + $150.00 x # 2 new lots created = $ 500.00
- ☐ LOT LINE ADJUSTMENT Application fee $200.00 + $100.00 X # ___ of lots involved = $_____
- ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee $200.00 = $_____
- ☐ SITE REVIEW – RESIDENTIAL Application fee $200.00+ $100.00 x # __ per dwelling unit =$_____
- ☐ SITE REVIEW – NON-RESIDENTIAL Application fee $200.00 + (not to exceed $10,000)
  - New construction $.15 sq. ft. x # _____ sq. ft.= $_____
  - Additions (new floor space) $.10 per sq. ft. x # _____sq. ft.= $_____
- ☐ MOTEL/HOTEL $35.00 x # ___ per lodging unit= $_____
- ☐ CHANGE OF USE Application fee $200.00 + (not to exceed $5,000)
  - Existing floor spaces $.10 per sq. ft. x # _____ sq. ft. = $_____
- ☐ CONDITIONAL USE PERMIT Application fee $200.00 x # _____ per Application = $_____
- ☐ GRAVEL PIT/ EXCAVATIONS
  - Application fee $50.00= $_____
  - Permit fee $75.00= $_____
- ☐ EXTENSIONS/AMENDMENTS/WAIVERS FOR AN APPROVED PLAN Application fee $200.00 = $_____
- ☐ REQUEST FOR REZONING Application fee $200.00 = $_____
- ☐ DRIVEWAY WAIVER Application fee $200.00 = $_____
- ☑ **TOTAL IMPERVIOUS PAVED AREA** (for new development, roadways or additions to existing parking lots, (not to exceed $10,000)) Application fee of $200.00 is N/A if it is part of a Site Review or Subdivision Plan. $200.00 + $.07 per sq. ft. x # 20,818 sq. ft. = $ 1657.26

SUBTOTAL PLAN REVIEW FEE = $ 2157.26

AND

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will review the list for accuracy and provide to us the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
  - Certified letters fee # _____ of x $10.00= $_____
- ☐ Certified letters fee: # of abutters _____ X $10.00= $_____
- ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters _____ X $1.00= $_____
- ☐ Creating/Printing Abutter Labels in triplicate per sheet _____ x $10.00= $_____

C. Foster's newspaper public notice fee $120.00 x # _____ applications = $_____

SUBTOTAL = $_____

TOTAL INVOICE AMOUNT = $_____

PLAN REVIEW FEE COLLECTED/PAID = $ _____

BALANCE DUE = $ _____

The amount due must be paid 28 hours prior to the Planning Board Meeting, to be heard.

City of Dover, New Hampshire
MINOR SUBDIVISION SUBMISSION CHECKLIST

[Revision Date: May 18, 2019]

This review checklist is intended to assist the applicant in the planning process of preparing a Subdivision application for Planning Board action. The size of the project will determine the types of information required for review, therefore, a **pre-application conference** with the Planning Department to determine the list of items that must be completed is strongly encouraged.

Plan Review Fees are due along with three (3) full size and twelve (12) half size (11x17), folded, copies of the plan set and materials, 3 weeks prior to the Planning Board meeting. Abutter/Notice Fees will be invoiced and are due 28 hours prior to Planning Board.

The applicant is cautioned that this checklist is only a guide and is not intended to be a complete list of all subdivision requirements. Please refer to the Subdivision Regulations for full details.

APPLICANT: Del Sol Dover, LLC File Number: _____

PROJECT TITLE: Subdivision Plan of Land

PROPERTY LOCATION: Crosby Road Tax Map: G Lot: 2-1

	Where/How Provided	Reviewed
1. Completed and signed Application form	✓	
2. Plan Review Fees are provided	✓	
3. Electronic copy of the surveyed plat layout	✓	
4. Electronic copy of supplementary materials and application	✓	
5. Waiver requests to the Subdivision Regulations, with written justification	N/A	
6. Conditional Use Permit applications	✓	
7. Fifteen folded copies of subdivision plan w/scale of not less than 1"=50' or 1"=100' for larger subdivisions. Plans shall contain the following items as appropriate:	✓	
Location map at appropriate scale	✓	
Proposed subdivision name and title and Planning File #	✓	
Date, north arrow and scale	✓	
Names of all abutting property owners	✓	
Name and address of owners and/or applicants	✓	
Signature & stamp of NH licensed land surveyor and/or engineer	✓	
Zoning District boundaries, including any special or overlay districts	✓	
Location of Conservation District areas	✓	
Location, names and widths of existing and proposed streets, including pavement widths, grades, curbs and crosswalks	✓	
Location and widths of existing & proposed easements & right of ways	✓	
Location and widths of existing and proposed sidewalks	N/A	
Existing and proposed property lines with dimensions and bearings tied into Dover's Geographic Information System coordinate system	✓	
Existing and proposed lot areas in square feet	✓	
Existing and proposed topographic information at two foot intervals	✓	
Existing and proposed buildings and structure locations	N/A	
Minimum building setbacks or build to lines on all lots	✓	
Location and size of existing and proposed electric, telephone, gas cable and other underground utilities	✓	

	Explain How Provided	Reviewed
Existing and proposed water lines and fire hydrants, including materials and capacity needed	✓	
Location and materials of sanitary sewage facilities within project site and projected additional peak hour sewer load	✓	
Existing and proposed septic system, including test pit locations and results and NHDES subdivision permit number	N/A	
Existing and proposed stormwater lines and facilities	N/A	
Location of Flood Hazard Zone	N/A	
Location of all bodies of water and watercourses	✓	
Location of wetlands and buffers	✓	
Existing natural features and/or significant vegetation on property	✓	
Soil types	✓	
Map and lot numbers for existing and proposed lots as assigned by Tax Assessor	✓	
Location of all land offered for dedication for public use or land to be held in common by property owners of the subdivision	N/A	
Location, material and size of existing and proposed permanent monuments	✓	
Existing railroad lines	✓	
Note regarding solid waste disposal	N/A	
All applicable Dover Common Subdivision notes	✓	
8. Construction Detail Sheets shall contain the following information (if appropriate):		
Profiles showing existing & proposed elevations along the center lines of proposed streets & within 100' of intersections with existing streets	✓	
Profiles showing the locations & a typical cross-section detail of streets	✓	
Location of street trees, street lighting poles and street signs	N/A	
Location, size and invert elevations of existing and proposed sanitary sewers, stormwater drains and fire hydrants	✓	
Location and size of all water, gas and other underground utilities	✓	
9. Additional Information if appropriate	N/A	
Stormwater Management Plan depicting the existing and proposed storm drainage system and engineered drainage analysis	✓	
Stormwater Management System Operation and Maintenance Plan	✓	
Letter to Serve from Public and Private Utilities	N/A	
Erosion and Sedimentation Control Plan	✓	
Proposed restrictive covenants or homeowners association documents	N/A	
Dates and permit numbers of all required state and federal permits	N/A	
If wetland buffer, indicate placards locations, as applicable	N/A	
Provide additional exhibits/technical data determined appropriate by the Planning Board or its staff as required	TBD	

REVIEWED BY: _____ DATE_____

City of Dover, New Hampshire
CONDITIONAL USE PERMIT APPLICATION

[Revision Date: October 19, 2020]

Office Use Only	Project #:		Date Received:	
	Amount Paid:		Time Received:	

APPLICANT AND OWNER INFORMATION

Name of Applicant: Del Sol Dover, LLC Telephone # 603-749-2800

Address of Applicant: 340 Central Avenue, Suite 202 Dover, NH 03820

E-Mail Address: chad@summitlanddev.com

Name of Property Owner (if different from applicant): N/A Telephone #

Address of Property Owner:

PROPERTY INFORMATION

Assessor's Map # G Lot(s) # 2-1

Address of Property: Crosby Road

Zoning District(s) CM Overlay District(s) None

Existing Use of Property: Vacant, Industrial Park

CONDITIONAL USE PERMIT INFORMATION

Type of Conditional Use Permit (Check All That Apply):

☐ Conservation District	☐ RCM Use Overlay District	☐ Gateway District
☐ Groundwater Protection	☐ Off-Street Parking and Loading	☐ Alternative Treatment Center
☒ Wetland Protection District	☐ Central Business District	☐ Heritage Residential District

Describe Proposed Use or Activity That Requires Conditional Use Permit and Describe Any Impacts:

To construct a 75' wide extension of Crosby Road that would result in 4,861 s.f. of wetland buffer impact. No wetlands will be disturbed.

List Any Associated State or Federal Permits That Have Been or Will Be Applied For and Indicate Their Status: None

Name of Professional That Prepared Plans: Kevin McEneaney - McEneaney Survey Associates
Stehpen J. Haight, PE - Civilworks New England

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-749-0443

Professional License #: NH LLS #661
NH PE #7978 E-mail address: kevin@surveynh.com
shaight@civilworksne.com

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (if different from owner): _____ Date: _____

Signature of Agent: _____ Date: _____

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 8/5/24

CITY OF DOVER CONDITIONAL USE
LIST OF ABUTTERS

Pursuant to RSA 676:4, the State Law of New Hampshire, the City of Dover is required to notify the applicant, abutters (including holders of conservation easements), and any professional whose seal is on the plan, of the public hearing by certified mail, return receipt requested. Staff will provide the abutter information, while the applicant must provide accurate contact information for the owner, applicant and professional agents representing the project.

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS
G	2-1	Del Sol Dover, LLC	340 Central Avenue, Suite 202 Dover, NH 03820

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS
Stephen J. Haight, PE	Civilworks New England	P.O. Box 1166 Dover, NH 03821
Kevin McEneaney, LLS	McEneaney Survey Associates	P.O. Box 1166 Dover, NH 03821
Bruce A. Gilday, CWS	BAG Land Consultants	43 Rockingham Street Concord, NH 03301

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

PLANNING BOARD FEE SCHEDULE/INVOICE

(Revised July 24, 2023)

Below are the fees associated with plan review and are subject to a nonrefundable application fee to cover administrative expenses. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover".

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):

- ☐ SUBDIVISION Application fee $200.00 + $150.00 x # _____ new lots created = $_____
- ☐ LOT LINE ADJUSTMENT Application fee $200.00 + $100.00 X # ___ of lots involved = $_____
- ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee $200.00 = $_____
- ☐ SITE REVIEW – RESIDENTIAL Application fee $200.00+ $100.00 x # __ per dwelling unit =$_____
- ☐ SITE REVIEW – NON-RESIDENTIAL Application fee $200.00 + (not to exceed $10,000)
  - New construction $.15 sq. ft. x # _____ sq. ft.= $_____
  - Additions (new floor space) $.10 per sq. ft. x # _____sq. ft.= $_____
- ☐ MOTEL/HOTEL $35.00 x # ___ per lodging unit= $_____
- ☐ CHANGE OF USE Application fee $200.00 + (not to exceed $5,000)
  - Existing floor spaces $.10 per sq. ft. x # _____ sq. ft. = $_____
- X CONDITIONAL USE PERMIT Application fee $200.00 x # 1 per Application = $ 200.00
- ☐ GRAVEL PIT/ EXCAVATIONS
  - Application fee $50.00= $_____
  - Permit fee $75.00= $_____
- ☐ EXTENSIONS/AMENDMENTS/WAIVERS FOR AN APPROVED PLAN Application fee $200.00 = $_____
- ☐ REQUEST FOR REZONING Application fee $200.00 = $_____
- ☐ DRIVEWAY WAIVER Application fee $200.00 = $_____
- ☐ **TOTAL IMPERVIOUS PAVED AREA** (for new development, roadways or additions to existing parking lots, (not to exceed $10,000)) Application fee of $200.00 is N/A if it is part of a Site Review or Subdivision Plan. $200.00 + $.07 per sq. ft. x # _____ sq. ft. = $_____

SUBTOTAL PLAN REVIEW FEE = $ 200.00

AND

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will review the list for accuracy and provide to us the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
  - Certified letters fee # _____ of x $10.00= $_____
- ☐ Certified letters fee: # of abutters _____ X $10.00= $_____
- ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters _____ X $1.00= $_____
- ☐ Creating/Printing Abutter Labels in triplicate per sheet _____ x $10.00= $_____

C. Foster's newspaper public notice fee $120.00 x # _____ applications = $_____

SUBTOTAL = $_____

TOTAL INVOICE AMOUNT = $_____

PLAN REVIEW FEE COLLECTED/PAID = $ _____

BALANCE DUE = $ _____

The amount due must be paid 28 hours prior to the Planning Board Meeting, to be heard.

PERMIT SNAPSHOT REPORT COND-2024-0025
FOR CITY OF DOVER, N.H.

Permit Type	Conditional Use	**Project:**		**App Date:**	08/06/2024
Work Class:	Environmental	**District:**	None	**Exp Date:**	NOT AVAILABLE
Status:	Fees Paid	**Square Feet:**	0.00	**Completed:**	NOT COMPLETED
Valuation:	$0.00	**Assigned To:**	Blonigen, Rachel	**Approval Expire Date:**	

Description: Wetland Buffer Impact (4861 sf) for construction of extension to Crosby Road.

Parcel:	**Address:**	**Zone:**
G0002-001000 Main	Littleworth Road Main Dover, NH 03820	CM(Non-Residential - Commercial Manuf

Plan Preparer
Stephen Haight
Business: (603) 749-0443

Surveyor
Kevin McEneaney
Business: (603) 742-0911

Owner
Chad Kageleiry
Business: (603) 749-2800

Wetlands Scientist
Bruce Gilday
Business: (603) 228-5775

Applicant
Civilworks New England
Steve Haight
181 Watson Road PO Box 1166
Dover, NH 03820
Business: (603) 749-0443
Mobile: (603) 817-6651

Permit Custom Fields

Select Permit Type	Wetland Protection District	General Purpose	New Construction	Project Zone	Non-Residential
What is the parcel zoned?	CM	New Change in Impervious/Paved Area (sq ft)	20818	Work	Construction of road extension to impact wetland buffer (4861 sf).
permitstatefed					

Attachment File Name	Added On	Added By	Attachment Group	Notes
Signature_Steve_Haight_8/6/2024.jpg	08/06/2024 12:51	Haight, Steve		Uploaded via CSS
Permit Snapshot Report.pdf	08/06/2024 12:52	Service, EnerGov		Attached by IO - ATTACH: Initial Permit Snapshot

Invoice No.	Fee	Fee Amount	Amount Paid
INV-00008885	Planning Impervious Paved Area Fee	$1,457.26	$1,457.26
	Planning General Application Fee	$200.00	$200.00
	Total for Invoice INV-00008885	$1,657.26	$1,657.26
	Grand Total for Permit	**$1,657.26**	**$1,657.26**

Submittal Name	Status	Received Date	Due Date	Complete Date	Resubmit	Completed
Conditional Use Review v.1	In Review	08/07/2024	09/04/2024		No	No

Item Review Name	Department	Assigned User	Status	Assigned Date	Due Date	Completed Date
Planning	Planning	Bassegio, Erin	In Review	08/07/2024	09/04/2024	

Workflow Step / Action Name	Action Type	Start Date	End Date
Review v.1		08/07/2024 14:29	
Confirm application complete v.1	Generic Action		08/07/2024 14:30
Conditional Use Review v.1	Receive Submittal	08/07/2024 0:00	
Planning Board v.1			
Planning Board Agenda v.1	Task		
Invoice for Notices v.1	Task		
Send Notices v.1	Task		

PERMIT SNAPSHOT REPORT (COND-2024-0025)

Planner Creates Staff Recommendations v.1	Permit Activity
Distribute Planning Board Materials v.1	Task
Planning Board Hearing v.1	Hold Hearing
Planning Board Decision v.1	Permit Activity
NOD Sent to Applicant v.1	Create Report
Issue Permit v.1	
Verify Fees Prior to Permit v.1	Generic Action
Issue and Review Permit v.1	Generic Action
Print and Email Permit v.1	Generic Action
Plans uploaded to Treeno v.1	Generic Action
Internal Notification of Plan Completion v.1	Generic Action
Recording v.1	Task

DEL SOL DOVER, LLC
340 Central Avenue, Suite 202
Dover, New Hampshire 03820

August 5, 2024

City of Dover
Planning Board
288 Central Avenue
Dover, NH 03820

Re: Minor Subdivision (3 Lots)
Tax Map G, Lot 2-1, Crosby Road Extension
Dover, New Hampshire

LETTER OF AUTHORIZATION

As Owner and Applicant for the above referenced project, I hereby authorize Civilworks New England and McEneaney Survey Associates to represent Del Sol Dover, LLC to the State of New Hampshire, the City of Dover Planning Board and any other Dover Boards or Committees relative to the pursuit of permits for the development of the subject parcel.

Respectfully,

Charles P. Kageleiry, Manager
DEL SOL DOVER, LLC

PROJECT NARRATIVE
for
DEL SOL DOVER, LLC
Minor Subdivision Application
Crosby Road Extension
Tax Map G, Lot 2-1

PROJECT OVERVIEW & SITE CHARACTERISTICS
The project parcel is shown on Tax Map G, as Lot 2-1, is located within the CM District and consists of 20.80± acres, currently undeveloped. This proposal is for a minor (3 lot) subdivision.

The project will create 2 additional lots from the existing lot in the following configuration:

- Map G Lot 2-1B (LOT 1) consisting of 362,325 s.f .(8.32 acres)
- Map G Lot 2-1 (LOT 2) consisting of 267,845 s.f. (6.15 acres)
- Map G Lot 2-1A (LOT 3) consisting of 219,168 s.f. (5.03 acres)

These lots will be accessed from a proposed 75' wide right-of-way being shown as an extension of Crosby Road which is currently 75' wide. The intent is that, when completed, the 75' wide extension will be accepted by the City of Dover as a public right-of-way. The proposed road extension design will include associated drainage improvements and public utilities. The proposed lots, when developed, will be served by proposed utilities extending from the existing Crosby Road ROW, including municipal water and sewer connections, underground electric service, natural gas service. There will be wetland buffer impacts associated with the ROW extension. Please see Conditional Use Permit application and narrative.

WETLAND SETBACK IMPACT TYPE
The project road design will require a Conditional Use Permit from the City of Dover. Approximately 4,861 s.f. of wetland buffer will be impacted by construction of the proposed road extension and its associated drainage and grading. The project does not impact bogs, marshes, sand dunes, tidal wetlands, cedar swamps, undisturbed tidal buffer zone, or involve any work within 50 feet of a salt marsh. The project is not located within 100 feet of prime wetlands.

DRAINAGE
The parcel is located at the end of Crosby Road within an established industrial park. The proposed subdivision of the 20.80-acre lot abuts other commercial properties to the west, an active railroad track to the south and Knox Marsh Brook to the east. The site is currently undeveloped. The 20.80-acre watershed of the parcel includes the project site as well as a portion of Crosby Road. On site soils are a mix of Scantic, Deerfield, and Deerfield Variant soils. The Scantic series soils are HSG D with Deerfield and Deerfield Variant series soils being classified as HSG B.

The post development watershed is modeled utilizing the same points of analysis as the predevelopment watershed, allowing direct comparison of the peak runoff between the pre- and post- developed conditions (see drainage report).

UTILITIES
The proposed project will connect to City of Dover water and sewer as well as Unitil for natural gas, and Eversource for electricity. Water, sewer, electric lines, and natural gas lines are currently located within Crosby Road. Building connections will be made per the City's Community Services Utility Division and Fire Department requirements and standards.

CONDITIONAL USE NARRATIVE
§170-27.1
WETLAND PROTECTION DISTRICT
for
DEL SOL DOVER, LLC
Crosby Road Extension (Minor Subdivision)
Tax Map G, Lot 2-1

F. Conditional use approval.

(1) Conditional use approval may be granted by the PLANNING BOARD (RSA 674:21II) after proper public notice and public hearing, for construction within the Wetland Protection District or buffer. Said construction may include but is not limited to a road or other accessway, utility right-of-way, communication lines, power lines and pipelines, STRUCTUREs, and parking LOTs provided that the proposed construction complies with the following standards:

(a) Practicable Alternative: There is no practicable alternative that would have a less adverse impact on the area. **The proposed roadway, side slopes, and bio-retention basin location were chosen to avoid wetland impacts and to minimize wetland buffer impacts. The areas of impervious impact to the wetland buffer were minimized by utilizing the site characteristics including existing slope information to minimize additional side slope impacts.**

(b) Avoidance: The potential impacts have been avoided to the maximum extent practicable. The APPLICANT will demonstrate by plan and example that the proposed construction represents the least impacting alternative. **There are 4,861 s.f. of wetland buffer impacts associated with the grading and drainage and the roadway extension and emergency vehicle maneuvering for the project. The design incorporates unique site characteristics including existing slope, and soil type to minimize wetland buffer impacts.**

(c) Minimization: Any unavoidable impacts have been minimized. No reasonable Alternative to the proposed construction exists which does not impact a wetland, or which has less detrimental impact on a wetland. Design, construction, and maintenance methods will be prepared by a registered engineer to minimize detrimental impacts to the wetlands and will include restoration of the site as nearly as possible to its original grade. **There are 4,861 s.f. of wetland buffer impacts for the roadway extension, grading and utilities. All impacts have been minimized to the greatest extent practicable.**

(d) Mitigation: If the APPLICANT is required by State rules to prepare a compensatory mitigation plan, the APPLICANT shall provide the Conservation Commission and PLANNING BOARD with one copy each of said plan for their review. **Mitigation is not required.**

(e) Approval for the wetlands impact has been received from the NHDES Wetlands Bureau pursuant to Section G (3), below. **A NHDES wetland permit application is not applicable.**

(f) To assess and summarize the wetlands' functions and values as denoted in the NH Method and Section 170.27.1(B)(2). **The function of the abutting wetland serves as a passage for runoff from the Crosby Road industrial park and Crosby Road. The existing ditches serve the City of Dover's drainage system by allowing continuous stormwater flows and eliminating flooding on Crosby Road. No changes are proposed to the wetland; therefore, this project prevents the destruction of and prevents significant changes to the wetland. The main function of these wetlands is as stormwater and stream conveyance and allowing unobstructed continued flow from Crosby Road areas. Due to low soil conductivity, recharging to groundwater is limited. It is our opinion that this project complies with Section 170.27.1(B)(2).**

SITE DEVELOPMENT DESIGN CRITERIA NARRATIVE
§153-14
STORMWATER MANAGEMENT
for
DEL SOL DOVER, LLC
Crosby Road Extension
Tax Map G, Lot 2-1

A. Stormwater management, erosion control and flood hazards.

(1) Purpose and objective. These regulations establish standards to manage the discharge of runoff to the City of Dover's municipal storm sewer system and water bodies, in a manner compliant with the requirements of state and federal law, including provisions of the federal stormwater management legislation for municipal separate storm sewer systems (MS4), as amended. These provisions and standards are implemented for the purpose of:

(a) Managing stormwater runoff to protect water quality and quantity. **The proposed roadway development has been designed in accordance with NH DES AoT permitting requirements to include the treatment and mitigation of stormwater runoff from the roadway.**

(b) Minimizing the contribution of a pollutant for which a water body is impaired to the maximum extent practicable (MEP). **The proposed development has been designed in accordance with NH DES AoT permitting requirements to include the treatment of stormwater runoff from all impervious areas of the roadway to minimize pollutant runoff.**

(c) Causing no discharge of runoff to an adjacent property in excess of runoff discharge in the existing developed or undeveloped condition. **The proposed development does not propose an increase in the peak rate of runoff from the project site.**

(d) Encouraging the use of low-impact development (LID) strategies. **The project proposes the use of bioretention practices for stormwater treatment.**

(2) Applicability of the stormwater standards.

(a) All projects requiring site plan or major subdivision approval shall be subject to the following set of stormwater standards according to the amount and type of disturbance. Applicability is as follows: **The project does not qualify for the redevelopment standards but is a precursor to future development, as such, the stormwater standards apply.**

[1] The minimum protections and management standards shall apply to all projects. **The design incorporates these standards.**

[2] The stormwater management for new development standards shall apply to any project that results in a contiguous land disturbance of more than 20,000 square feet or creates more than 4,000 square feet of new impervious area. **The design incorporates these standards.**

[3] The stormwater management for redevelopment standards shall apply to any project that results in a contiguous land disturbance of more than 20,000 square feet or creates more than 4,000 square feet of new impervious area where the existing land use has been previously developed as commercial, industrial, institutional, governmental, recreational, or multifamily. **The redevelopment standards are not applicable to this project.**

(b) All projects of such magnitude as to require a permit from the National Pollutant Discharge Elimination System (NPDES) Program or the New Hampshire Department of Environmental Services (NHDES) Alteration of Terrain (AoT) Program shall also comply with the standards of the Environmental Protection Agency (EPA) and/or NHDES permits and this section, whereas the stricter standards shall apply. **The project will require NH DES AoT permitting, a NH DES Wetland Permit, and a NPDES CGP through the EPA. The design of the project has incorporated the associated standards of these agencies.**

(3) Design standards.

(a) Minimum protections and management standards.

[1] Where applicable, all development must comply with the EPA Phase II Stormwater Rules and the City's MS4 permit, as amended. **The project complies with the City's design and stormwater requirements.**

[2] Existing surface waters, including ponds, rivers, perennial and intermittent streams (natural or channelized), and wetlands (including vernal pools), shall be protected by the minimum buffer setback as specified in Chapter 170, Zoning, § 170-27.1. Stormwater and erosion and sediment control best management practices (BMPs) shall be located outside the specified buffer zone unless otherwise approved by the Planning Board. **The project proposes a wetland crossing for access to the site and wetland buffer impacts as part of the construction. A Conditional Use Permit application has been submitted as part of the application process.**

[3] Low-impact development (LID) site planning and design strategies shall be used to the MEP in order to reduce the generation of the stormwater runoff Volume for both new and redevelopment projects. An owner/applicant must document why LID strategies are not appropriate if not used to manage stormwater. **LID strategies were implemented to the maximum extent practicable. The site was evaluated for infiltration practices but the site characteristics, including soil types, topography, depth to the SHWT and depth to ledge prevent the use of infiltration practices.**

[4] All proposed stormwater practices and measures shall be installed and maintained in accordance with manufacturers' specifications and performance specifications outlined in the New Hampshire Stormwater Management Manual Volume 2 (December 2008 or current revision) a copy of which can be found on The NHDES website. **The project incorporates stormwater BMP designed in accordance with NH DES AoT permitting requirements. Details provided for construction are aligned with the NH Stormwater Manual and the engineer of design will be required to review material submittals and witness the installation of the practices. NH DES AoT will require a letter from the design engineer indicating the site stormwater BMP's were installed as designed and permitted.**

[5] All storage facilities for fuel, chemicals, chemical or industrial wastes, and biodegradable raw materials shall meet the regulations of the NHDES, including but not limited to those involving underground storage tanks, aboveground storage tanks, hazardous waste, and best management practices for groundwater protection (Part Env Wq 401). **The project does not propose the storage of the referenced materials onsite.**

[6] Salt and other deicing materials shall be stored under cover or located such that no direct discharges to receiving waters are possible. Snow storage areas shall be located such that no direct discharges to receiving waters are possible. See the NHDES guidance fact sheet on road salt and snow disposal. **The project does not propose the storage of deicing materials onsite.**

[7] The use of sodium-chloride-based materials for winter maintenance shall be the minimum necessary for safety. The use of sodium-chloride-based materials is discouraged within the groundwater protection districts. **The roadway is an extension of the existing Crosby Road and is being proposed as a City road. The City currently practices salt minimization plan as part of their winter maintenance practices.**

[8] Impervious surfaces for parking areas and roads shall be minimized to the extent possible. **The project design incorporated the minimization of impervious areas to the maximum extent possible. All aspects of the design including road width, and turning areas were evaluated.**

[9] Stormwater runoff from new impervious surfaces shall be directed to a best management practice for flow mitigation, treatment and/or infiltration. **The proposed design includes the treatment of stormwater runoff from all impervious areas of the proposed roadway.**

(b) Stormwater management for new development.

[1] Runoff of impervious surfaces shall be treated to provide 80% removal of total suspended solids (TSS) and 50% removal of both total nitrogen and phosphorus. Removal rates shall be determined using approved manufacturer's pollutant removal efficiency analysis or the pollutant removal efficiencies outlined in the New Hampshire Stormwater Management Manual Volume 1, Appendix E (December 2008 or current revision), a copy of which is available from the NHDES website. **The project utilizes bioretention basins for treatment of all impervious areas. This system provides 90% removal of TSS and 65% removal of both total nitrogen and phosphorous per the NH Stormwater Manual.**

[2] Rainfall amount shall be based on current extreme precipitation estimates obtained from the Northeast Regional Climate Center. **The design incorporates NRCC precipitation amounts and the associated storm distribution data. As the project will require a NH DES AoT permit, the precipitation amounts have been increased by 15% accordingly.**

[3] Measures shall be taken to control the post-development peak rate runoff so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events. **The proposed design mitigates post-development peak rate runoff to the pre-developed conditions.**

[4] Measures shall be taken to control the post-development surface water runoff volume so that it does not exceed predevelopment runoff for the two-, ten-, twenty-five- and fifty-year, twenty-four-hour storm events. For sites where infiltration/recharge is limited or not practicable, the owner/applicant must demonstrate that the project will not cause or contribute to flooding or functional impairments to streets, adjacent properties, and downstream properties. **The site was evaluated for the inclusion of infiltration practices but the site characteristics, including soil types, topography, depth to the SHWT prevent the use of infiltration practices. The project proposes a slight**

increase in the volume of runoff from the site. The increased volume of runoff will be discharged directly to a large wetland complex associated with Knox Marsh Brook. The increase in volume will not cause flooding to adjacent or downstream properties.

[5] Infiltration rates for designing groundwater recharge practices shall be determined in accordance with Section Env-Wq 1504.14. **The site was not feasible for infiltration practices and as such infiltration rates were not calculated.**

[6] Stormwater conveyance practices shall be sized appropriately to convey the ten-year, twenty-four-hour storm event without overtopping or causing flooding on the property. **Stormwater conveyance practices are designed to ensure they pass the 50-yr, 24-hour storm events without overtopping.**

[7] For large projects adding greater than or equal to 10 acres of impervious cover, or projects located in known areas of flooding concern, or specifically within areas with a 1% chance of being inundated by water in any given year, the owner/applicant shall submit a supplementary report that describes how the project will not increase the future flooding potential and complies with the AoT requirements pertaining to floodplain impacts as described in Section Env-Wq 1503.09, regardless of whether an AoT permit is required. **The project is located outside of the 0.2 percent annual chance floodplain. The project does not propose permanent or temporary disturbance or alteration of terrain within the flood plain.**

[8] The design of the stormwater management systems shall take into account upstream and upgradient runoff that flows onto, over, or through the site to be developed or redeveloped and provide for this contribution of runoff. **The project has incorporated offsite and upgradient stormwater runoff in support of the design for the wetland crossing culvert and the area of Quality Way captured by the closed drainage system.**

[9] Seasonal high-water table elevations must be accounted for in all BMP design criteria. **Test pit information was utilized in determining the SHWT associated with the bioretention basin design.**

[10] Access for maintenance of stormwater facilities must be included as part of the design, where necessary. Access easements may be required. **Stormwater facilities are included with the roadway and will be incorporated into each of the sites as they get developed. Stormwater access easements may be required for this project.**

[11] Plantings in treatment areas shall be native grasses, shrubs and/or other native plants in sufficient numbers and density to prevent soil erosion and to achieve water-quality treatment. **N/A**

(c) Stormwater management for redevelopment. In order to determine the stormwater requirements for redevelopment projects, the percentage of the site covered by existing impervious areas must be calculated. Stormwater requirements for redevelopment will vary based upon the amount of site surface area that is covered by existing impervious surfaces. **The project does not meet redevelopment requirements and this section is Not Applicable (N/A).**

[1] For sites meeting the definition of a redevelopment project and having less than 40% existing impervious surface coverage, the stormwater management requirements will be the same as new development projects, with the important distinction that the applicant can meet those requirements either on site or at an approved off-site location (i.e., off-site mitigation). The applicant must satisfactorily demonstrate that impervious area reduction, LID strategies and BMPs have been implemented on site to the MEP. **N/A**

[2] For sites meeting the definition of a redevelopment project and having more than 40% existing impervious surface coverage, stormwater shall be managed in accordance with one or more of the following techniques, listed in order of preference: **N/A**

[a] Implement measures on site that result in mitigation and treatment of at least 30% of the existing impervious cover as well as 50% of the additional proposed impervious surfaces and pavement areas through the application of LID; or

[b] Implement other LID techniques on site to the MEP to provide mitigation and treatment for at least 50% of the entire site area.

[3] The owner/applicant may utilize off-site mitigation to meet the redevelopment requirements when the following standards have been met. **N/A**

[a] The owner/applicant shall demonstrate, to the satisfaction of the Planning Board, that on-site treatment has been implemented to the MEP.

[b] The owner/applicant shall find an approved, off-site location within the same watershed as the project site or within the drainage area of the same receiving water body.

[c] Off-site mitigation shall be equivalent to no less than the total area of pervious cover not treated on site.

[d] The owner/applicant shall submit a full design of the proposed off-site measures for review and approval.

[e] The owner/applicant must also demonstrate that there is no downstream drainage or flooding impact as a result of not providing on-site management.

(d) Erosion control standards during construction. The following standards shall be applied in project planning and shall be implemented prior to and during construction activity: **The plan set includes temporary and permanent sediment and erosion control practice notes and details in support of meeting the erosion control standards.**

[1] All proposed measures shall meet, at a minimum, the design standards for best management practices set forth in the New Hampshire Stormwater Management Manual Volume 3 (December 2008 or current revision), a copy of which is available from the NHDES website. **The sediment and erosion control details provided in the plan set are all designed in accordance with the NH Stormwater Manual.**

[2] When a project requires a stormwater permit from the EPA Construction General Permit (CGP) Program, copies of the stormwater pollution prevention plan (SWPPP) inspections shall be provided to the Community Services Department. **If required, a SWPPP will be provided prior to construction.**

[3] Stripping of vegetation shall be done in a manner that minimizes soil erosion. Whenever practical, natural vegetation shall be retained, protected, or supplemented. **The Erosion Control Notes in the provided plan set indicate that the smallest practical area shall be disturbed during construction.**

[4] The area of land disturbance shall be kept to a minimum and be limited to an area only large enough to accommodate construction activities for a particular construction phase. **The Erosion Control Notes in the provided plan set indicate that the smallest practical area shall be disturbed during construction and that in no case shall greater than 5 acres be disturbed at any time.**

[5] Off-site surface water and runoff from undisturbed areas shall be diverted away from disturbed areas where feasible, or measures to convey stormwater through the project area without causing erosion of sediment must be included. The integrity of downstream drainage systems shall be maintained. **Direction to ensure that stormwater conveyance practices shall be stabilized prior to receiving stormwater runoff is included on the Erosion Control Notes sheet provided as part of this submittal.**

[6] Appropriate erosion and sediment control measures shall be installed prior to any soil land disturbance and must be reviewed and approved by the Community Services Department. **Construction scheduling and inspections will be discussed with Community Services at the required pre-construction meeting.**

[7] Perimeter site controls shall not be placed within wetland areas, stream channels or wetland buffers. **This project will require a City of Dover Conditional Use Permit for work within wetland buffers. Sediment and erosion control will be limited within the wetland buffer as identified and approved through these permits.**

[8] Disturbed soil areas shall be either temporarily or permanently stabilized. In areas where final grading has not occurred, temporary stabilization measures should be in place within seven calendar days for exposed soil areas that are within 100 feet of a surface water body or a wetland and no more than 14 calendar days for all other areas. Permanent stabilization should be in place within three calendar days following completion of final grading of exposed soil areas. **The definitions of, and direction for, stabilization of the site is provided on the Erosion Control Notes sheet provided as part of this submittal.**

[9] All temporary erosion and sediment control measures shall be maintained in functioning condition until final site stabilization is accomplished. A proposed BMP inspection schedule shall be included in the submittal. **The erosion control inspection scheduling requirements are identified on the Erosion Control Notes sheet provided as part of this submittal.**

[10] Additional temporary stabilization for the winter season consistent with NHDES guidelines shall be in place for disturbed areas that are not permanently stabilized by October 1, or at the discretion of the Community Services Department. **The NH DES AoT winter construction notes are identified on the Erosion Control Notes sheet provided as part of this submittal.**

[11] Special stabilization details shall be provided with the submission for any land disturbance on slopes equal to or steeper than 3:1. **Slopes greater than 3:1 require erosion control matting and a detail is provided in the plan set.**

[12] All temporary erosion and sediment control measures shall be removed after final site stabilization. Trapped sediment and other disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized within 30 calendar days unless conditions dictate otherwise. **Temporary practice details identify the need to remove sediment and/or stabilize the area once the practices have been removed.**

[13] For projects proposing to disturb and expose soils in areas of 10 acres or more at one time, a temporary (or permanent) sediment basin must be provided with storage for a calculated volume of runoff from a drainage area from a two-year, twenty-four-hour storm, or equivalent control measures, where attainable, until final stabilization of the site. Alternatively, the sediment of storage per acre of drainage area until final stabilization of the site. In determining appropriate locations and number of sediment basins needed, the operators may consider such factors as erodibility of site soils, slope lengths, available area on site, construction period and other unique site considerations. **The project does not propose the disturbance of greater than 10 acres of area.**

[14] Use of temporary sediment basins should avoid any additional vegetation clearing or site land disturbance not otherwise needed for post-construction. Sediment basin locations must be reviewed by the Community Services Department prior to construction and must consider the potential for off-site impacts, including public safety, especially as it relates to sediment movement and/or sediment basin failure, and alternative sediment controls must be used where site limitations preclude a safe design. **Temporary sediment basin locations, if constructed, will be discussed with Community Services prior to the construction of the practices. These discussions will occur upon submission/review of the SWPPP, if required.**

(e) Installation and construction inspections. The owner/applicant shall be responsible for inspection requirements as follow:

[1] The Community Services Department or its designated agent shall have access to the site to complete routine inspections. **Community Services access and inspection requirements will be discussed at the pre-construction meeting.**

[2] The Community Services Department shall be notified 24 hours prior to installation of a stormwater BMP in order to schedule an inspection. These inspections shall be completed during normal working hours. **The project notes provide direction for the contractor to notify the design engineer and the Community Services Department as required.**

[3] The Planning Board or Community Services Department may require the design engineer and/or an independent third party to provide inspection and oversight of the construction of the stormwater management facilities and erosion and sediment control measures at its discretion. Such oversight may be especially important for implementing techniques such as porous pavement or subsurface stormwater infiltration systems. The owner/applicant shall be responsible for all fees associated with third-party inspections. **NH DES AoT permitting requires the design engineer to provide a letter at the completion of work that indicates the stormwater practices were installed as designed.**

[4] All SWPPP inspections must be conducted by a qualified professional such as a professional engineer (PE), a certified professional in erosion and sediment control (CPESC), a certified erosion sediment and stormwater inspector (CESSWI), or a certified professional in stormwater quality (CPSWQ). Inspection reports shall be

submitted to the Community Services Department. **The project notes provide direction for the inspector to be qualified and for all reports to be submitted to the Community Services Department.**

[5] The owner is ultimately responsible for the installation, construction, inspection, and disposition of all stormwater management and erosion control measures required by the provisions of these regulations. **The project notes identify the owner as having the responsibility for ensuring the stormwater management and erosion control measures are installed as approved.**

(f) Stormwater management plan (SWMP) submittal requirements. At the discretion of the Planning Board or Community Services Department, a technical review by an independent third party may be required of any SWMP prepared under these regulations. Such a review shall be performed by a qualified professional consultant and the expense of which shall be the full responsibility of the owner/applicant. **The SWMP is a comprehensive set of documents that include, at a minimum, a drainage report, plan set, and Stormwater I&M Manual. These documents each serve a role in presenting the necessary information to the appropriate audience. The information required in this section is provided within the SWMP documents.**

[1] For projects requiring minimum protection standards, a plan including the following information shall be submitted:

[a] Description of erosion and sediment control measures as well as sequence for final stabilization of the project site. **This information is provided within the Erosion Control Notes within the plan set.**

[b] Proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns. **This information is provided within the drainage report and the Pre/Post Development Watershed Plans.**

[c] Description of LID proposed measures. **This information is provided in the drainage report and throughout the plan set and details.**

[2] For projects requiring new development or redevelopment standards, a drainage report that contains the following items shall be submitted: **The SWMP documents include the proposed information when applicable.**

[a] Description of construction period and earth movement schedule, including anticipated project start and completion dates, sequence and duration of grading and construction activities, sequence, and timing of installation and/or application of soil erosion and sediment control measures as well as sequence for final stabilization of the project site. **The SWMP documents include the proposed information when applicable.**

[b] Description of the on-site and adjacent wetlands, streams and other water resources, including methods used to identify these resources, and a description of any buffer setbacks that may apply, steep slopes, critical habitat, existing vegetation, areas with a 1% chance of being inundated by water in any given year, and whether any downstream water bodies are listed as impaired according to NHDES's most recent 303(d) list. **The SWMP documents include the proposed information when applicable.**

[c] Soils information for proposed disturbed areas shall be delineated by a certified soil scientist. For all other areas that contribute runoff to the project site, soil types may be identified in accordance with Natural Resources Conservation Service (NRCS) countywide soil survey. **The SWMP documents include the proposed information when applicable.**

[d] Description of existing drainage patterns, receiving water bodies or drainage infrastructure and soil types for recharge potential. **The SWMP documents include the proposed information when applicable.**

[e] Watershed area limits, including any off-site and upstream areas contributing flow to shared drainage channels and/or infrastructure. **The SWMP documents include the proposed information when applicable.**

[f] Description of proposed changes in impervious cover areas and any changes in pre- and post-development drainage patterns. **The SWMP documents include the proposed information when applicable.**

[g] Methods and assumptions used to calculate pre- and post-development runoff volume, peak discharge, and discharge velocity for the specified design storm events. **The SWMP documents include the proposed information when applicable.**

[h] Methods and assumptions used to calculate the pollutant load removal. **The SWMP documents include the proposed information when applicable.**

[i] Description of LID measures that are proposed to limit the development footprint, preserve existing vegetation and mimic existing hydrology to the extent feasible. **The SWMP documents include the proposed information when applicable.**

[j] If not used, provide rationale why LID measures are not practical for the site. **The SWMP documents include the proposed information when applicable.**

[k] Describe measures and calculations for proposed practices used to achieve no net increase in runoff volumes leaving the site. **The SWMP documents include the proposed information when applicable.**

[l] Provide calculations for the infiltration or exfiltration system. **The SWMP documents include the proposed information when applicable.**

[m] If an increase in post-development runoff volume is anticipated due to limited applicability for LID measures and site constraints, provide an assessment and supporting calculations to demonstrate no adverse impacts to downstream infrastructure, adjacent properties, or aquatic habitat. **The SWMP documents include the proposed information when applicable.**

[n] Descriptions, details, and design criteria and calculations for all structural, nonstructural, permanent, and temporary erosion and sedimentation control measures and BMPs. This information should include seeding mixtures and rates, types of sod, methods of seedbed preparation, expected seeding dates (or limitations on seeding time frames), type and rate of lime and fertilizer application, and type and quantity of mulching for temporary and permanent

control facilities. **The SWMP documents include the proposed information when applicable.**

[o] Where proposed changes are anticipated within mapped limits of the areas with a 1% chance of being inundated by water in any given year, provide hydrologic and hydraulic analysis to show no net increase in flood elevations. **The SWMP documents include the proposed information when applicable.**

[p] Proposed schedule for the inspection and maintenance of all erosion control measures on site prior to achieving final site stabilization. **The SWMP documents include the proposed information when applicable.**

[q] Describe procedures for removing temporary erosion control measures and removal of accumulated sediment captured by such measures. **The SWMP documents include the proposed information when applicable.**

[r] Any other specific study, calculation, or investigation as requested by the City. **Additional information is provided as requested and may include traffic studies, structural designs, septic/sewer designs, geotechnical reports, etc. These documents are provided on a case-by-case basis and as requested by the City.**

[s] Describe procedures to limit and/or optimize the use of deicing materials and minimize off-site increases in chloride levels in adjacent surface water and groundwater. **The Stormwater I&M Manual includes the implementation of a salt minimization plan.**

[t] Provide a maintenance and inspection plan for post-construction monitoring of stormwater BMPs to ensure long-term performance and functionality, including details of who will be responsible for inspections and maintenance, proposed schedule, documentation, submittal procedures and contingency plans if future maintenance is required. **A Stormwater I&M Manual is provided as part of the submission.**

[u] Provide copies of pertinent state and federal permits. **Copies of permits will be provided to the City.**

(g) Long-term operation and maintenance. The owner shall be responsible for continued inspection and maintenance requirements. **An I&M Manual that identifies the owner's responsibilities has been provided as a part of the submission.**

[1] An operation and maintenance manual shall be created with the following information:

[a] The names of the responsible qualified professionals who will implement the required reporting, inspections, and maintenance activities. **The Owner, Responsible Party, and the Management Company are identified in the I&M Manual.**

[b] An inspection checklist, identifying item or BMP, inspection frequency, and components to be inspected. The list shall clearly outline performance thresholds and triggers for maintenance. **Inspection requirements and maintenance thresholds are identified in the I&M Manual.**

[c] Snow and ice removal shall be performed by a contractor certified by the "Green SnoPro" Program, or approved equivalent, following best management practices for the application of deicing materials. **The I&M Manual requires the use of a Green SnowPro contractor.**

[d] Deicing log to track amount and type of deicing material applied. **The I&M Manual requires the implementation of a salt minimization plan that also requires the owner or operator to track salt usage onsite through a quantity usage log.**

[e] A site plan clearly identifying the locations of all stormwater practices to be inspected and maintained. **The approved Grading and Drainage Plan accompanies the I&M Manual.**

[f] Inspection and maintenance log to be submitted to the City of Dover Community Services Department on an annual basis. Documents shall be submitted no later than December 15 of each year. **The I&M Manual identifies this requirement.**

[2] The owner of record shall record at the Registry of Deeds documentation sufficient to provide notice to all persons that may acquire any property subject to the requirements and responsibilities described in the approved stormwater management plan. The notice shall comply with the applicable requirements for recording contained in RSA 477 and 478. The notice need not set forth the requirements at length, so long as it is sufficient to provide notice to prospective purchasers of the requirements for maintenance and reporting. **Not Applicable.**

Stormwater Management System Inspection & Maintenance Plan

Prepared for:

LOT 2 SITE DEVELOPMENT
Map G, Lot 2-1

Crosby Road
Dover, New Hampshire
Strafford County

AUGUST 2024

Owner of Record:

DEL SOL DOVER, LLC
340 Central Avenue
Suite 202
Dover, New Hampshire 03820

Prepared By:

CIVILWORKS NEW ENGLAND
P.O. Box 1166
181 Watson Road
Dover, New Hampshire 03821

Introduction

Civilworks NE, has prepared the following Stormwater Management System Inspection & Maintenance Plan for **Del Sol Dover, LLC.** The intent of this plan is to provide a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this site.

The inspection and maintenance requirements outlined in this document are required to be performed in perpetuity. In the event the property is sold, future owners will be responsible for implementing the responsibilities outlined in this document.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will also help to minimize potential environmental impacts to the areas surrounding the developed site. By following the enclosed procedures, the property owners, and maintenance personnel will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

This plan also requires the Owner/Operator to prepare and implement a salt minimization plan to reduce salt usage on-site and ultimately within the watershed. This plan will allow the owner/operator to monitor and modify how much salt is needed, when it should be applied, where it needs to be applied, with the ultimate goal of reducing salt-use without compromising safety. It is expected that salt-use reduction will lead to long-term cost-savings as a result of purchasing less salt and reduced impacts on vegetation (e.g., landscaping) and corrosion of infrastructure.

The salt minimization plan should include the retention of a contractor who has completed the Green SnowPro Training course and obtained NHDES Salt Application Certification.

It is anticipated that this be a living document that will be updated at regular intervals (recommend updating annually in advance of the winter season in order to facilitate adjustments).

Owner:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

In the event of a change in ownership, this Inspection and Maintenance Plan shall be transferred to the new party; transfer shall be documented to NH DES in writing.

Contact / Responsible Party:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Chad Kageleiry
Phone: (603) 749 2800
Email: chad@summitlanddev.com

The contact information for the Contact / Responsible Party shall be kept current; transfer shall be documented to NHDES in writing.

Management Company:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

The contact information for the Management Party shall be kept current.

Inspection Schedule / Record Retention

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NHDES. See the Inspection and Maintenance Plan for frequency requirements. Inspections shall include a photograph of each practice that is subject to the I&M requirements each time it is inspected. A copy of the completed Stormwater Management System's Inspection & Maintenance Log, inspection photographs, and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law. All Inspection and Maintenance records must be provided to NHDES upon request and to the City of Dover Community Services Department annually before Dec 15th.

Stormwater Management System Components

The Stormwater Management System associated with the project is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)
- Bioretention Basin w/ Internal Storage Reservoir (ISR)
- Grassed Lined Conveyance Swale
- Stone Lined Conveyance Swale
- Pre-Treatment Structures
  - Sediment Forebay
- Pavement
- Litter / Trash Removal

Design elements are identified in the design plans, a copy of which shall be maintained with this Inspection and Maintenance Plan.

Control of Invasive Species

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. Invasive plants shall be controlled to prevent them from reproducing, spreading, or re-growing. See the University of New Hampshire – Cooperative Extension's "Method for Disposing Non-Native Invasive Plants", included at the end of this manual, for guidance on the removal and disposal of invasive species.

Inspection and Maintenance Plan

By implementing the following procedures, the owners will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

PIPES/CULVERTS:

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

OUTLET STRUCTURE(S):

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

ENERGY DISSIPATION STRUCTURES (RIP RAP):

- Inspect at least once a year.
- Inspect for sediment accumulation.
- Remove all debris immediately.
- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- If stones become displaced from the riprap areas, they should be replaced immediately and chinked in to assure stability. Add additional riprap as needed. Vegetation growing through the riprap should be eliminated at least yearly.

BIORETENTION BASIN W/ ISR:

- Inspection, by a **qualified professional**, of the Bioretention Basin at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection. If the Bioretention Basin systems do not drain within 72-hours following a rainfall event, a **qualified professional** should assess the condition and determine measures required to restore filtration practice (as applicable).
- Inlet and outlet pipes, inlet and outlet structures, containment structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Vegetation should be inspected at least annually and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed at least once annually. The vegetation should be maintained in a healthy condition, as appropriate to the function of the facility and type of vegetation, to prevent the establishment of woody vegetation.

- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

GRASS LINED CONVEYANCE SWALE:

- Inspect once per year.
- Inspect for erosion, sediment accumulation, vegetation loss, and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and dead vegetation.
- Perform periodic mowing of swale (at least twice annually), maintain a 4" stand of vegetative growth.

STONE LINED CONVEYANCE SWALE

- Inspect once per year.
- Inspect for erosion, sediment accumulation, woody vegetation and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and woody vegetation.
- Reset any dislodged stones.

PRE-TREATMENT STRUCTURES:

SEDIMENT FOREBAY:

- Vegetated areas shall be mowed to maintain a 4" start of vegetative growth.
- Inspect at least once per year.
- Inspect for sediment accumulation.
- Remove all debris immediately.

PAVEMENT:

- Minimize sanding.
- Minimize application of salt for ice control.
- Clean periodically (1-2 times per year) using a sweeper or vacuum sweeper. Vacuum sweeping is the preferred method.

LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

DE-ICING AGENTS:

- To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends that the Owner/Operator develop a Road Salt and Deicing Minimization Plan for the parking lots and roadways. The plan should develop the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. The plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. (See Deicing Salt Quantity Use Log).
- Use sand as primary agent for driveway and access way safety during ice and snow conditions.
- Minimize the use of salt during the winter.

- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Recommend using a certified Winter Operator (Green SnowPro Trained) for applying de-icing agents.
- Monitor weather and apply de-icing agents based on weather conditions and temperatures.

ANTI-ICING AND SALT MINIMIZATION:

- Owner to develop a Road Salt and Deicing Minimization Plan.
- Provide a written policy that the “Development” will keep in place to minimize salt and other deicer use after the project has been completed.
- Use the attached form to track the use of salt and other deicers for each storm event and compiling salt use data annually.

Inspection & Maintenance Table

System Component / BMP	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Pipes/Culverts	Annually	• Check for clogging • Check for sediment accumulation	Remove when noticed Clean when necessary
Outlet Structure(s)	Annually	• Inspect once per year. • Inspect for clogging and sediment accumulation. • Remove all debris immediately and sediment accumulations ≥ 2 inches.	≥ 2 in. sediment Remove immediately
Energy Dissipation (ED) Structures (Rip Rap)	Annually	• Check for erosion • Check for displaced stones • Check for woody vegetation • Check for sediment accumulation	≥ 3 in. sediment Remove annually Replace/ reset Dislodged stones immediately
Bioretention Basin w/ ISR • Inlet/Outlet Piping • Pond • Sediment • Drawdown • Trash/Debris • Vegetation (Veg.) • Embankments	Bi-Annually “ “ Annually Periodically “ “ “ “	• Check for erosion, settlement, seepage, etc. • Check for sediment accum. in pond • Check drainage time • Check for and remove trash/debris • Maintain >75% veg. (pond & slopes) Maintain healthy stand of veg.	Repair immediately ≥ 2 in sediment >72 hours Remove all trash/debris Restore veg. in-kind Mow when ≥ 6 in
Grass Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Ensure swale is stabilized • Maintain healthy stand of veg., min 4” • Inspect for invasive species	≥ 1 in. sediment Repair immediately Restore vegetation in-kind Mow twice per year Remove/Dispose of accordingly
Stone Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Inspect for woody/ invasive vegetation • Check for dislodged stones	≥ 1 in. sediment Repair immediately Remove/Dispose of accordingly
Pre-Treatment Structures: Sediment Forebay	Annually	• Check for sediment accumulation • Check for woody vegetation growth • Check for debris • Vegetated areas shall be mowed to maintain a 4” start of vegetation growth.	Remove/ Dispose of accordingly Mow twice per year
Pavement: • Sanding • Salt Applications • Sweep/Vacuum • Trash/Debris	Limit use As required 1 - 2 x’s Year Periodically	• Minimize use to prevent tracking issues • RECORD APPLICATION RATES • Sweep or vacuum to prevent tracking issues • Check for trash/debris	Sweep to prevent issues Minimize (as required) Sweep/Vac as needed Remove when noticed
Litter / Trash Removal	Periodically	• Check for litter and trash	Remove when noticed

Inspection & Maintenance Checklist/Log

The following pages contain a blank copy of the Stormwater Management System's Inspection & Maintenance Log and a Deicing Salt Quantity Use Log. These forms are provided to assist the owners with the inspection and maintenance of the aforementioned Stormwater Management System.

Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance_____ Inspector:_____

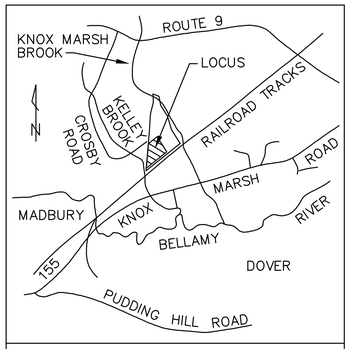
System Component / BMP	Cleaning / Repair Needed (List Items / Comments)	Date of Cleaning/Repair	Performed By

Deicing Salt Quantity Use Log

Date	Amount of Material Applied	Comments

3 LOT MINOR SUBDIVISION
FOR
DEL SOL DOVER, LLC
"CROSBY ROAD EXTENSION"
TAX MAP G, LOT No. 2-1

CROSBY ROAD
DOVER, NH
AUGUST 2024



LOCATION PLAN
(NO SCALE)

OWNER
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

OWNER SIGNATURE

SITE CIVIL ENGINEER
CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

LAND SURVEYOR
MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND
P.O. BOX 681
24 CHESTNUT STREET
DOVER, NH 03820
(603) 742-0911

WETLAND/SOIL SCIENTIST
BRUCE A. GILDAY, CWS
BAG LAND CONSULTANTS
43 ROCKINGHAM STREET
CONCORD, NH 03301
(603) 228-5775

PERMIT SUMMARY:

1. THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:

   ALTERATION OF TERRAIN: PENDING

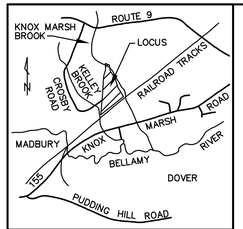
2. LIST ANY VARIANCES OR SPECIAL EXCEPTIONS GRANTED BY THE ZONING BOARD OF ADJUSTMENT OR CONDITIONAL USE PERMITS GRANTED BY THE PLANNING BOARD FOR THE PROPOSED USE OR STRUCTURE, INCLUDING THE CASE NUMBER AND DATE OF DECISION AND ANY CONDITIONS.

   SUBDIVISION: PENDING
   CONDITIONAL USE PERMIT: PENDING

SHEET INDEX	SHEET

COVER SHEET	1
EXISTING CONDITIONS PLAN (BY MCENEANEY SURVEY)	2
SUBDIVISION PLAN (BY MCENEANEY SURVEY)	3
TOPOGRAPHIC & SITE SPECIFIC SOILS SUBDIVISION PLAN (BY MCENEANEY SURVEY)	4
NOTE SHEET	5
CROSBY ROAD EXTENSION SITE & UTILITY PLAN	6
CROSBY ROAD EXTENSION PLAN & PROFILE	7
EROSION CONTROL NOTES	8
EROSION CONTROL DETAILS	9-10
DETAILS	11-12

PLANNING FILE NO.: .....



LOCATION PLAN
(NO SCALE)

REFERENCE PLANS:

1.) SUBDIVISION PLAN OF LAND PREPARED FOR WESTFIELD, LLC TAX MAP G, LOT No. 2 LITTLEWORTH ROAD & CROSBY ROAD CITY of DOVER COUNTY of STRAFFORD STATE of NEW HAMPSHIRE. SCALE: 1" = 200' / 400'; DATED: FEBRUARY 9, 2021, REVISED THROUGH 3/24/21; BY THIS OFFICE. DOVER PLANNING FILE 21–07. RECORDED S.C.R.D. PLANS 12388, 12389, 12390.

2.) SUBDIVISION PLAN LOTS 1, 2, 3 AND COMPOSITE PLAN OF CROSBY ROAD INDUSTRIAL PARK, DOVER, NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: JUNE 30, 1985, REVISED THROUGH 8/12/85; BY: LECLERC STOWELL ASSOCIATES. RECORDED S.C.R.D. PLAN 27A–2.

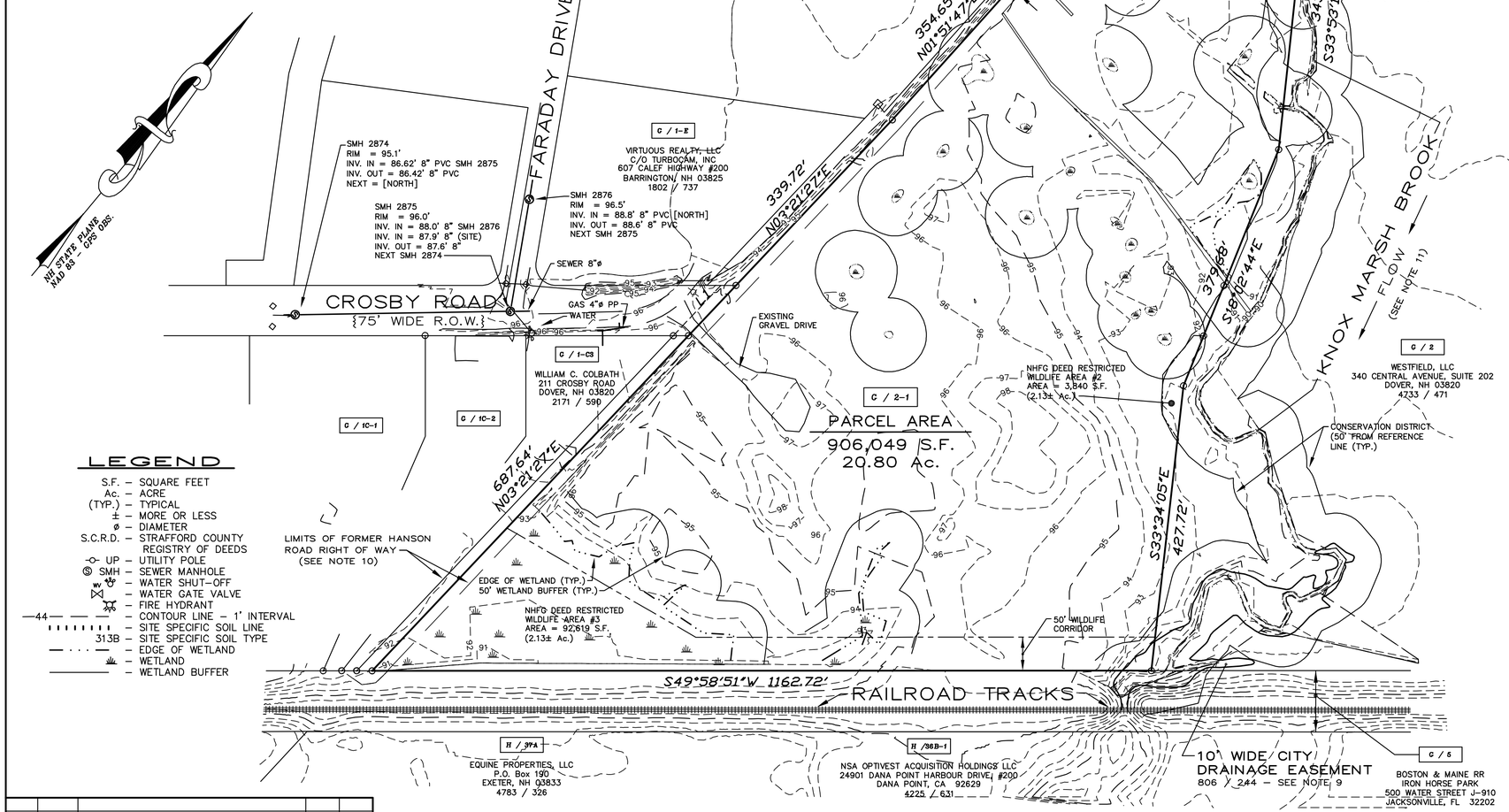
3.) LOT LINE ADJUSTMENT PLAN PREPARED FOR BUSINESS PARTNERS, INC. AND CHAUVIN ARNOUX, INC., CROSBY ROAD & FARADAY DRIVE, TAX MAP G, LOTS 1L & 31–1, DOVER, NEW HAMPSHIRE, COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: NOVEMBER 5, 1999. BY: McENEANEY SURVEY ASSOCIATES, INC. RECORDED S.C.R.D. PLAN 57–65.

4.) ALTA –ACSM LAND TITLE SURVEY – COCHECO LAND MANAGEMENT, INC. – FARADAY DRIVE, DOVER, NEW HAMPSHIRE. SCALE: 1" = 30'; DATED: MARCH 25, 1998; BY: TRITECH ENGINEERING CORPORATION. RECORDED S.C.R.D. PLAN 51–69.

5.) SUBDIVISION OF LAND FOR THE DOVER INDUSTRIAL DEVELOPMENT AUTHORITY IN DOVER, N.H. SCALE: 1" = 50'; DATED: JUNE 21, 1991; BY: BRUCE L. POHOPEK. RECORDED S.C.R.D. PLAN 39–39.

6.) RIGHT–OF–WAY AND TRACK MAP – BOSTON AND MAINE R.R. OPERATED BY THE BOSTON AND MAINE R.R. – STATION 3390+17 TO STATION 3442+97. SCALE: 1" = 100'; DATED: JUNE 30, 1914, REVISED THROUGH MARCH 1982. BY: OFFICE OF VALUATION ENGINEER, BOSTON, MASS. PLAN V2N.H./63.

7.) CITY OF DOVER, PUBLIC WORKS DEPT., PROPOSED DRAINAGE DITCH FROM DOVER INDUSTRIAL PARK THROUGH RILEY LAND TO BROOK. SCALE: 1" = 100'; DATED: MARCH 23, 1965; BY: CITY OF DOVER ENGINEERING, FILE No. 12–49.



LEGEND

- S.F. – SQUARE FEET
- Ac. – ACRE
- (TYP.) – TYPICAL
- ± – MORE OR LESS
- ø – DIAMETER
- S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
- UP – UTILITY POLE
- SMH – SEWER MANHOLE
- WV – WATER SHUT–OFF
- WATER GATE VALVE
- FIRE HYDRANT
- 44 – CONTOUR LINE – 1' INTERVAL
- SITE SPECIFIC SOIL LINE
- 313B – SITE SPECIFIC SOIL TYPE
- EDGE OF WETLAND
- WETLAND
- WETLAND BUFFER

No.	Bearing	Distance
L1	N03°21'27"E	103.15'
L2	N08°02'33"E	109.95'
L3	N00°50'14"E	84.52'

NOTES:

1.) OWNERS OF RECORD:

DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NEW HAMPSHIRE 03820
S.C.R.D. VOL. 5075, PAGE 142

2.) C / 2–1 – DENOTES TAX MAP AND PARCEL NUMBER.

3.) PLAN INTENT: TO SHOW THE EXISTING SITE CONDITIONS. PARCEL IS SERVED BY MUNICIPAL SEWER AND WATER SERVICE.

4.) PARCEL AREA: 906,049 S.F. / 20.80 Ac.

5.) ZONING DISTRICT: COMMERCIAL MANUFACTURING (CM) DISTRICT:

MINIMUM LOT SIZE	= 20,000 S.F.
LOT COVERAGE	= 50 PERCENT
MINIMUM FRONTAGE	= 100 FEET
FRONT SETBACK	= 35 FEET
SIDE SETBACK	= 10 FEET MIN.
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SHEET 2 OF 12

NO.	DATE	DESCRIPTION	BY	CHK
		REVISIONS		

19–2210	EXIST. COND.	
PROJECT NO	TYPE	FIELDBOOK & PAGES

EXISTING CONDITIONS PLAN
PREPARED FOR
DEL SOL DOVER, LLC
TAX MAP G, LOT No. 2–1
CROSBY ROAD
CITY of DOVER
COUNTY of STRAFFORD
STATE of NEW HAMPSHIRE

DRAWN BY: RJM	FILE: 2210\DWGS\G–2–1 EC
SCALE: 1" = 100'	DATE: AUGUST 6, 2024

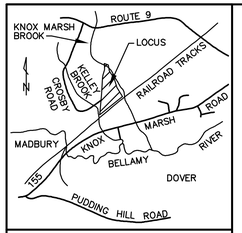
100 50 0 50 100 200 300 400

STATE OF NEW HAMPSHIRE – No. 661 – KEVIN M. McENEANEY – LICENSED LAND SURVEYOR – SIGNATURE

McEneaney Survey Associates
of NEW ENGLAND
P.O. Box 1166 – 181 WATSON ROAD
DOVER, NH 03820 (603) 742–0911

SURVEYING – PLANNING – CONSULTING

8/6/2024 11:13:09 File: M:\2210\Drawings\G-2-1 2024 subdiv.dwg Layout: 2210 G-2-1 EC 2022-09-19



LOCATION PLAN
(NO SCALE)

REFERENCE PLANS:

1.) SUBDIVISION PLAN OF LAND PREPARED FOR WESTFIELD, LLC TAX MAP G, LOT No. 2 LITTLEWORTH ROAD & CROSBY ROAD CITY of DOVER COUNTY of STRAFFORD STATE of NEW HAMPSHIRE. SCALE: 1" = 200' / 400'; DATED: FEBRUARY 9, 2021, REVISED THROUGH 3/24/21; BY THIS OFFICE. DOVER PLANNING FILE 21–07. RECORDED S.C.R.D. PLANS 12388, 12389, 12390.

2.) SUBDIVISION PLAN LOTS 1, 2, 3 AND COMPOSITE PLAN OF CROSBY ROAD INDUSTRIAL PARK, DOVER, NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: JUNE 30, 1985, REVISED THROUGH 8/12/85; BY: LECLERC STOWELL ASSOCIATES. RECORDED S.C.R.D. PLAN 27A–2.

3.) LOT LINE ADJUSTMENT PLAN PREPARED FOR BUSINESS PARTNERS, INC. AND CHAUVIN ARNOUX, INC., CROSBY ROAD & FARADAY DRIVE, TAX MAP G, LOTS 1L & 31–1, DOVER, NEW HAMPSHIRE, COUNTY OF STRAFFORD. SCALE: 1" = 100'; DATED: NOVEMBER 5, 1999. BY: McENEANEY SURVEY ASSOCIATES, INC. RECORDED S.C.R.D. PLAN 57–65.

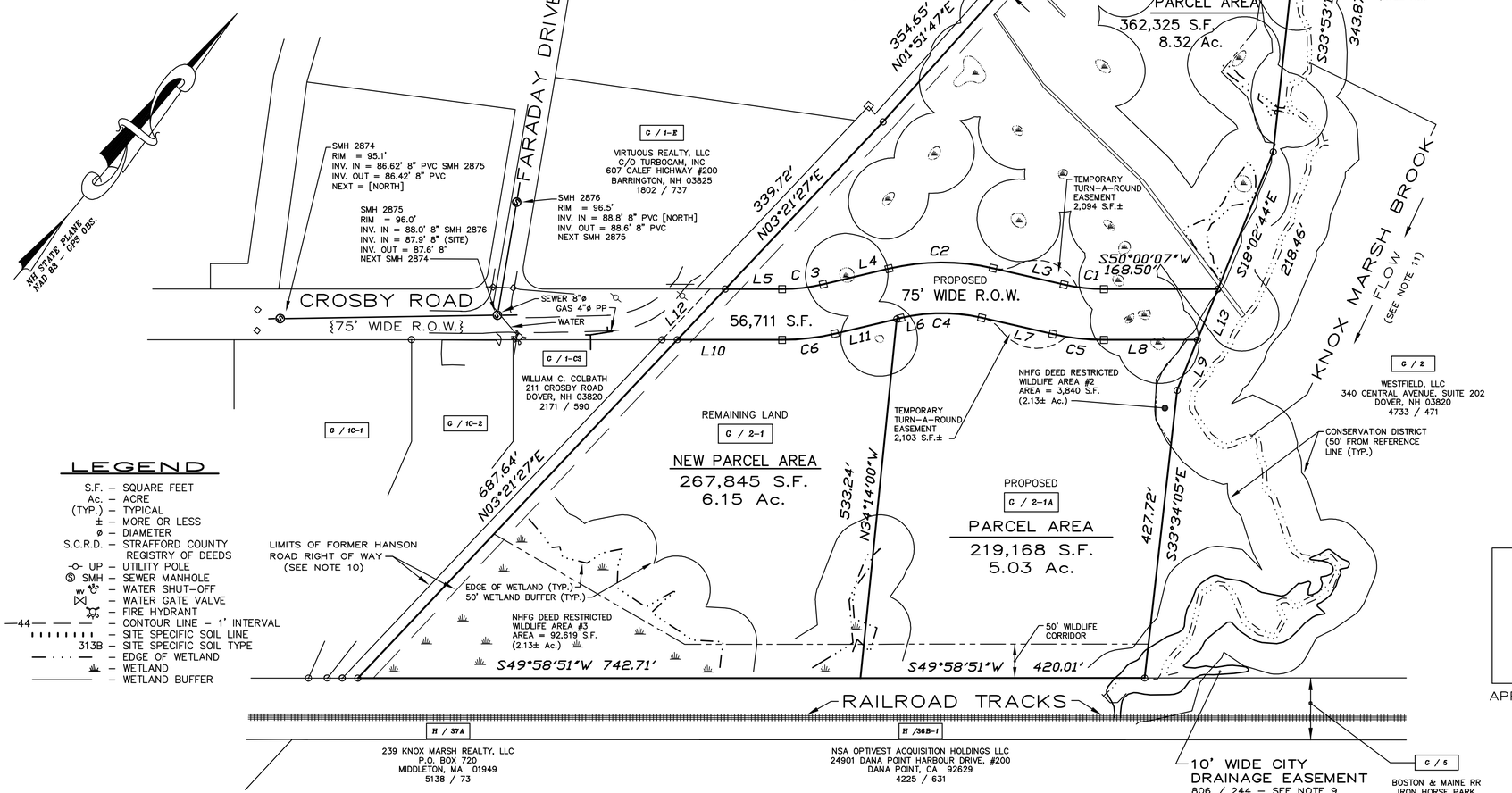
4.) ALTA –ACSM LAND TITLE SURVEY – COCHECO LAND MANAGEMENT, INC. – FARADAY DRIVE, DOVER, NEW HAMPSHIRE. SCALE: 1" = 30'; DATED: MARCH 25, 1998; BY: TRITECH ENGINEERING CORPORATION. RECORDED S.C.R.D. PLAN 51–69.

5.) SUBDIVISION OF LAND FOR THE DOVER INDUSTRIAL DEVELOPMENT AUTHORITY IN DOVER, N.H. SCALE: 1" = 50'; DATED: JUNE 21, 1991; BY: BRUCE L. POHOPEK. RECORDED S.C.R.D. PLAN 39–39.

6.) RIGHT–OF–WAY AND TRACK MAP – BOSTON AND MAINE R.R. OPERATED BY THE BOSTON AND MAINE R.R. – STATION 3390+17 TO STATION 3442+97. SCALE: 1" = 100'; DATED: JUNE 30, 1914, REVISED THROUGH MARCH 1982. BY: OFFICE OF VALUATION ENGINEER, BOSTON, MASS. PLAN V2N.H./63.

7.) CITY OF DOVER, PUBLIC WORKS DEPT., PROPOSED DRAINAGE DITCH FROM DOVER INDUSTRIAL PARK THROUGH RILEY LAND TO BROOK. SCALE: 1" = 100'; DATED: MARCH 23, 1965; BY: CITY OF DOVER ENGINEERING, FILE No. 12–49.

No.	Bearing	Distance
L1	N08°02'33"E	109.95'
L2	N00°50'14"E	84.52'
L3	S62°57'04"W	107.65'
L4	S36°37'58"W	100.00'
L5	S50°00'07"W	84.10'
L6	N36°37'58"E	6.22'
L7	N62°57'04"E	107.65'
L8	N50°00'07"E	138.27'
L9	S18°02'44"E	80.35'
L10	N50°00'07"E	154.91'
L11	N36°37'58"E	93.78'
L12	N03°21'27"E	103.15'
L13	S18°02'44"E	80.86'



LEGEND

S.F. – SQUARE FEET
Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
ø – DIAMETER
S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
UP – UTILITY POLE
SMH – SEWER MANHOLE
WV – WATER SHUT–OFF
– WATER GATE VALVE
– FIRE HYDRANT
44 – CONTOUR LINE – 1' INTERVAL
– SITE SPECIFIC SOIL LINE
313B – SITE SPECIFIC SOIL TYPE
– EDGE OF WETLAND
– WETLAND
– WETLAND BUFFER

NO.	DATE	DESCRIPTION	BY	CHK
		REVISIONS		

19–2210	SUNDIV	–	–
PROJECT NO	TYPE	FIELDBOOK & PAGES	

No.	Central Angle	Radius	Arc Length	Chord Length	Chord Bearing
C1	12°56'58"	262.50	59.33	59.20	S56°28'36"W
C2	26°19'07"	337.50	155.03	153.67	S49°47'31"W
C3	13°22'09"	262.50	61.25	61.11	S43°19'02"W
C4	26°19'07"	262.50	120.58	119.52	N49°47'31"E
C5	12°56'58"	337.50	76.28	76.12	N56°28'36"E
C6	13°22'09"	337.50	78.75	78.57	N43°19'02"E

⊙ – IRON ROD WITH IDENTIFICATION CAP TO BET SET AT PROPERTY CORNERS
□ – GRANITE BOUND WITH DRILL HOLE TO BET SET AT RIGHT OF WAY POINTS OF CURVATURE

"I HEREBY CERTIFY THAT THIS PLAN IS BASED ON AN ACTUAL GROUND SURVEY PERFORMED WITH A TOTAL STATION, BY ME OR THOSE UNDER MY DIRECT SUPERVISION AND THAT, TO THE BEST OF MY KNOWLEDGE AND BELIEF, SAID SURVEY MEETS OR EXCEEDS THE MINIMUM PRECISION REQUIREMENTS FOR SURVEY CLASSIFICATION "U" AS SET FORTH IN TABLE 500.1 OF THE NEW HAMPSHIRE CODE OF ADMINISTRATIVE RULES OF THE BOARD OF LICENSURE FOR LAND SURVEYORS."

NOTES:

1.) OWNERS OF RECORD:

OWNER SIGNATURE

DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NEW HAMPSHIRE 03820
S.C.R.D. VOL. 5075, PAGE 142

2.) C / 2–1 – DENOTES TAX MAP AND PARCEL NUMBER.

3.) PLAN INTENT: TO SUBDIVIDE THE SUBJECT PARCEL INTO THREE (3) LOTS WITH AN INCLUDED SEVENTY FIVE (75) FOOT WIDE RIGHT OF WAY EXTENDING FROM THE CURRENT TERMINUS OF CROSBY ROAD. PARCEL IS SERVED BY MUNICIPAL SEWER AND WATER SERVICE.

4.) TOTAL PARCEL AREA: 906,049 S.F. / 20.80 Ac.

5.) ZONING DISTRICT: COMMERCIAL MANUFACTURING (CM) DISTRICT:

MINIMUM LOT SIZE	= 20,000 S.F.
LOT COVERAGE	= 50 PERCENT
MINIMUM FRONTAGE	= 100 FEET
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APPROVAL BLOCK

SHEET 3 OF 12

SUBDIVISION PLAN OF LAND
PREPARED FOR
DEL SOL DOVER, LLC
TAX MAP G, LOT No. 2–1
CROSBY ROAD
CITY of DOVER
COUNTY of STRAFFORD
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. SUBM–2024–00xx

DRAWN BY: RJM	FILE: 2210\DWGS\G–2–1 2024S
SCALE: 1" = 100'	DATE: AUGUST 6, 2024

100 50 0 50 100 200 300 400

STATE OF NEW HAMPSHIRE LICENSED LAND SURVEYOR No. 661 KEVIN M. McENEANEY SIGNATURE

McEneaney Survey Associates of NEW ENGLAND
P.O. Box 1166 – 181 WATSON ROAD
DOVER, NH 03820 (603) 742–0911

SURVEYING – PLANNING – CONSULTING

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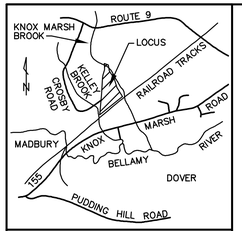

LOCATION PLAN
(NO SCALE)

LEGEND

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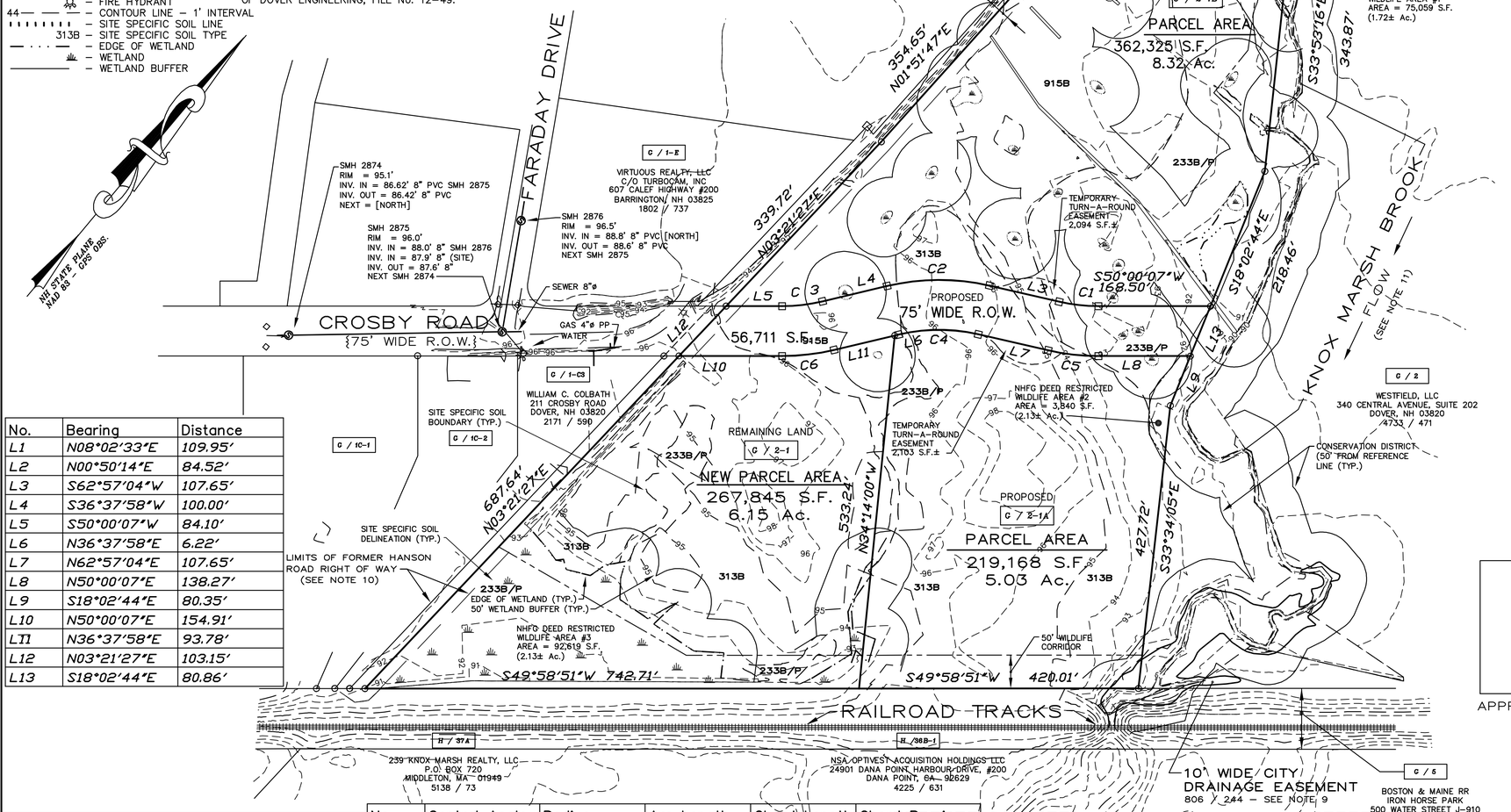
SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	SOIL TAXONOMIC NAME	HSG CLASS	DRAINAGE CLASS
233B/P	SCANTIC	D	POORLY DRAINED (P)
313B	DEERFIELD	B	MODERATELY–WELL DRAINED
915B	DEERFIELD VARIANT	B	SOMEWHAT POORLY DRAINED

SLOPE	SLOPE DESIGNATION	PERCENT SLOPE
	B	0 TO 8 PERCENT



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NO.	DATE	DESCRIPTION	BY	CHK
		REVISIONS		

19–2210	SUNDIV	–	–
PROJECT NO	TYPE	FIELDBOOK & PAGES	

⊙ – IRON ROD WITH IDENTIFICATION CAP TO BET SET AT PROPERTY CORNERS
□ – GRANITE BOUND WITH DRILL HOLE TO BET SET AT RIGHT OF WAY POINTS OF CURVATURE

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NOTES:

1.) OWNERS OF RECORD:

OWNER SIGNATURE

DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NEW HAMPSHIRE 03820
S.C.R.D. VOL. 5075, PAGE 142

2.) C / 2–1 – DENOTES TAX MAP AND PARCEL NUMBER.

3.) PLAN INTENT: TO SUBDIVIDE THE SUBJECT PARCEL INTO THREE (3) LOTS WITH AN INCLUDED SEVENTY FIVE (75) FOOT WIDE RIGHT OF WAY EXTENDING FROM THE CURRENT TERMINUS OF CROSBY ROAD. PARCEL IS SERVED BY MUNICIPAL SEWER AND WATER SERVICE.

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MINIMUM FRONTAGE	= 100 FEET
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SIDE SETBACK	= 10 FEET MIN.
REAR SETBACK	= 10 FEET MIN.
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6.) A PORTION OF THE SUBJECT PARCEL IS LOCATED IN THE 0.2 PERCENT ANNUAL CHANCE FLOODPLAIN AS SHOWN ON FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 330145; PANELS 0310 & 0320; SUFFIX E; MAP NUMBERS 33017C0310E & 33017C0320E; EFFECTIVE DATE SEPTEMBER 30, 2015, THAT AREA DIRECTLY ADJACENT TO THE RAILROAD TRACKS AT KNOX MARSH BROOK.

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14.) SITE SPECIFIC SOIL MAPPING WAS PERFORMED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012); 43 ROCKINGHAM STREET, CONCORD, NH 03301. SEE REPORT DATED MAY 29, 2024.

SHEET 4 OF 12
TOPOGRAPHIC & SITE SPECIFIC SOILS

APPROVAL BLOCK

SUBDIVISION PLAN OF LAND
PREPARED FOR
DEL SOL DOVER, LLC
TAX MAP G, LOT No. 2–1
CROSBY ROAD
CITY of DOVER
COUNTY of STRAFFORD
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No.	SUBM–2024–00xx
DRAWN BY: RJM	FILE: 2210\DWGS\G–2–1 2024S
SCALE: 1" = 100'	DATE: AUGUST 6, 2024

100 50 0 50 100 200 300 400

STATE OF NEW HAMPSHIRE – LICENSED LAND SURVEYOR – No. 661 – KEVIN M. McENEANEY – SIGNATURE

McEneaney Survey Associates of NEW ENGLAND
P.O. Box 1166 – 181 WATSON ROAD
DOVER, NH 03820 (603) 742–0911

SURVEYING – PLANNING – CONSULTING

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GENERAL NOTES

1. OWNER OF RECORD:
   DEL SOL DOVER, LLC
   340 CENTRAL AVENUE, SUITE 302
   DOVER, NEW HAMPSHIRE 03820
   S.C.R.D. VOLUME 5075, PAGE 142.
2. G / 2-1 – DENOTES TAX MAP AND PARCEL NUMBER.
3. PLAN INTENT: TO SUBDIVIDE THE SUBJECT PARCEL INTO THREE (3) LOTS WITH AN INCLUDED SEVENTY FIVE (75) FOOT WIDE RIGHT OF WAY EXTENDING FROM THE CURRENT TERMINUS OF CROSBY ROAD. PARCEL IS SERVED BY MUNICIPAL SEWER AND WATER SERVICE.
4. TOTAL PARCEL AREA = 906,049 S.F. / 20.80 Ac.
5. ZONING DISTRICT: COMMERCIAL MANUFACTURING (CM) DISTRICT
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7. BASIS OF BEARING IS NH STATE PLANE (NAD83) BASED ON GPS OBSERVATION DATED JANUARY 22, 2021.
   VERTICAL DATUM IS NAVD88 BASED ON GPS OBSERVATION DATED NOVEMBER 18, 2022.
8. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND IN JANUARY 2021 WITH AN ERROR NOT GREATER THAN 1 IN 10,000.
9. HANSON ROAD (A/K/A HANSON WAY) IS AN UNIMPROVED 33' WIDE ROAD. THE CITY OF DOVER DISCONTINUED HANSON ROAD AS A PUBLIC WAY WITH THE 2008 RESOLUTION, R-2008.05.14-80. PER ACCEPTED PRACTICE, TITLE TO THE UNDERLYING LAND OF THE ROAD EXTENDS TO THE CENTERLINE FOR ABUTTING PARCELS. THE USE RIGHTS OF THE ENTIRE WIDTH OF HANSON ROAD MAY EXIST FOR ABUTTING OWNERS.
10. THE PARCEL IS SUBJECT TO A DOVER CONSERVATION OVERRIDING DISTRICT, 170-27B.(2), AREAS WITHIN FIFTY (50) FEET OF A FRESHWATER BROOK, KNOX MARSH BROOK.
11. IRON ROD WITH IDENTIFICATION CAP HAVE BEEN SET AT ALL EXISTING LOT CORNERS AND ANGLE POINTS. IRON ROD WITH IDENTIFICATION CAP TO BE SET AT ALL PROPOSED LOT CORNERS.
12. WETLANDS ONSITE WERE IDENTIFIED UTILIZING THE 1987 FEDERAL TECHNICAL REPORT. THE DELINEATION WAS UPDATED IN JULY 2024 BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CWS 018); 43 ROCKINGHAM STREET, CONCORD, NH 03301.
13. SITE SPECIFIC SOIL MAPPING WAS UPDATED IN JULY 2024 BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012); 43 ROCKINGHAM STREET, CONCORD, NH 03301. SEE REPORT DATED MAY 29, 2024.

DEMOLITION NOTES:

1. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
2. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
3. THE CONTRACTOR SHALL NOTIFY "DIG SAFE" PRIOR TO ANY DEMOLITION/ CONSTRUCTION ACTIVITIES. (811).
4. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, UTILITIES AND PAVEMENT ON THE SITE TO THE LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT AND POLES.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO FAMILIARIZE HIMSELF WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS NOT ALREADY OBTAINED BY THE OWNER AND ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
8. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
9. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES, AND CODES.
10. EXISTING ("OLD") WATER SERVICES TO THE SUBJECT SITE SHALL BE DISCONNECTED AND SHUT-OFF AT THE WATER MAIN.
11. EXISTING SEWER SERVICES TO BE CUT AND PERMANENTLY CAPPED AT PROPERTY LINE AS APPLICABLE.
12. ALL EROSION CONTROL NOTES SHALL INCLUDE PROVISIONS FOR CONSTRUCTION SEQUENCING, TEMPORARY EROSION CONTROL MEASURES, AND PERMANENT STANDARDS SUCH AS LOAM SPREAD RATE FOR DISTURBED AREAS, RATES OF LIME, TYPE AND RATES FOR FERTILIZER, AND SEED AND MULCH MIXTURE WITH RATES OF APPLICATION.
13. ALL STONEWALLS THAT NEED TO BE REMOVED FOR CONSTRUCTION SHALL BE STOCKPILED AND REUSED ON SITE.

SUBDIVISION NOTES:

1. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A PLAN REFERENCED AND PREPARED BY MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND (SEE EXISTING CONDITIONS PLAN IN THIS PLAN SET).
2. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS ASSOCIATED WITH A 3 LOT SUBDIVISION, THE CONSTRUCTION OF CROSBY ROAD EXTENSION, PUBLIC WATER AND SEWER, UNDERGROUND UTILITY IMPROVEMENTS, AND GRADING & DRAINAGE IMPROVEMENTS.
3. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO APPLICABLE CITY AND STATE CODES.
4. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS, AND THE AMERICAN WITH DISABILITIES ACT, LATEST EDITIONS.
5. ON-SITE SNOW STORAGE SHALL OCCUR ALONG THE EDGES OF PROPOSED PAVEMENT.
6. ALL CONSTRUCTION LAYOUT SHALL BE DONE BY A LICENSED SURVEYOR UNDER CONTRACT WITH THE CONTRACTOR.
7. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE CONSTRUCTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE FACILITIES AND THEIR COMPONENTS DURING DEMOLITION AND CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE OWNER'S REPRESENTATIVE. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE-DOWNS. SUCH MATERIALS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AT THE COMPLETION OF THE PROJECT.
8. METHODS OF DEMOLITION, CONSTRUCTION AND ERECTION ARE THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN ENVIRONMENTAL CONTROLS AS REQUIRED BY FEDERAL, STATE AND MUNICIPAL REGULATIONS AND PERMITS. ENVIRONMENTAL CONTROLS SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DUST CONTROL AND SILT BARRIERS.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE TO STRUCTURES OR UTILITIES OR INJURIES TO THE PUBLIC DURING THE CONSTRUCTION PHASE CAUSED BY HIMSELF, HIS EMPLOYEES, HIS SUBCONTRACTORS OR EMPLOYEES OF SAME. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES FOR THE PROTECTION OF THE WORK, WORKERS AND PUBLIC SAFETY.
10. BUILDING ADDRESSES TO BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT.
11. THE SITE SHALL BE MAINTAINED TO PROVIDE ACCESSIBILITY IN ALL WEATHER CONDITIONS.
12. THE LIMITS OF CONSTRUCTION DISTURBANCE THAT ARE LOCATED IN OR WITHIN THE 50 FT. OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR TO ANY EARTH DISTURBANCE ACTIVITY OCCURS.
13. AS-BUILT PLANS OF THE SITE SHALL BE SUBMITTED ON PAPER AND IN A DIGITAL FORMAT IN PDF AND AUTOCAD DWG, AUTOCAD DXF OR AN ESRI FORMAT TO THE CITY OF DOVER ENGINEER'S OFFICE UPON COMPLETION OF PROJECT. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E. DIGITAL FILES SHALL BE GEO-REFERENCED TO NEW HAMPSHIRE STATE PLANE COORDINATES NAD83 AND SHALL BE EXPRESSED IN FEET.
14. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY-FRIDAY 7 AM-6 PM, SATURDAY HOURS 7 AM-6 PM, AND NO SUNDAY AND NO FEDERAL HOLIDAY WORK HOURS. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE CITY ENGINEER OR ASSISTANT CITY MANAGER.
15. A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND THE CITY ENGINEER SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.
16. ALL CONSTRUCTION SHALL CONFORM WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AND WITH THE CITY OF DOVER COMMUNITY SERVICES REGULATIONS AND STANDARD SPECIFICATION FOR CONSTRUCTION. THE MORE STRINGENT SPECIFICATION SHALL APPLY.
17. A LETTER OF CREDIT FOR THE COST OF REVEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED AND THE APPROVED CONSTRUCTION SIGN INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.
18. THE OWNER OF RECORD SHALL RECORD AT THE REGISTRY OF DEEDS DOCUMENTATION SUFFICIENT TO PROVIDE NOTICE TO ALL PERSONS/ENTITIES THAT MAY ACQUIRE ANY PROPERTY SUBJECT TO THE REQUIREMENTS AND RESPONSIBILITIES DESCRIBED IN THE APPROVED STORMWATER MANAGEMENT PLAN, THE NOTICE SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR RECORDING CONTAINED IN RSA 477 AND 478. THE NOTICE NEED NOT SET FORTH THE REQUIREMENTS AT LENGTH, SO LONG AS IT IS SUFFICIENT TO PROVIDE NOTICE TO PROSPECTIVE PURCHASERS TO THE REQUIREMENTS FOR MAINTENANCE AND REPORTING.
19. ANY RETAINING WALL TALLER THAN FOUR FEET (4') REQUIRES ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
20. ANY FENCE TALLER THAN SEVEN FEET (7') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
21. FIRE DEPARTMENT ACCESS ROAD(S) SHALL BE INSTALLED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRE APPARATUS IN ALL WEATHER CONDITIONS AT ALL TIMES.
22. COMMERCIAL VEHICLE ROUTE DURING CONSTRUCTION SHALL CONFORM TO DOVER CITY CODE OR BE COORDINATED WITH THE COMMUNITY SERVICES DIRECTOR.
23. APPLICANT SHALL COMPLETE LAND USE DEVELOPMENT TRACKING FORM, MOST RECENTLY REVISED VERSION, UTILIZING THE ONLINE POLLUTION TRACKING AND ACCOUNTING PILOT PROJECT (PTAPP) PORTAL. (HTTPS://WWW.UNH.EDU/UNHSC/PTAPP)
24. NO ROADWAY WITH PRIVATE UTILITY EASEMENTS SHALL BE ACCEPTED AS A PUBLIC ROAD BY THE CITY UNLESS THE EASEMENTS ARE EXPUNGED PRIOR TO THE TRANSFER OF LAND TO THE CITY. LICENSE AGREEMENTS FOR ANY AND ALL PRIVATE UTILITIES WITHIN THE RIGHT OF WAY MAY BE GRANTED BY THE CITY UPON ACCEPTANCE OF THE UNENCUMBERED ROADWAY CONSISTENT WITH APPLICABLE STATE LAW.
25. INDIVIDUAL AND SHARED DRIVEWAYS THAT ARE LONGER THAN 150 LF FROM THE ACCESS ROAD SHALL BE THE STANDARD WIDTH AS SPECIFIED IN NFPA1.
26. THE SITE LAYOUT IS DESIGNED IN COMPLIANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. THE PROPOSED STRUCTURE WILL ALSO BE DESIGNED WITH APPLICABLE ACCESSIBILITY REGULATIONS. (I.E. IBC, ANSI-117.1) AND NH RSA 155-A:5.

GRADING NOTES:

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. CONTRACTOR SHALL RETAIN A GEOTECHNICAL ENGINEERING CONSULTANT APPROVED BY THE OWNER, TO CONDUCT COMPACTION TESTING AND FILL GRADATION MONITORING.
3. SEE EROSION CONTROL NOTES & DETAIL SHEET FOR TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
4. ALL DRAINAGE PIPES SHALL BE HDPE OR APPROVED EQUAL UNLESS OTHERWISE NOTED.
5. ALL DISTURBED AREAS NOT OTHERWISE CALLED FOR SURFACE TREATMENT SHALL RECEIVE 6" OF HIGH QUALITY LOAM AND SHALL BE SEEDED WITH GRASS.
6. ALL SITEWORK CONSTRUCTION SHALL BE ADVANCED USING "BEST MANAGEMENT PRACTICES" SANCTIONED BY THE USDA, SCS AND NHDES.
7. TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED, UTILIZED AND MAINTAINED UNTIL BASE MATERIALS ARE CONSTRUCTED.
8. CONTRACTOR SHALL PROVIDE A FINISH GRADED SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE AND UNDER RAISED STRUCTURES.
9. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.
10. INSPECT SILT BARRIERS AFTER EACH RAIN STORM OF 1/4 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF THE FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE STRUCTURE HEIGHT.
11. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IS REQUIRED FOR THIS PROJECT. THE SWPPP MUST INCLUDE THE APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) TO MINIMIZE THE DISCHARGE OF POLLUTANTS FROM THE SITE. PARTIES RESPONSIBLE FOR DEVELOPING THE SWPPP SHOULD REFER TO THE EPA NPDES CONSTRUCTION GENERAL PERMITS NOTICE OF INTENT FOR A COMPLETE OUTLINE OF REQUIRED ELEMENTS. THESE PLANS AND THE STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN PREPARED FOR THIS PROJECT MAY BE UTILIZED IN FULFILLING THE REQUIREMENTS.
12. LIMIT TREE CLEARING TO ONLY THE EXTENT NECESSARY FOR CONSTRUCTION.
13. CONTRACTOR SHALL NOTIFY THE CITY OF DOVER AND THE DESIGN ENGINEER 48 HOURS PRIOR TO THE INSTALLATION OF PERMANENT STORMWATER BMP'S TO PROVIDE THE CITY AND THE ENGINEER THE OPPORTUNITY TO WITNESS THE CONSTRUCTION AND MATERIALS. THE DESIGN ENGINEER MUST CERTIFY THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS.
14. DENSITY REQUIREMENTS:

LOCATION	MINIMUM DENSITY
BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL	95%
BELOW LOAM AND SEED AREA	90%

   *ALL PERCENTAGES SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH AASHTO STANDARD 180, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH AASHTO STANDARD T-191, T-204, OR T-238 AND T-239.

UTILITY NOTES

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
5. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
6. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, DOUBLE CEMENT LINED DUCTILE IRON PIPE OR TYPE "K" COPPER, OR CITY APPROVED MATERIAL.
7. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF DOVER WATER DEPARTMENT.
8. ALL GRAVITY SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE NOTED AND CONFORM TO THE REQUIREMENTS OF THE CITY OF DOVER SEWER DEPARTMENT STANDARDS.
9. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
10. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
11. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE UTILITY COMPANIES.
12. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
13. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
14. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
15. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES. COORDINATE WITH GAS COMPANY.
16. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
17. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
18. SAWCUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
19. GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF DOVER.
20. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF DOVER.
21. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
22. CONTRACTOR SHALL PHASE UTILITY CONSTRUCTION, PARTICULARLY WATER MAIN AND GAS MAIN CONSTRUCTION AS TO MAINTAIN CONTINUOUS SERVICE TO ABUTTING PROPERTIES. CONTRACTOR SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
23. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.

UTILITY CONTACTS

NATURAL GAS: – UNITIL CORPORATION
CONTACT: DAVID MACLEAN
325 WEST ROAD
PORTSMOUTH, NH 03801
TEL: (603)-294-5261
EMAIL: MACLEAND@UNITIL.COM

WATER & SEWER: – CITY OF DOVER COMMUNITY SERVICES DEPARTMENT
PUBLIC WORKS & UTILITIES
CONTACT: KEN MAVROGEORGE, PE
271 MAST ROAD
DOVER, NH 03820
TEL: (603)-516-6450
EMAIL: K.MAVROGEORGE@DOVER.NH.GOV

ELECTRIC: – EVERSOURCE
CONTACT: TREVER EMMONS
4 OLD DOVER ROAD
ROCHESTER, NH 03867
TEL: (603)-332-7515
EMAIL: TREVER.EMMONS@EVERSOURCE.COM

PLANNING FILE NO.: SUBD-2024-

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

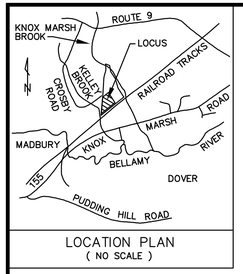
NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO:18043
FILE: SUB

NOTE SHEET

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH



LOCATION PLAN
(NO SCALE)

NH STATE PLANE
NAD 83 - GPS OBS.

INFORMATION FROM CITY OF DOVER G.I.S.
– WATER MAIN LOCATION AND IDENTIFICATIONS
– CATCH BASIN AND SEWER MANIFOLD IDENTIFICATIONS

GAS LOCATION FROM SURFACE PAINT MARKINGS

WATER - DOVER FARAD1-020-MI

SEWER MAIN

SMH 2876
RIM = 96.5'
INV. IN = 88.8' 8" PVC [NORTH]
INV. OUT = 88.6' 8" PVC
NEXT SMH 2875

SMH 2875
RIM = 96.0'
INV. IN = 88.0' 8" SMH 2876
INV. IN = 87.9' 8" (SITE)
INV. OUT = 87.6' 8"
NEXT SMH 2874

CATCH BASIN
#7080 RIM = 96.0'

CATCH BASIN
#7081 RIM = 95.9'

74
95.1'
= 86.62' 8" PVC SMH 2875
T = 86.42' 8" PVC
[NORTH]

SEWER MAIN

TIE INTO EXISTING SEWER STUB

SEWER 8"ø

TAPPING SADDLE WITH THRUST BLOCK (SIZE V.I.F).

WATER - DOVER FARAD1-020-MI

HYDRANT #319

GAS 4"ø PP

CROSBY ROAD
{75' WIDE R.O.W.}

C / 1-C1

C / 1-C2

C / 1-E
VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

UTILITY POLE 364A/1Y UGU DROP

EXISTING EDGE OF PAVEMENT

OHU

UTILITY POLE 364A/1 1140-22

MEET/MATCH EXISTING PAVEMENT

PROPOSED OVERHEAD UTILITIES

PSMH1

PROPOSED 8" CL D.I. WATERLINE

2" GAS STUB

6" CL D.I WATERLINE STUB

6" PVC SEWER STUB

PROPOSED UNDERGROUND UTILITES

PROPOSED TRANSFORMER PAD

FORMER HANSON ROAD

50' WETLAND BUFFER

C / 2-1B
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

8"X6" ANCHOR TEE WITH GATE VALVE AND THRUST BLOCK (TYP)

8"X6" ANCHOR TEE WITH GATE VALVE AND THRUST BLOCK (TYP)

PSMH3

BEGIN SGC

END SGC

PROPOSED 4" GAS LINE

PAVED SLUICE

C / 2-1
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

75' PUBLIC ROW

6" PVC SEWER STUB

2" GAS STUB

6" CL D.I WATERLINE STUB

C / 2-1A
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

END SGC

PROPOSED GRAVEL (TYP)

PROPOSED HYDRANT

PROPOSED 6" REDUCER WITH GATE VALVE

PROPOSED 20' 8" CL D.I. WATERLINE STUB

PROPOSED GAS LINE STUB

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

LEGEND

Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
ø – DIAMETER
S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
UP – UTILITY POLE
– FIRE HYDRANT
– WETLAND
– EDGE OF WETLAND
– WETLAND BUFFER
312'R – PAVEMENT RADUIS
SGC – SLOPED GRANITE CURB
PEOP – PROPOSED EDGE OF PAVEMENT
PW – PROPOSED WATER
PG – PROPOSED GAS
PE – PROPOSED ELECTRIC
PS – PROPOSED SEWER
– PROPOSED GRAVEL

PLANNING FILE NO.: SUBD-2024-

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

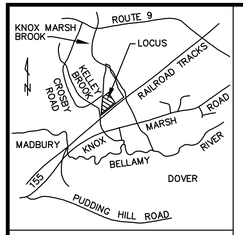
DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO:18043
FILE: SUB

CROSBY ROAD EXTENSION SITE & UTILITY PLAN

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

6



LOCATION PLAN
(NO SCALE)

NH STATE PLANE NAD 83 GPS OBS.

INFORMATION FROM CITY OF DOVER G.I.S.
– WATER MAIN LOCATION AND IDENTIFICATIONS
– CATCH BASIN AND SEWER MANHOLE IDENTIFICATIONS

GAS LOCATION FROM SURFACE PAINT MARKINGS

FORMER HANSON ROAD

50' WETLAND BUFFER

CATCH BASIN #7080 RIM = 96.0'

CATCH BASIN #7081 RIM = 95.9'

TBM CB7081 RIM=95.9

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

WETLAND BUFFER IMPACT "A"

WETLAND BUFFER IMPACT "B"

WETLAND BUFFER IMPACT "C"

CONSTRUCTION ENTRANCE

BIORETENTION POND 1 W/ ISR (BIO1 W/ ISR)

PROPOSED 8" SILTSOXX (TYP)

WETLAND BUFFER INCLUDED ON "SITE PLAN–LOT 2"

BIORETENTION POND 3 W/ ISR (BIO3 W/ ISR)

WETLAND BUFFER IMPACT:

IMPACT "A"	= 4,437 SF
IMPACT "B"	= 27 SF
IMPACT "C"	= 397 SF
TOTAL	**= 4,861 SF**

CROSBY ROAD EXTENSION
PLAN VIEW
HORIZONTAL SCALE: 1"=40'

HIGH PT. STA.7+50.00
HIGH PT. ELEV.98.89
PVI STA.7+50.00
PVI ELEV.99.02
AD=–1.00
K=100.00
100.00' VC

PVC STA.7+00.00
PVC ELEV.98.77

PVT STA.8+00.00
PVT ELEV.98.77

EOP CROSBY ROAD EXTENSION
STA. 8+55.50

CROSBY ROAD EXTENSION
PROPOSED CUL-DE-SAC EASEMENT

EXISTING SMH 2875
STA. 0+00.32
INV.OUT=87.32

PROPOSED INV.IN=87.9' TIE INTO EXISTING SEWER STUB

EXISTING CROSBY ROAD

EOP CROSBY ROAD EXTENSION (MATCH EXISTING GRADE)

PSMH 1
STA. 3+06.78
RIM=96.9'
INV.IN=89.2'
INV.OUT=89.1'

PSMH2
STA. 3+77.00
RIM=97.2'
INV.IN=89.6'
INV.OUT=89.5'

EXISTING GRADE

PROPOSED GRADE

0.50%

MINIMUM 30'

PSMH3
STA.6+13.43
RIM=98.2'
INV.IN=90.60'
INV.OUT=90.50'

MINIMUM 5'

0.50%

4" GAS MAIN

8" D.I. CL WATERLINE

8" SDR35 L=300' S=.004

8" SDR35 L=66' S=.004

8" SDR35 L=230' S=.004

4" GAS MAIN

8" D.I. CL WATERLINE

DATUM=84

96.2	95.9	95.8	96.0	96.3	96.5	95.8	95.2	95.5	95.4	96.0	95.4	95.3	96.0	96.9	96.0	95.0	93.6	93.3
96.22	96.27	96.32	96.38	96.43	96.52	96.77	97.02	97.27	97.52	97.77	98.02	98.27	98.52	98.77	98.89	98.77	98.52	94.68

0+00 0+50 1+00 1+50 2+00 2+50 3+00 3+50 4+00 4+50 5+00 5+50 6+00 6+50 7+00 7+50 8+00 8+50 8+70.48

CROSBY ROAD EXTENSION
PROFILE VIEW
HORIZONTAL SCALE: 1"=40'
VERTICAL SCALE: 1"=4'

LEGEND
S.F. – SQUARE FEET
Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
– – – 92 – – – – CONTOUR LINE – 1' INTERVAL
———— – EDGE OF WETLAND
– WETLAND
———— – WETLAND BUFFER
96 – PROPOSED CONTOUR
X 96 – PROPOSED FINISH GRADE
– PROPOSED CONDITIONAL USE IMPACT

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

PLANNING FILE NO.: SUBD–2024–

CROSBY ROAD EXTENSION PLAN & PROFILE

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

7

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8–6–24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:JH
PROJECT NO: 18043
FILE: SUB

DESCRIPTION

1. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS ASSOCIATED WITH A 3 LOT SUBDIVISION, THE CONSTRUCTION OF CROSBY ROAD EXTENSION, PUBLIC WATER AND SEWER, UNDERGROUND UTILITY IMPROVEMENTS, AND GRADING & DRAINAGE IMPROVEMENTS.

PROJECT NAME AND LOCATION

DEL SOL DOVER, LLC
3 LOT SUBDIVISION CROSBY RD EXTENSION — *LATITUDE N43° 10' 49"*
DOVER, NEW HAMPSHIRE 03820 — *LONGITUDE W70° 54' 41"*

DISTURBED AREA

±56,000 S.F.

NOTES:

1. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.

SEQUENCE OF MAJOR ACTIVITIES

1. CONTRACTOR SHALL PREPARE THE SWPPP, FILE FOR AND OBTAIN THE NOI A MINIMUM OF 2 WEEKS PRIOR TO COMMENCEMENT OF SITE WORK.
2. PLACE TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S PRIOR TO EARTH MOVING ACTIVITIES.
3. ALL EROSION CONTROL AND PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO COMMENCING EARTH MOVING OPERATIONS.
4. SELECTIVE DEMOLITION.
5. REGRADE SITE TO SUBGRADE.
6. TEMPORARY WATER DIVERSION (SWALES, BASINS) MUST BE USED AS NECCESSARY UNTIL AREAS ARE STABILIZED.
7. SWALES AND PONDS (AS APPLICABLE) SHALL BE CONSTRUCTED EARLY ON IN THE CONSTRUCTION SEQUENCE AND BEFORE ROUGH GRADING OF THE SITE AND ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. INSTALL DRAINAGE STRUCTURES AND CONTROLS.
9. INSTALL FOUNDATION FOOTINGS AND WALLS.
10. INSTALL UTILITIES.
11. PLACE GRAVELS AND FINE GRADE.
12. STABILIZE ROADWAYS AND PARKING AREAS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED (AS APPLICABLE) WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.
14. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EVERY 1/2" OF RAINFALL.
15. IN ALL CASES THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION AND IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
16. WHEN ALL SITE WORK IS COMPLETE AND ALL DISTURBED AREAS ARE STABILIZED REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND FILE THE EPA – N.O.T.

DEFINITIONS

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED.

1. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
2. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
3. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED; OR
4. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED

INSTALLATION, MAINTENANCE, AND INSPECTION PROCEDURES OF EROSION AND SEDIMENT CONTROLS

A. SILT BARRIER

1. INSTALLATION
   a. USE SILT BARRIER AS PERIMETER CONTROLS, PARTICULARLY AT THE LOWER OR DOWN SLOPE EDGE OF A DISTURBED AREA.
   b. LEAVE SPACE FOR MAINTENANCE BETWEEN TOE AND SLOPE OF SILT BARRIER.
   c. TRENCH IN THE SILT BARRIER ON THE UPHILL SIDE (6 INCHES DEEP BY 6 INCHES WIDE).
   d. INSTALL STAKES ON THE DOWNHILL SIDE OF THE SILT BARRIER.
   e. CURVE THE END OF THE SILT BARRIER UP-GRADIENT TO HELP IT CONTAIN RUNOFF.
2. SEQUENCE OF INSTALLATION
   a. SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.
3. MAINTENANCE
   a. SILT BARRIERS SHOULD BE INSPECTED AND MAINTAINED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
   b. SILT BARRIERS HAVE A USEFUL LIFE OF ONE SEASON. ON LONGER CONSTRUCTION PROJECTS, SILT BARRIERS SHOULD BE REPLACED PERIODICALLY TO MAINTAIN EFFECTIVENESS.
   c. REMOVE SEDIMENT WHEN IT REACHES ONE-THIRD (1/3) THE HEIGHT OF THE SILT BARRIER.
   d. REPLACE THE SILT BARRIERS WHERE THEY ARE TORN, WORN, OR OTHERWISED DAMAGED AND MONITOR PERFORMANCE TO ENSURE EFFECTIVE PERFORMANCE.
   e. RETRENCH OR REPLACE ANY SILT BARRIER THAT IS NOT PROPERLY ANCHORED TO THE GROUND.
   f. IF THERE IS EVIDENCE OF END FLOW ON PROPERLY INSTALLED BARRIERS, EXTEND BARRIERS UPHILL OR CONSIDER REPLACING THEM WITH OTHER MEASURES, SUCH AS TEMPORARY DIVERSIONS AND SEDIMENT TRAPS.
   g. SILT BARRIERS SHOULD BE REPAIRED IMMEDIATELY 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, SILT BARRIERS SHOULD BE REPLACED WITH A TEMPORARY CHECK DAM.

B. MULCHING

1. TIMING
   a. APPLY MULCH PRIOR TO ANY STORM EVENT. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.
   b. IN OTHER AREAS, THE TIME PERIOD CAN RANGE FROM 14 TO 30 DAYS OF INACTIVITY ON A AREA. THE LENGTH OF TIME VARYING WITH SITE CONDITIONS. PROFESSIONAL JUDGEMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.
   c. WITHIN 100 FEET OF RIVERS, STREAMS, WETLANDS, AND IN LAKE AND POND WATERSHEDS, THE TIME PERIOD OF WHICH MULCHING SHOULD TAKE OCCUR SHOULD BE NO GREATER THAN SEVEN (7) DAYS. THIS SEVEN DAY LIMIT SHOULD BE REDUCED FURTHER DURING WET WEATHER PERIODS.
2. APPLICATION RATE
   a. MULCH SHALL BE APPLIED AT A RATE OF BETWEEN 1.5 TO 2 TONS PER ACRE, OR 70 TO 90 POUNDS PER 1000 SQUARE FEET.
   b. GUIDELINES FOR WINTER MULCH APPLICATION. WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 150-200 POUNDS OF HAY OR STRAW PER ACRE WITH ABOUT 4 INCHES IN DEPTH. A TACKIFIER MAY BE ADDED TO THE MULCH.
3. MAINTENANCE
   a. ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS. CHECK FOR SIGNS OF EROSION OR DISPLACEMENT OF THE MULCH. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED.
   b. NETS MUST BE INSPECTED AFTER RAIN EVENTS FOR DISLOCATION OR FAILURE AND SHOULD BE REPAIRED AS NECCESSARY.
   c. INSPECTIONS SHOULD TAKE PLACE UNTIL THE SITE IS ESTABLISHED.
   d. EROSION CONTROL MIX MULCH USED FOR TEMPORARY STABILIZATION SHOULD BE LEFT IN PLACE. VEGETATION ADDS STABILITY AND SHOULD BE PROMOTED.

C. TEMPORARY SEEDING

1. SEEDBED PREPARATION
   a. STONES AND TRASH SHOULD BE REMOVED SO AS NOT TO INTERFERE WITH THE SEEDING AREA.
   b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED.
   c. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS.
      i) APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OR 13.8 POUNDS PER 1,000 SQUARE FEET OF LOW PHOSPHATE FERTILIZER OR EQUIVALENT.
      ii) APPLY LIMESTONE AT A RATE OF 3 TONS PER ACRE OR 138 POUNDS PER 1,000 SQUARE FEET.
2. SEEDING
   a. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SUMMARY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   b. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
   c. TEMPORARY SEEDING BETWEEN MAY 15TH AND AUGUST 15TH SHOULD BE COVERED WITH HAY OR STRAW MULCH, ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING" PRACTICE.
   d. VEGETATED GROWTH COVERING 85% OF THE DISTURBED AREA SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH.
3. MAINTENANCE
   a. TEMPORARY SEEDING SHALL BE INSPECTED PERIODICALLY. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER FABRICS, CHECK DAMS, ETC.).

D. PERMANENT SEEDING

1. BEDDING – STONES LARGER THAN 2 INCHES, TRASH, ROOTS, AND OTHER DEBRIS INTERFERRING WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA SHOULD BE REMOVED. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF 4" TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL.
2. FERTILIZER
   a. LIME AND FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 4 INCHES USING A DISC, SPRING TOOTH HARROW, OR OTHER SUITABLE EQUIPMENT PRIOR TO OR AT THE SAME TIME OF SEEDING.
   b. FERTILIZER SHOULD BE RESTRICTED TO A LOW PHOSPHATE, SLOW RELEASE NITORGEN FERTILIZER WHEN APPLIED TO AREAS BETWEEN 25 FEET AND 250 FEET FROM A SURFACE WATER BODY. NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER.
   c. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
      AGRICULTURAL LIMESTONE @ 138 LBS. PER 1,000 S.F.
      LOW PHOSPHATE (N-P2O5-K2O) FERTILIZER @ 13.8 LBS. PER 1,000 S.F.
3. SEED MIXTURE (RECOMMENDED)
   RATE:

TYPE	LBS. PER ACRE	LBS. PER 1,000 S.F.
TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDSFOOT TREFOIL	8	0.20
TOTAL	48	1.10

4. SEEDING
   a. SPRING SEEDING USUALLY GIVES THE BEST RESULTS FOR ALL SEED MIXES OR WITH LEGUMES. PERMANENT SEEDING SHOULD BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST.
   b. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   c. VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH. IF THIS CONDITION IS NOT ACHIEVED, IMPLEMENT TEMPORARY STABILIZATION MEASURES FOR OVERWINTER PROTECTION.
5. HYDROSEEDING
   a. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF STRAW MULCH ON CRITICAL AREAS IS PREFERRED SINCE IT GRANTS BETTER SLOPE PROTECTION BY USING ADHESIVE MATERIALS.
   b. SLOPES MUST BE NO STEEPER THAN 2 TO 1 (2 FEET HORIZONTALLY TO 1 FOOT VERTICALLY).
   c. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
6. MAINTENANCE
   a. PERMANENT SEEDED AREAS SHOULD BE INSPECTED AT LEAST MONTHLY DURING THE COURSE OF CONSTRUCTION. INSPECTIONS, MAINTENANCE, AND CORRECTIVE ACTIONS SHOULD CONTINUE UNTIL THE OWNER ASSUMES PERMANENT OPERATION OF THE SITE.
   b. SEEDED AREAS SHOULD BE MOWED AS REQUIRED TO MAINTAIN A HEALTHY STAND OF VEGETATION, WITH MOWING HEIGHT AND FREQUENCY DEPENDENT ON TYPE OF GRASS COVER.
   c. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABALIZATION OF EXPOSED SOILS.
   d. IF EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS RESEEDED. WITH OTHER TEMPORARY MEASURES USED TO PROVIDE EROSION PROTECTION DURING THE PERIOD OF VEGETATION ESTABLISHMENT.
   e. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.

E. STORM DRAIN INLET PROTECTION

1. SPECIFICATIONS
   a. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE BARRIER SHOULD BE LESS THAN ONE ACRE.
   b. ANY RESULTANT PONDING OF STORMWATER MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.
2. INSTALLATION
   a. INSTALL INLET PROTECTION AS SOON AS STORM DRAIN INLETS ARE INSTALLED AND BEFORE LAND-DISTURBANCE ACTIVITIES BEGIN IN AREAS WITH EXISTING STORM DRAIN SYSTEMS.
   b. PROTECT ALL INLETS THAT COULD RECEIVE STORMWATER FROM YOUR CONSTRUCTION PROJECT.
   c. USE IN CONJUNCTION WITH OTHER EROSION PREVENTION AND SEDIMENT CONTROL BMPS.
   d. DESIGN YOUR INLET PROTECTION TO HANDLE THE VOLUME OF WATER FROM THE AREA BEING DRAINED. ENSURE THAT THE DESIGN IS SIZED APPROPRIATELY.
3. MAINTENANCE
   a. INSPECT INLETS BARRIERS FREQUENTLY, BEFORE AND AFTER EACH RAINFALL EVENT AND REPAIR WHEN NECESSARY.
   b. SEDIMENT SHOULD BE REMOVED AND THE STORM DRAIN SEDIMENT BARRIER RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE BARRIER.
   c. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
   d. SWEEP STREETS, SIDEWALKS, AND OTHER PAVED AREAS REGULARLY.
   e. ALL CATCH BASINS AND STORM DRAIN INLETS MUST BE CLEANED AT THE END OF CONSTRUCTION AND AFTER THE SITE HAS BEEN FULLY STABILIZED

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES THE SILT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN TWENTY ONE (21) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT FENCES AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED. ALL AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.

WASTE DISPOSAL

a. WASTE MATERIALS
   ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
b. HAZARDOUS WASTE
   ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
c. SANITARY WASTE
   ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

MAINTENACE OF STORMWATER MANAGEMENT FACILITIES

THE PROJECT PROPONENT IS RESPONSIBLE FOR THE MAINTENANCE OF ALL STORMWATER FACILITIES DURING CONSTRUCTION AND THE PROPERTY OWNER IS RESPONSIBLE AFTER CONSTRUCTION IS COMPLETE.

CATCH BASINS & STORMWATER TREATMENT STRUCTURES

1. CATCH BASINS & STORMWATER TREATMENT STRUCTURES SHOULD BE INSPECTED ON A MONTHLY BASIS AND/OR AFTER A MAJOR RAINFALL EVENT TO ASSURE THAT DEBRIS OR SEDIMENTS DO NOT REDUCE THE EFFECTIVENESS OF THE SYSTEM.

SPILL PREVENTION

A. MATERIAL MANAGEMENT PRACTICES
   THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL SANITARY EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
   GOOD HOUSEKEEPING:
   THE FOLLOWING GOOD HOUSEKEEPING PRACTICES THAT WILL BE FOLLOWED ON SITE DURING
   1. THE CONSTRUCTION PROJECT:
      a. AN EFFORT WILL BE MADE TO STORE ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB.
      b. ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.
      c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
      d. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.
      e. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
      f. WHENEVER POSSIBLE ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
   2. HAZARDOUS PRODUCTS:
      a. THE FOLLOWING PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
      b. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
      c. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION.
      d. SURPLUS PRODUCT THAT MUST BE DISPOSED OF WILL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.

B. PRODUCT SPECIFICATION PRACTICES
   THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ON SITE:
   1. PETROLEUM PRODUCTS:
      a. ALL ON SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENACE TO REDUCE LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
   2. FERTILIZERS:
      a. FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER. STORAGE WILL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
   3. PAINTS:
      a. ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM BUT WILL BE DISPOSED OF PROPERLY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
   4. CONCRETE TRUCKS:
      a. CONCRETE TRUCKS WILL DISCHARGE AND WASH OUT SURPLUS CONCRETE OR DRUM WASH WATER IN A CONTAINED AREA ON SITE.

C. SPILL CONTROL PRACTICES
   IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
   a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
   b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.
   c. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.
   d. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
   e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OF LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.
   f. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM RECURRING AND HOW TO CLEANUP THE SPILL IF IT OCCURS. A DESCRIPTION OF THE SPILL, ITS CAUSE, AND THE CLEANUP MEASURES WILL BE INCLUDED.
   g. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.

THE PROJECT PROPONENT IS REQUIRED TO MANAGE CONSTRUCTION TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO CONTROLLING INVASIVE SPECIES AND CONTROLLING FUGITIVE DUST IN ACCORDANCE WITH ENV-A 1002.

AGR 3800 PROHIBITED INVASIVE PLANT SPECIES RULES

THE RULE, AGR 3800, STATES: NO PERSON SHALL COLLECT, TRANSPORT, IMPORT, EXPORT, MOVE, BUY SELL, DISTRIBUTE, PROPAGATE OR TRANSPLANT ANY LIVING AND VIABLE PORTION OF ANY PLANT SPECIES, WHICH INCLUDED ALL OF THEIR CULTIVARS AND VARIETIES, LISTED IN TABLE 3800.1, NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES LIST: A COMPLETE COPY OF THE RULES CAN BE ACCESSED ON THE INTERNET AT HTTP://AGRICULTURE.NH.GOV/TOPICS/PLANTS_INSECTS.HTM.

ENV-A 1002 FUGITIVE DUST: PRECAUTIONS TO PREVENT, ABATE, AND CONTROL FUGITIVE DUST.

a. ANY PERSON ENGAGED IN ANY ACTIVITY WITHIN THE STATE EMITS FUGITIVE DUST, OTHER THAT THOSE LISTED IN ENV-A 1002.02 (b), SHALL TAKE PRECAUTIONS THROUGHOUT THE DURATION OF THE ACTIVITY IN ORDER TO PREVENT, ABATE, AND CONTROL THE EMISSION OF FUGITIVE DUST.
b. PRECUATIONS REQUIRED BY (a) ABOVE, SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   I) THE USE OF WATER OR HYDROPHILIC MATERIAL ON OPERATIONS OR SURFACES, OR BOTH;
   II) THE APPLICATION OF ASPHALT, WATER, OR HYDROPHILIC MATERIAL, OR TARPS OR OTHER SUCH COVERS TO MATERIAL STOCKPILES;
   III) THE USE OF HOODS, FANS, FABRIC FILTERS, OR OTHER DEVICES TO ENCLOSE AND VENT AREAS WHERE MATERIALS PRONE TO PRODUCING FUGITIVE DUST ARE HANDLED;
   iv) THE USE OF CONTAINMENT METHODS FOR SANDBLASTING OR SIMILAR OPERATIONS; AND
   v) THE USE OF VACUUMS OR OTHER SUCTION DEVICES TO COLLECT AIRBORNE PARTICULATE MATTER.

WINTER CONSTRUCTION NOTES

1. ALL PROPOSED POST-DEVELOPMENT VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT.
2. ALL DITCHES & SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS.
3. AFTER OCTOBER 15TH, INCOMPLETE ROAD AND PARKING SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3-INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT.

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO:18043
FILE: SUB

PLANNING FILE NO.: SUBD-2024-

EROSION CONTROL NOTES

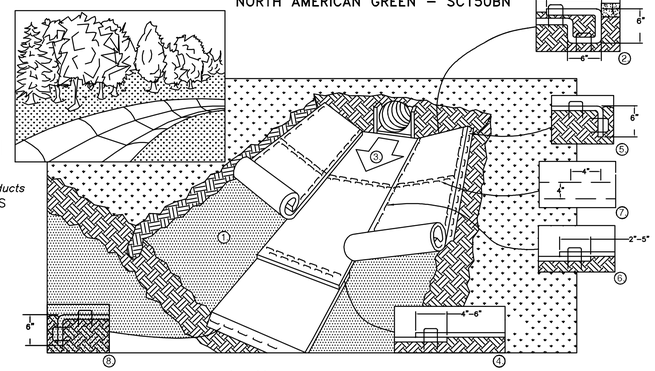
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

8

CHANNEL INSTALLATION
NORTH AMERICAN GREEN – SC150BN

NORTH AMERICAN GREEN
EROSION CONTROL *Products Guaranteed* SOLUTIONS



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" – 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" – 5" (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. NOTE: * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

CRITICAL POINTS

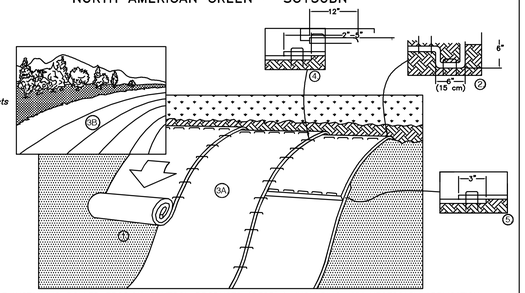
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE:
* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

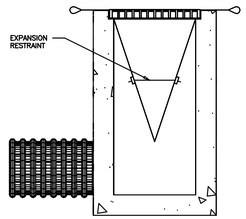
SLOPE INSTALLATION
NORTH AMERICAN GREEN – SC150BN

NORTH AMERICAN GREEN
EROSION CONTROL *Products Guaranteed* SOLUTIONS



1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM®, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

NOTE: THE USE OF WELDED PLASTIC OR BIODEGRADABLE PLASTIC NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED. THE USE OF WILDLIFE FRIENDLY ORGANIC MATERIALS IS RECOMMENDED.



INSTALLATION DETAIL

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS. AS SUPPLIED BY AH HARRIS OF PORTSMOUTH OR APPROVED EQUAL

REGULAR FLOW SILTSACK®
(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®
(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

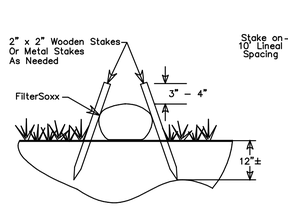
PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®

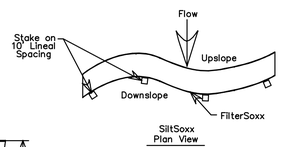
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK®, WITH A WOVEN PILLOW INSERT.

DETAIL OF INLET SEDIMENT CONTROL DEVICE



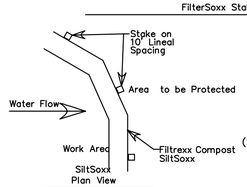
FilterSoxx Section
At Ends of Run
Cross Stakes

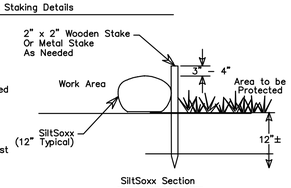


SiltSoxx
Plan View

Notes:
1. All material to meet Filtrexx specifications
2. FilterSoxx compost/soil/rock/seed fill to meet application requirements.
3. Compost material to be dispersed on site, as determined by Engineer.

FilterSoxx Staking Details





SiltSoxx Section

Notes:
1. All material to meet Filtrexx specifications
2. SiltSoxx compost/soil/rock/seed fill to meet application requirements.
3. SiltSoxx depicted is for minimum slopes. Greater slopes may require larger socks per the Engineer.
4. Compost material to be dispersed on site, as determined by Engineer.

SILTSOXX DETAILS
NOT TO SCALE

SEEKING REPORTS OF RARE TURTLES

The NH Fish & Game Department is collecting observations of four turtle species:

Blanding's turtle (state endangered)
- Large, dark/black domed shell with lighter speckles
- Distinct yellow throat/chin
- Aquatic but often moves on land

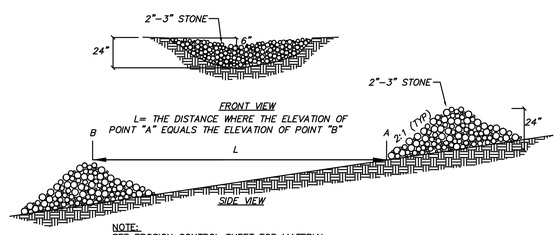
Wood turtle (special concern)
- Sculpted, pyramidal brownish shell
- Orange around neck and limbs
- River/stream turtle spending many months on land

Eastern box turtle (state endangered)
- Small terrestrial turtle with highly domed shell
- Irregular yellow or orange markings over brown/black base

Spotted turtle (state threatened)
- Small, mostly aquatic with black or dark brown with yellow spots.
- Fairly flat shell compared to Blanding's turtle

Report sightings to RAARP@wildlife.nh.gov or 603-271-2461 ***Please report promptly, noting specific location and date – Photographs strongly encouraged***

NOTES:
1. ALL OUTSIDE CONSTRUCTION PERSONNEL SHALL RECEIVE TRAINING IN THE IDENTIFICATION OF RARE TURTLE SPECIES AND MADE AWARE OF THEIR PROTECTED STATUS.
2. THE USE OF WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED
3. ~~THE USE OF EROSION CONTROL BERM, WHITE FILTREXX DEGRADABLE WOVEN SILT~~ SOCK, OR 'WILDLIFE FRIENDLY' WOVEN ORGANIC MATERIAL (E.G. COCO OR JUTE MATTING SUCH AS NORTH AMERICAN GREEN SC150BN OR EQUIVALENT) ARE ACCEPTABLE FOR USE
4. IF WOOD, SPOTTED, OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI AT 271–1738 or JOSH MEGYESY AT 271–1125 FOR FURTHER INSTRUCTIONS.



NOTE:
SEE EROSION CONTROL SHEET FOR MATERIAL, INSTALLATION AND MAINTENANCE REQUIREMENTS.

STONE CHECK DAM
NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	SUB	REVISION	APP'D	DATE

DATE: 8–6–24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO:18043
FILE: SUB

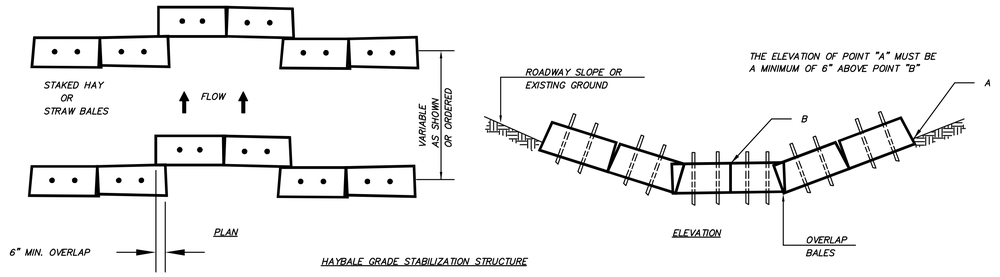
PLANNING FILE NO.: SUBD–2024–

EROSION CONTROL DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

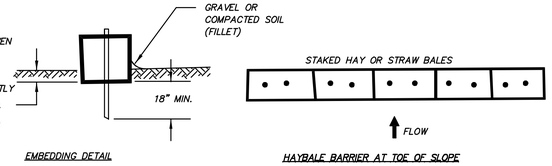
9



HAYBALE GRADE STABILIZATION STRUCTURE

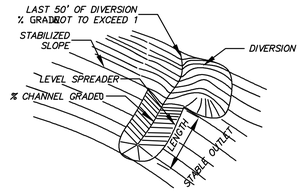
CONSTRUCTION SPECIFICATIONS

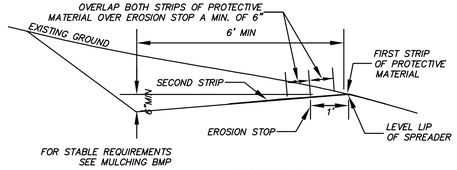
1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 2" x 2" STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. REMOVE AND PROPERLY DISPOSE OF ALL SEDIMENT PRIOR TO REMOVING HAYBALES.



HAYBALE NOTES AND DETAILS

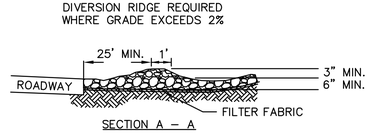
NOT TO SCALE

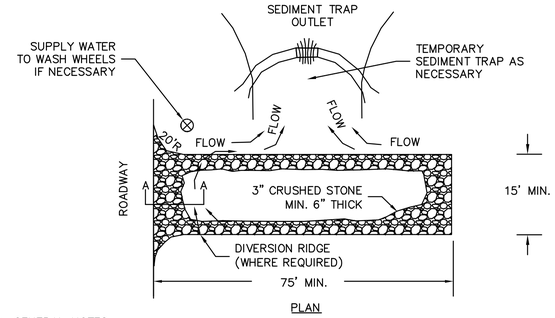




LEVEL SPREADER DETAIL

NOT TO SCALE





A. GENERAL NOTES:

1. A STABILIZED CONSTRUCTION ENTRANCE/EXIT CONSISTS OF A PAD OF STONE AGGREGATE PLACED ON A GEOTEXTILE FILTER FABRIC, LOCATED AT ANY POINT WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE TO AN EXISTING ACCESS ROAD WAY OR OTHER PAVED SURFACE. ITS PURPOSE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC ROADS BY CONSTRUCTION VEHICLES. THIS HELPS PROTECT RECEIVING WATERS FROM SEDIMENT CARRIED BY STORM WATER RUNOFF FROM ROADS
2. ONLY CONSTRUCTION TRAFFIC LEAVING THE SITE IS REQUIRED TO USE THE TEMPORARY STABILIZED EXIT. CONSIDER PROVIDING A SEPARATE, UNPROTECTED ENTRANCE FOR TRAFFIC ENTERING THE SITE. THIS WILL INCREASE THE LONGEVITY OF THE STABILIZED EXIT BY ELIMINATING HEAVY LOADS ENTERING THE SITE AND REDUCING THE TOTAL TRAFFIC OVER THE DEVICE.
3. LOCATE THE CONSTRUCTION ENTRANCES AND EXITS, A MINIMUM OF 100 FEET FROM INTERSECTIONS, TO LIMIT SEDIMENT LEAVING THE SITE AND TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES. AVOID ENTRANCES THAT HAVE STEEP GRADES AND ENTRANCES AT CURVES IN ROADS.
4. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR MAINTENANCE OF ANY MEASURES USED TO TRAP SEDIMENT.

B. SPECIFICATIONS (TEMPORARY CONSTRUCTION ENTRANCE/EXITS SHOULD MEET THE FOLLOWING REQUIREMENTS).

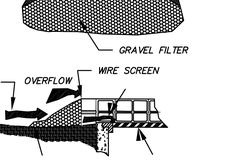
1. STONE SIZE MINIMUM: USE SHOULD BE 3" CRUSHED STONE.
2. THE MINIMUM LENGTH OF THE PAD SHOULD BE 75 FEET.
3. THE MINIMUM WIDTH OF THE PAD SHOULD BE 15 FEET OR THE WIDTH OF THE ENTRANCE, WHICHEVER IS GREATER
4. THE PAD SHOULD SLOPE AWAY FROM THE EXISTING ROADWAY.
5. THE PAD SHOULD BE AT LEAST 6" THICK.
6. A GEOTEXTILE FILTER FABRIC SHOULD BE PLACED BETWEEN THE STONE PAD AND THE EARTH SURFACE BELOW THE PAD.
7. THE PAD SHOULD BE MAINTAINED OR REPLACED WHEN MUD AND SOIL PARTICLES CLOG THE VOIDS IN THE STONE SUCH THAT MUD AND SOIL PARTICLES ARE TRACKED OFF–SITE.
8. NATURAL DRAINAGE THAT CROSSES THE LOCATION OF THE STONE PAD SHOULD BE INTERCEPTED AND PIPED BENEATH THE PAD, AS NECESSARY, WITH SUITABLE OUTLET PROTECTION.

C. MAINTENANCE REQUIREMENTS (THE ENTRANCE/EXIT SHOULD BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY, THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT).

1. WHEN THE CONTROL PAD BECOMES INEFFECTIVE, THE STONE SHOULD BE REMOVED ALONG WITH THE COLLECTED SOIL MATERIAL, REGRADED ON SITE, AND STABILIZED. THE ENTRANCE SHOULD THEN BE RECONSTRUCTED.
2. THE CONTRACTOR SHOULD SWEEP THE PAVEMENT AT EXITS WHENEVER SOIL MATERIALS ARE TRACKED ONTO THE ADJACENT PAVEMENT OR TRAVELED WAY.
3. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY. WHEN WHEEL WASHING IS REQUIRED, IT SHOULD BE CONDUCTED ON AN AREA STABILIZED WITH AGGREGATE, WHICH DRAINS INTO AN APPROVED SEDIMENT–TRAPPING DEVICE. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES OR WATERWAYS.

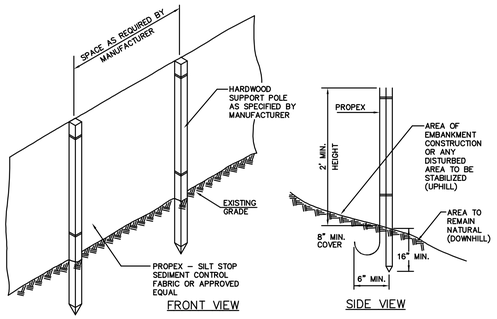
TEMPORARY CONSTRUCTION ENTRANCE/EXIT

NOT TO SCALE



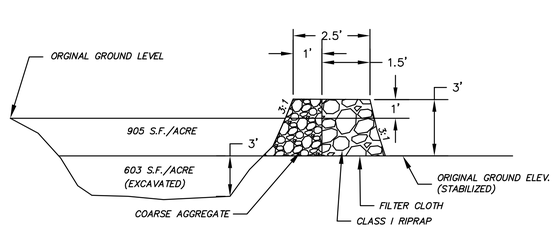
TEMPORARY EROSION CONTROL

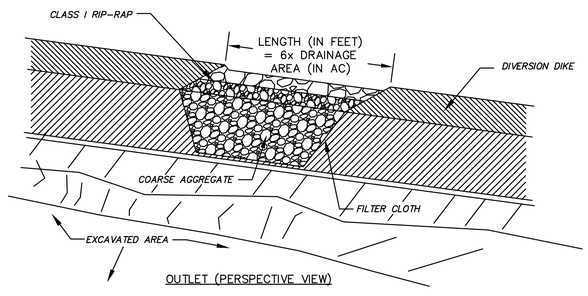
NOT TO SCALE



SILT FENCE DETAIL

NOT TO SCALE





NOTES:
1. COARSE AGGREGATE SHALL MEET NHDOT 304.5 SPECIFICATIONS AND SHALL NOT CONTAIN MORE THAN 5% FINES PASSING THE #200 SIEVE.
2. FILTER CLOTH SHALL BE MIRAFI 700X OR APPROVED EQUAL.
3. CLASS I RIPRAP SHALL MEET NHDOT 583 SS SPECIFICATIONS.
4. THE MAXIMUM CONTRIBUTING AREA TO THE TRAP SHALL BE LESS THAN 5 AC.
5. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED.
6. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

TEMPORARY SEDIMENT TRAP

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8–6–24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 18043
FILE: SUB

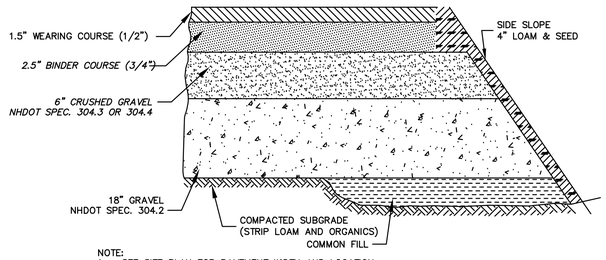
PLANNING FILE NO.: SUBD–2024–

EROSION CONTROL DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

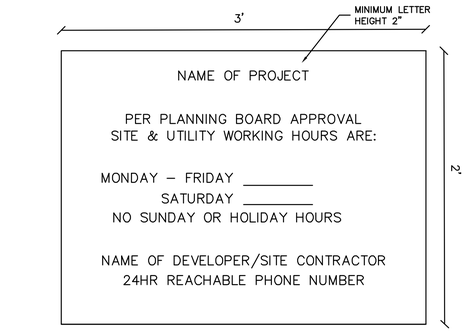
10



NOTE:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. GEOTEXTILE FABRIC MAYBE REQUIRED UNDER THE ROADWAY AND /OR THE PARKING AREAS AS REQUIRED BY THE ENGINEER BASED UPON SITE CONDITIONS.

HEAVY DUTY TYPICAL PAVEMENT SECTION

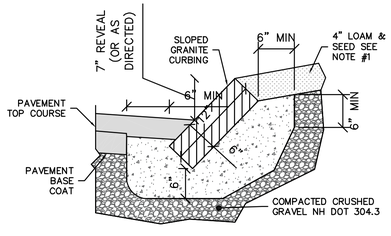
NOT TO SCALE



NOTES:
1. SIGN SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND
2. SIGN SHALL BE WEATHER RESISTANT AND SECURED TO THE GROUND
3. HOURS ON THE SIGN SHALL COMPLY WITH ALL PLANNING BOARD CONDITIONS OF APPROVAL.

CITY OF DOVER D-2
CONSTRUCTION SIGN

NOT TO SCALE



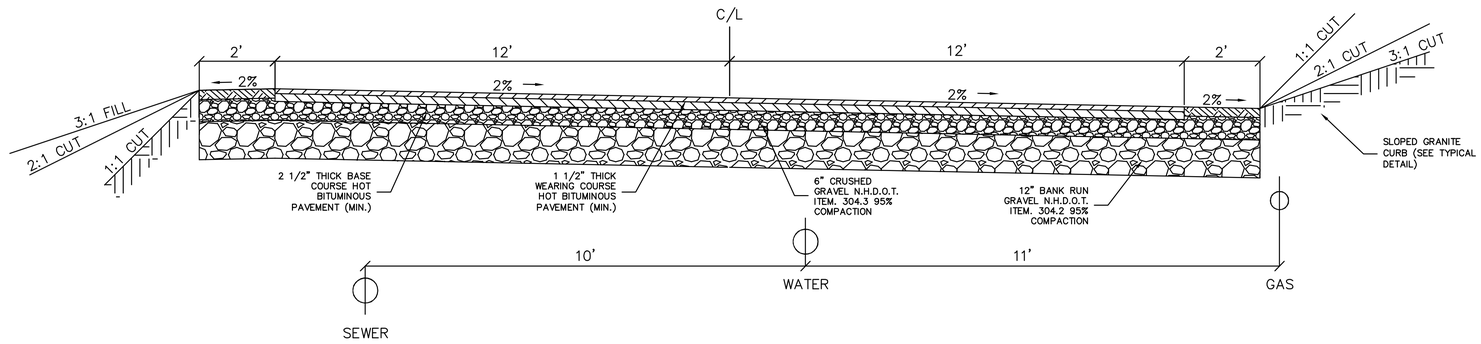
SLOPED GRANITE CURB

RADIUS	MAX LENGTH
< 21'	USE CURVED CURB
12'	3'
22' – 28'	4'
29' – 35'	5'
36' – 42'	6'
43' – 49'	7'
50' – 56'	8'
57' – 60'	9'
OVER 60'	10'

NOTES:
1. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
2. CONCRETE CURB SUPPORT SHOULD BE SET 1/2" BELOW THE TOP OF THE PAVEMENT BASE COURSE.

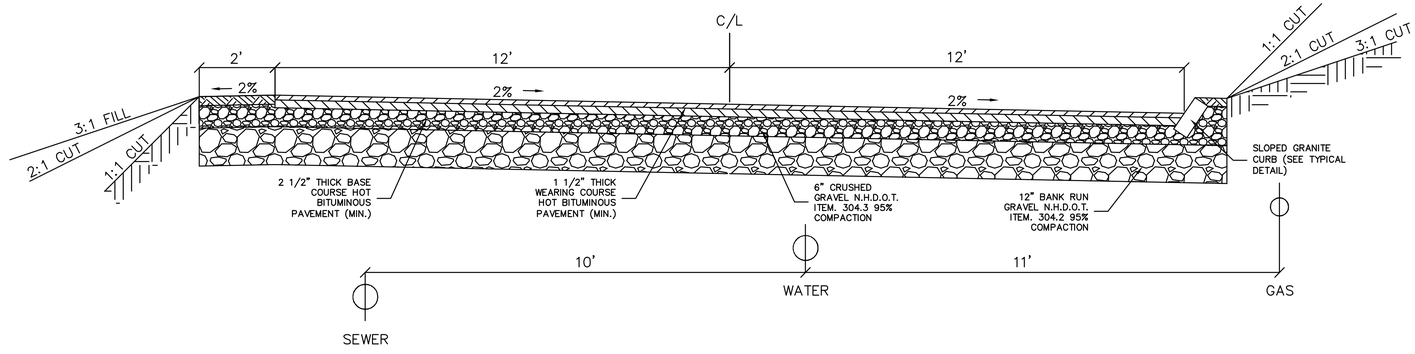
CITY OF DOVER D-8 GRANITE CURB DETAIL

NOT TO SCALE



PROPOSED CROSBY ROAD EXTENTSION
TYPICAL CROSS SECTION
STATION 2+40.29 TO 3+28.00

NOT TO SCALE



PROPOSED CROSBY ROAD EXTENTSION
TYPICAL CROSS SECTION
STATION 3+28.00 TO 8+56.10

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & MUNICIPAL ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

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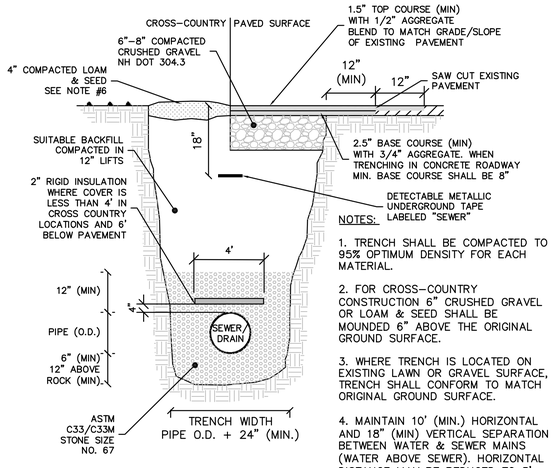
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

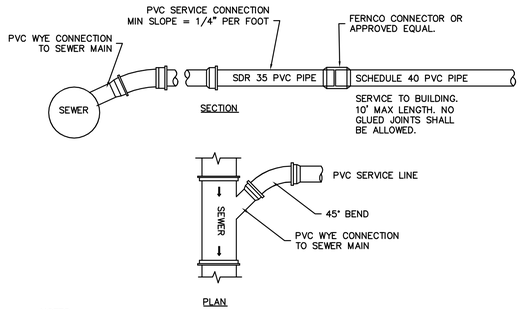


NOTES:

1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT AND ROCKS OVER 6" IN LARGEST DIMENSION
6. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-3
SEWER TRENCH DETAIL

NOT TO SCALE

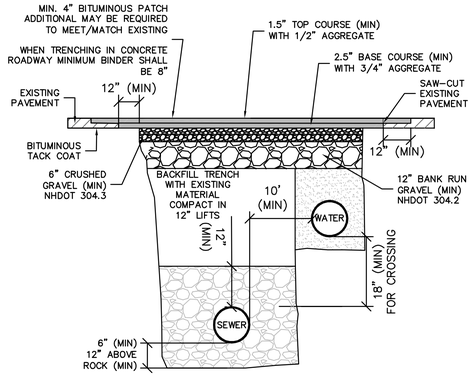


NOTES:

1. TRENCHING AND BEDDING REQUIREMENTS PER CITY SEWER TRENCH DETAIL (D-3).
2. SERVICE LATERAL DIAMETER VARIES PER APPLICATION. REVIEW SIZE WITH CITY ENGINEER PRIOR TO INSTALLATION.
3. SDR 35 SHALL NOT EXTEND INTO THE BUILDING

CITY OF DOVER D-17
SEWER SERVICE DETAIL

NOT TO SCALE

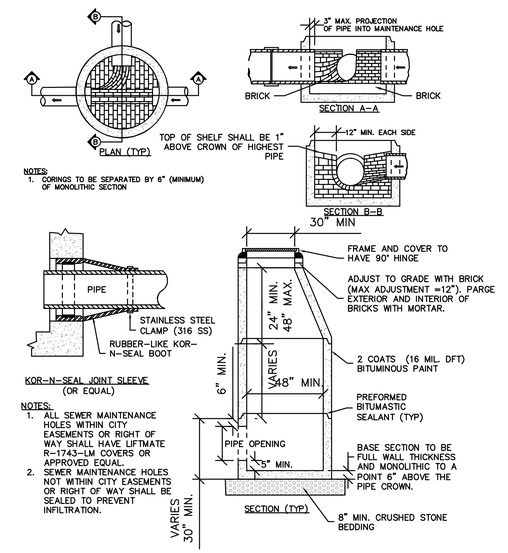


NOTES:

1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY.
2. ALL WORK SHALL COMPLY WITH THE CITY OF DOVER CONSTRUCTION GUIDELINES AND PROCEDURES
3. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.

CITY OF DOVER
TYPICAL TRENCH DETAIL

NOT TO SCALE

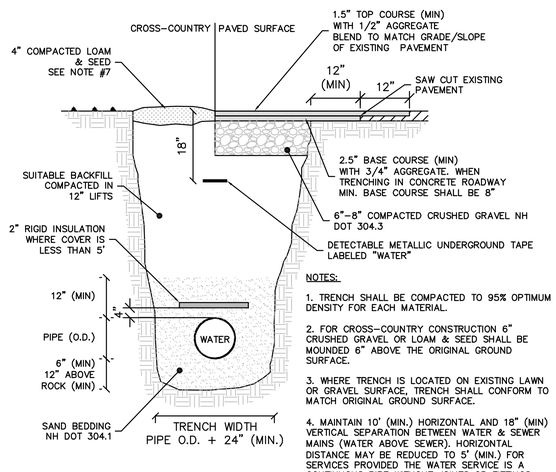


NOTES:

1. ALL SEWER MAINTENANCE HOLES WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL HAVE LIFTMATE R-1743-LM COVERS OR APPROVED EQUAL.
2. SEWER MAINTENANCE HOLES NOT WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL BE SEALED TO PREVENT INFILTRATION.

CITY OF DOVER
TYPICAL SEWER MANHOLE DETAIL

NOT TO SCALE

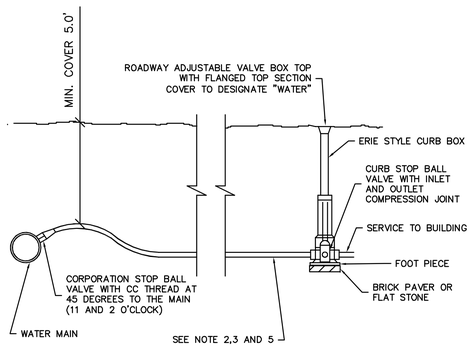


NOTES:

1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT, AND ROCKS OVER 6" IN LARGEST DIMENSION
6. PROVIDE MINIMUM 5' OF COVER. ENGINEERING APPROVAL REQUIRED FOR LESS THAN 5' OF COVER.
7. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-4
WATER TRENCH DETAIL

NOT TO SCALE

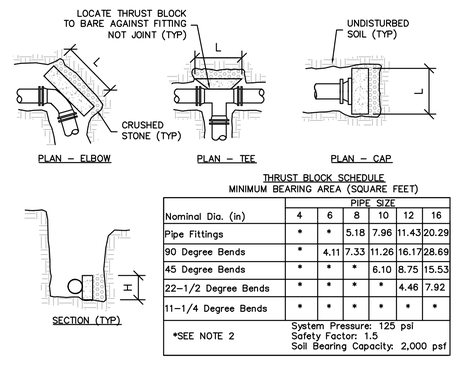


NOTES:

1. ALL WATER LINES 4" OR GREATER SHALL BE DUCTILE IRON WITH AN 8 MIL POLYETHYLENE WRAP, INCLUDING TEE AND OTHER CONNECTIONS.
2. WATER SERVICE LINES SHALL BE COPPER TUBING (TYPE K) BETWEEN MAIN AND CURB STOP.
3. SERVICE BETWEEN CURB STOP AND BUILDING MAY BE (BLUE OR BLACK) CTS SDR 9 PLASTIC POLYETHYLENE RATED FOR 250 psi.
4. CAM-LOCK REQUIRED FOR CTS OR IPS, MJ ADAPTER REQUIRED FOR HDPE
5. 3/4"- COPPER, CTS
   1"- COPPER, CTS
   2"- CTS, HDPE, IPS

CITY OF DOVER D-13
WATER SERVICE CONNECTION DETAIL

NOT TO SCALE



THRUST BLOCK SCHEDULE
MINIMUM BEARING AREA (SQUARE FEET)

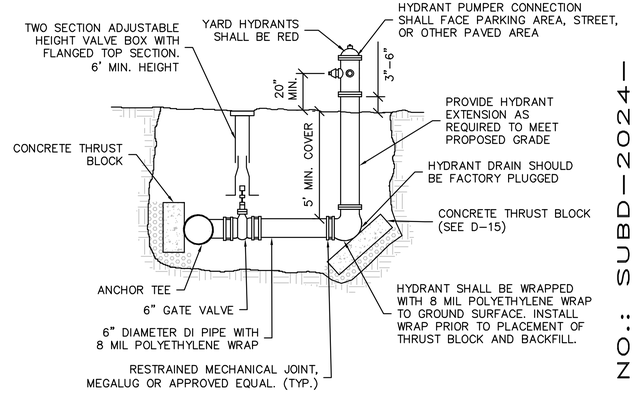
	PIPE SIZE					
Nominal Dia. (in)	4	6	8	10	12	16
Pipe Fittings	*	*	5.18	7.96	11.43	20.29
90 Degree Bends	*	4.11	7.33	11.26	16.17	28.69
45 Degree Bends	*	*	*	6.10	8.75	15.53
22-1/2 Degree Bends	*	*	*	*	4.46	7.92
11-1/4 Degree Bends	*	*	*	*	*	*
*SEE NOTE 2	System Pressure: 125 psi Safety Factor: 1.5 Soil Bearing Capacity: 2,000 psf					

NOTES:

1. ALL THRUST BLOCKS SHALL BE PRE-CAST CONCRETE UNLESS APPROVED BY THE CITY ENGINEER.
2. 2'X2'X2' MINIMUM THRUST BLOCK REQUIRED, ANY BEARING AREA OVER 4SF REQUIRES THRUST BLOCKS, RESTRAINED JOINTS AND CALCULATIONS ASSOCIATED WITH THE JOINT.
3. THE MINIMUM BEARING AREAS SHOWN IN THE THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 125 PSI. IF THE SYSTEM PRESSURE IS ABOVE 125 PSI, INCREASE THE NOTED AREAS PROPORTIONALLY TO THE ACTUAL SYSTEM PRESSURE.
4. FOR MINIMUM BEARING AREAS OVER 4 SF, THE LENGTH (L) OF THE BLOCK IS APPROXIMATELY TWICE AS LONG AS THE HEIGHT (H).
5. PLACE CRUSHED STONE BEHIND THRUST BLOCK AGAINST UNDISTURBED SOIL.
6. PLACE THRUST BLOCK ALONG MAXIMUM LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
7. CONCRETE COMPRESSIVE STRENGTH: 2,000 PSI MINIMUM.
8. USE OF THRUST BLOCKS DOES NOT ELIMINATE THE REQUIREMENT OF OTHER RESTRAINTS OR VICE VERSA.

CITY OF DOVER D-15
THRUST BLOCK DETAIL

NOT TO SCALE



NOTES:

1. FIRE HYDRANTS SHALL BE FACTORY SEALED EDDY STYLE 2641.
2. HYDRANT SHALL BE PAINTED RED WITH EPOXY PAINT AS RECOMMENDED BY THE HYDRANT MANUFACTURER.
3. HYDRANT SHALL OPEN LEFT.

CITY OF DOVER
TYPICAL HYDRANT DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE
CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

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DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3 LOT SUBDIVISION
CROSBY ROAD EXTENSION
DOVER, NH

DRAINAGE ANALYSIS

Del Sol Dover, LLC
CROSBY ROAD EXTENSION &
LOT 2 DEVELOPMENT
TAX MAP G, LOT 2-1
DOVER, NH

August 2024

Prepared For:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Prepared By:

Civilworks NE
PO Box 1166
181 Watson Road
Dover, NH 03820

CONTENTS

1.0 INTRODUCTION

2.0 DRAINAGE ANALYSIS

2.1 DRAINAGE DESIGN PARAMETERS
- 2.1.1 Watersheds
- 2.1.2 Soils
- 2.1.3 Rainfall Data
- 2.1.4 Runoff Curve Numbers

2.2 EXISTING CONDITIONS
- 2.2.1 Table A – Existing Conditions Hydrology

2.3 DEVELOPED CONDITIONS
- 2.3.1 Table B – Developed Conditions Hydrology

2.4 HYDROLOGIC COMPARISON
- 2.4.1 Table C – Existing vs. Developed Conditions Hydrology

2.5 STORMWATER DESIGN
- 2.5.1 Stormwater Best Management Practices
- 2.5.2 Pollutant Removal
- 2.5.3 Groundwater Recharge
- 2.5.4 Outlet Protection

3.0 APPENDIX A – HYDROLOGIC CALCULATIONS
- A Extreme Precipitation Table
- A-1 Existing Watersheds
  - Drainage Diagram, Area, and Soil Listings
  - Node Listing – 2-yr
  - Node Listing – 10-yr
  - 10-yr Storm Summary Hydrographs
  - Node Listing – 25-yr
  - Node Listing – 50-yr
- A-2 Developed Watersheds
  - Drainage Diagram, Area, and Soil Listings
  - Node Listing – 2-yr
  - Node Listing – 10-yr
  - 10-yr Storm Summary Hydrographs
  - Node Listing – 25-yr
  - Node Listing – 50-yr

4.0 APPENDIX B – DESIGN
- B-1 Stormwater Best Management Practices
- B-2 Pollutant Removal
- B-3 Outlet Protection

5.0 APPENDIX C – INSPECTION AND MAINTENANCE
- C-1 Stormwater Management System Inspection & Maintenance Plan

6.0 APPENDIX D – WATERSHED PLANS
- D-1 Pre-Development Conditions
- D-2 Post-Development Conditions

1.0 INTRODUCTION

This is a hydrologic analysis of a portion of the subject parcel located on Crosby Road in Dover, NH. The 20.80± acre lot is identified as Tax Map G, Lot 2-1. The parcel is being subdivided into three (3) lots (Lot 2-1, 2-1A, & 2-1B) ranging in size from approximately 5.0 to 8.3 acres. This hydrologic analysis analyzes the land development associated with construction of the proposed road and the development of the newly formed (6.15+/- acre) Lot 2-1. The area of analysis is currently undeveloped and primarily consists of mowed fields with a small, graveled area for site access. The project parcel, Lot 2-1, is relatively flat and slopes to the railroad tracks located along the south easterly property line. The parcel is bound by commercial lots to the North, East, and West, and the railroad tracks to the South and Southeast.

This analysis includes the construction of an 807 foot, 24-foot-wide paved road (Crosby Road extension) and the full build out of one (Tax Map G Lot 2-1) of the three (3) commercial lots. The commercial development consists of the construction of a 9,600-sf building, site access from the newly constructed Crosby Road extension, associated parking, gravel lay down area, underground utilities, and grading and drainage improvements. The proposed drainage system incorporates grassed and stone lined swales for stormwater conveyance, sediment forebays for pre-treatment, and three (3) bioretention basins with internal storage reservoirs (ISR's) for stormwater treatment. A large portion of stormwater runoff from the proposed roadway is designed to drain into the stormwater drainage structures located on Lot 2-1 while the last 50+/- ft will be treated be treated within the proposed right-of-way and proposed Lot 2-1A. The proposed stormwater system captures, stores, and treats the stormwater runoff from the site and roadway, then redirects it to the existing discharge points. The proposed stormwater drainage structures will be maintained by the project proponent as outlined within the Stormwater Management System Inspection & Maintenance Manual (Stormwater I&M Manual) in Appendix C.

To effectively analyze the pre-development subject parcel and proposed roadway, a 12.19 ac area was analyzed and divided into three (3) watersheds, A, B, & C. The remaining 8.61 acres of the original larger lot is not being developed as part of this project. Watershed A drains to the south to an existing drainage ditch along the railroad tracks; Watershed B drains to the country drainage associated with the former Hanson Road, prior to discharge from a cross culvert under the driveway of an abutting lot; and Watershed C drains to Knox Marsh Brook. The site is located within a Great Bay Community; therefore, this analysis includes a 15% increase to the extreme precipitation data obtained from the Northeast Regional Climate Center.

The post development condition maintains the same three (3) watersheds as the pre-development condition. Watersheds A & B are further divided into subcatchments, three (3) and two (2) respectively, to account for the proposed stormwater management system. The post-development watersheds utilize the same points of discharge as the existing conditions, and they provide a direct comparison to the pre-development model. Bioretention Basins with ISR's were utilized for stormwater treatment as the site is located

within a “Class A – All Features” watershed as identified on the NHDES OneStop Data Mapper. This analysis indicates that the proposed stormwater measures, and stormwater management plan will treat and mitigate stormwarer runoff in general accordance with ENV-Wq 1500 of the New Hampshire Code of Administrative Rules and the City of Dover’s Subdivision and Site Review Regulations. The proposed development of the site, in conjunction with the implementation of the Stormwater I&M Manual, will have minimal impact on the watersheds.

2.0 DRAINAGE ANALYSIS

A comprehensive hydrologic study of this site has been performed utilizing nationally recognized runoff estimating techniques developed by the USDA, Soil Conservation Services (SCS). The technique and runoff models are described in various SCS publications and references as follows:

“Stormwater Management and Erosion Sediment Control Handbook for Urban and Developing Areas in New Hampshire”

“New Hampshire Stormwater Manual Volume 2 - Post-Construction Best Management Practices Selection & Design”

“Civil Engineering Reference Manual, Fifth Edition”

“Open-Channel Hydraulics” Chow.

“Stormwater Modeling System” HydroCAD Ver. 10.10

2.1 DRAINAGE DESIGN PARAMETERS

A brief review of the procedures and parameters used in the drainage study follows:

2.1.1 Watersheds

The watershed was delineated using on site topographic and as built survey data field located by McEneaney Survey Associates of New England.

2.1.2 Soils

Soil types were determined utilizing a site specific soils map prepared by BAG Land Consultants, Bruce A. Gilday, CSS#012. The hydrologic soil drainage classifications used for this analysis are Class B and D.

Hydrologic Drainage Class B:

Map Unit Symbol	Soil Taxonomic Name	Drainage Class
313B	Deerfield	Moderately-Well Drained
915B	Deerfield Variant	Somewhat Poorly Drained

Hydrologic Drainage Class D:

Map Unit Symbol	Soil Taxonomic Name	Drainage Class
233B/P	Scantic	Poorly Drained (P)

2.1.3 Rainfall Data

Extreme precipitation estimate values from the Northeast Regional Climate Center were utilized in this analysis. The analysis has been performed for the 2-year, 10-year, 25-year, and 50-year storm events with 3.60", 5.44", 6.88", and 8.23" rainfall depths respectively. The rainfall data has been peaked by 15% in accordance with NHDES Alteration of Terrain requirements as the site is located within the Coastal Region.

2.1.4 Runoff Curve Numbers

The SCS runoff curve numbers were used and are summarized within each sub-catchment drainage summary in Appendix A.

2.2 EXISTING CONDITIONS

For the purposes of this analysis, the subject parcel was analyzed as three (3) watersheds.

2.2.1 Table A – Existing Conditions (2, 10, 25, and 50-year storm events)

Watershed	**Pre-Development Volume (af)**	**Pre Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.625	2.8	6.6	9.8	12.7
B	0.080	0.4	1.2	1.8	2.5
C	0.223	1.4	3.0	4.2	5.3

2.3 DEVELOPED CONDITIONS

The post development model was analyzed utilizing the same summing points as the pre-development analysis.

2.3.1 Table B – Developed Conditions (2, 10, 25, and 50-year storm events)

Watershed	**Post-Development Volume (af)**	**Post Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.915	2.5	6.3	9.7	12.7
B	0.055	0.3	0.8	1.3	1.7
C	0.261	1.4	3.0	4.2	5.3

2.4 HYDROLOGIC COMPARISON

The analysis indicates that the proposed project will have negligible impact on the developed watersheds.

2.4.1 Table C – Pre/Post Development Comparison (2, 10, 25, and 50-year storm events)

Watershed	Pre/**Post-Development Volume (af)**	Pre/**Post Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.625/**0.915**	2.8/**2.5**	6.6/**6.3**	9.8/**9.7**	12.7/**12.7**
B	0.080/**0.055**	0.4/**0.3**	1.2/**0.8**	1.8/**1.3**	2.5/**1.7**
C	0.223/**0.261**	1.4/**1.4**	3.0/**3.0**	4.2/**4.2**	5.3/**5.3**

2.5 STORMWATER DESIGN

The project incorporates best management practices to mitigate runoff as well as treat and convey stormwater.

2.5.1 Stormwater Best Management Practices (BMP's)

This project incorporates three (3) bioretention basins with ISR's to mitigate flow and water quality from the proposed development. Pre-treatment for the proposed

stormwater BMP's will utilize sediment forebays. See Appendix B-1 for the BMP design calculations and supporting documentation.

2.5.2 Pollutant Removal

This project treats 1.65+/- acres of proposed impervious area. The project incorporates the following practice and associated pollutant removal efficacy as identified in the New Hampshire Stormwater Management Manual Volume 2, Appendix B:

	TSS	TN	TP
Bioretention Basin with ISR:	90%	65%	65%

The pollutant removal meets or exceeds The City of Dover's Site Review Regulations. See Appendix B-2 for the removal efficiency data as provided in Volume 1.

2.5.3 Groundwater Recharge

The site was evaluated for infiltration practices in support of groundwater recharge. The site's characteristics were not conducive for infiltration. The site limitations prevent infiltration and therefore will influence the project's ability to meet City and State requirements to attenuate volume and meet channel protection requirements respectively.

Site characteristics including soil type, topography, and depth to SHWT prevent the infiltration of stormwater. However, the project's stormwater infrastructure is designed to attenuate flow from the development of the parcel in support of meeting the spirit of the channel protection criteria to the greatest extent practicable. The discharge from the site is directed to large wetland complexes associated with Kelley and Knox Marsh Brooks and the proposed project will not contribute to flooding or functional impairments to streets, adjacent properties, or downstream properties.

2.5.4 Outlet Protection

BMP's, conveyance structures, and outlet protection have been sized to convey the 50-year, 24 hour storm event. All proposed rip-rap applications shall consist of min. d50 = 6" stone with a stone layer thickness of 12" (min) on a filter fabric layer over a 6" thick (min) gravel base. See Appendix B-3 for design calculations and supporting data, the plan set for rip-rap locations and the drainage details for additional information.

APPENDIX A

HYDROLOGIC CALCULATIONS

Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

About this Project | Data & Products | Daily Monitoring | Documentation

Select Product

- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps

Select Location *Double-click map to place a marker, or enter address or latitude/longitude.*

Hybrid | Map | Satellite | Terrain

Locate by Address → | Locate by Lat/Lon 43.17° N -70.91° W → | Locate by State/County

Select Options

Smoothing: Yes

Delivery: Popup

Submit

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This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) | Natural Resources Conservation Service (NRCS)

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point	
Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.180 degrees North
Longitude	70.911 degrees West
Elevation	20 feet
Date/Time	Mon Jun 24 2024 14:58:45 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day		+15%
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	1.99	~~2.60~~	2.85	**1yr**	2.30	2.74	3.14	3.87	4.44	**1yr**	2.99
2yr	0.32	0.49	0.61	0.81	1.01	1.28	**2yr**	0.87	1.17	1.50	1.91	2.44	~~3.13~~	3.48	**2yr**	2.77	3.35	3.84	4.57	5.21	**2yr**	3.60
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.06	3.96	4.46	**5yr**	3.50	4.29	4.90	5.78	6.54	**5yr**	
10yr	0.40	0.63	0.80	1.09	1.41	1.84	**10yr**	1.22	1.69	2.17	2.82	3.65	~~4.73~~	5.38	**10yr**	4.19	5.17	5.90	6.90	7.77	**10yr**	5.44
25yr	0.46	0.74	0.94	1.29	1.72	2.26	**25yr**	1.48	2.09	2.69	3.51	4.59	~~5.98~~	6.90	**25yr**	5.30	6.64	7.54	8.73	9.76	**25yr**	6.88
50yr	0.51	0.82	1.06	1.48	1.99	2.66	**50yr**	1.72	2.45	3.17	4.17	5.47	~~7.16~~	8.33	**50yr**	6.33	8.01	9.08	10.43	11.61	**50yr**	8.23
100yr	0.58	0.93	1.20	1.70	2.31	3.11	**100yr**	1.99	2.88	3.73	4.94	6.51	~~8.56~~	10.07	**100yr**	7.57	9.68	10.94	12.47	13.81	**100yr**	9.84
200yr	0.64	1.04	1.35	1.94	2.69	3.65	**200yr**	2.32	3.39	4.41	5.87	7.77	10.24	12.17	**200yr**	9.06	11.70	13.18	14.91	16.44	**200yr**	
500yr	0.75	1.24	1.61	2.34	3.28	4.51	**500yr**	2.83	4.20	5.47	7.34	9.79	12.98	15.64	**500yr**	11.49	15.04	16.87	18.91	20.72	**500yr**	

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.91	1.25	1.55	2.04	2.48	**1yr**	1.81	2.38	2.92	3.35	4.05	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.16	1.36	1.83	2.36	3.04	3.38	**2yr**	2.69	3.25	3.73	4.45	5.06	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.15	2.78	3.70	4.11	**5yr**	3.27	3.96	4.58	5.40	6.10	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.57	1.82	2.45	3.14	4.26	4.78	**10yr**	3.77	4.59	5.31	6.24	7.01	**10yr**
25yr	0.44	0.67	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.85	3.67	5.04	5.79	**25yr**	4.46	5.57	6.48	7.56	8.43	**25yr**
50yr	0.48	0.73	0.91	1.31	1.77	2.19	**50yr**	1.53	2.14	2.36	3.21	4.12	5.78	6.69	**50yr**	5.11	6.44	7.53	8.74	9.68	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.51	**100yr**	1.74	2.46	2.64	3.59	4.61	6.61	7.73	**100yr**	5.85	7.43	8.76	10.09	11.08	**100yr**
200yr	0.60	0.90	1.14	1.65	2.30	2.88	**200yr**	1.99	2.81	2.93	4.02	5.16	7.57	8.93	**200yr**	6.70	8.58	10.19	11.67	12.72	**200yr**
500yr	0.70	1.04	1.34	1.94	2.77	3.47	**500yr**	2.39	3.39	3.40	4.67	6.01	9.01	10.78	**500yr**	7.97	10.37	12.44	14.15	15.20	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.23	1.74	2.21	2.83	3.05	**1yr**	2.50	2.93	3.37	4.17	4.76	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.24	**2yr**	0.90	1.22	1.48	1.95	2.50	3.25	3.59	**2yr**	2.87	3.45	3.96	4.72	5.39	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.54	1.85	2.49	3.19	4.22	4.80	**5yr**	3.73	4.61	5.23	6.17	6.94	**5yr**
10yr	0.46	0.70	0.87	1.21	1.57	1.92	**10yr**	1.35	1.87	2.23	3.04	3.84	5.19	5.98	**10yr**	4.59	5.75	6.55	7.58	8.46	**10yr**
25yr	0.55	0.84	1.05	1.49	1.96	2.47	**25yr**	1.69	2.41	2.87	3.95	4.92	6.93	8.02	**25yr**	6.13	7.71	8.73	9.96	11.02	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.98	**50yr**	2.02	2.91	3.48	4.80	5.97	8.55	10.03	**50yr**	7.57	9.64	10.87	12.25	13.47	**50yr**
100yr	0.74	1.12	1.40	2.03	2.78	3.59	**100yr**	2.40	3.51	4.21	5.87	7.24	10.55	12.55	**100yr**	9.34	12.07	13.52	15.08	16.47	**100yr**
200yr	0.86	1.29	1.63	2.37	3.30	4.35	**200yr**	2.85	4.26	5.12	7.18	8.78	13.06	15.72	**200yr**	11.56	15.11	16.83	18.54	20.18	**200yr**
500yr	1.05	1.56	2.00	2.91	4.13	5.59	**500yr**	3.57	5.46	6.61	9.39	11.34	17.35	21.17	**500yr**	15.36	20.36	22.49	24.42	26.41	**500yr**

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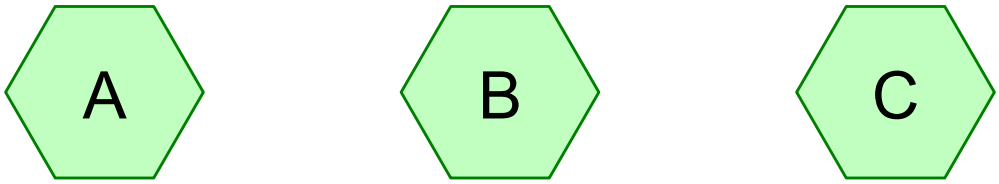
Northeast Regional Climate Center

A – 1

EXISTING WATERSHEDS



A

B

C

Subcat Reach Pond Link

Routing Diagram for 24085 - Pre
Prepared by Civilworks New England
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.549	61	>75% Grass cover, Good, HSG B (A, B, C)
3.457	80	>75% Grass cover, Good, HSG D (A, C)
0.186	96	Gravel surface, HSG B (A)
12.192	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.735	HSG B	A, B, C
0.000	HSG C	
3.457	HSG D	A, C
0.000	Other	
12.192		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	8.549	0.000	3.457	0.000	12.005	>75% Grass cover, Good	A, B, C
0.000	0.186	0.000	0.000	0.000	0.186	Gravel surface	A
0.000	**8.735**	**0.000**	**3.457**	**0.000**	**12.192**	**TOTAL AREA**	

A – 1

NODE LISTING – 2-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=0.91"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=2.8 cfs 0.625 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.4 cfs 0.080 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=1.13"
Flow Length=402' Tc=20.7 min CN=71 Runoff=1.4 cfs 0.223 af

Total Runoff Area = 12.192 ac Runoff Volume = 0.928 af Average Runoff Depth = 0.91"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

NODE LISTING – 10-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=2.12"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=6.6 cfs 1.458 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=1.64"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.2 cfs 0.211 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=2.45"
Flow Length=402' Tc=20.7 min CN=71 Runoff=3.0 cfs 0.486 af

Total Runoff Area = 12.192 ac Runoff Volume = 2.155 af Average Runoff Depth = 2.12"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

10-YR STORM SUMMARY

Summary for Subcatchment A: A

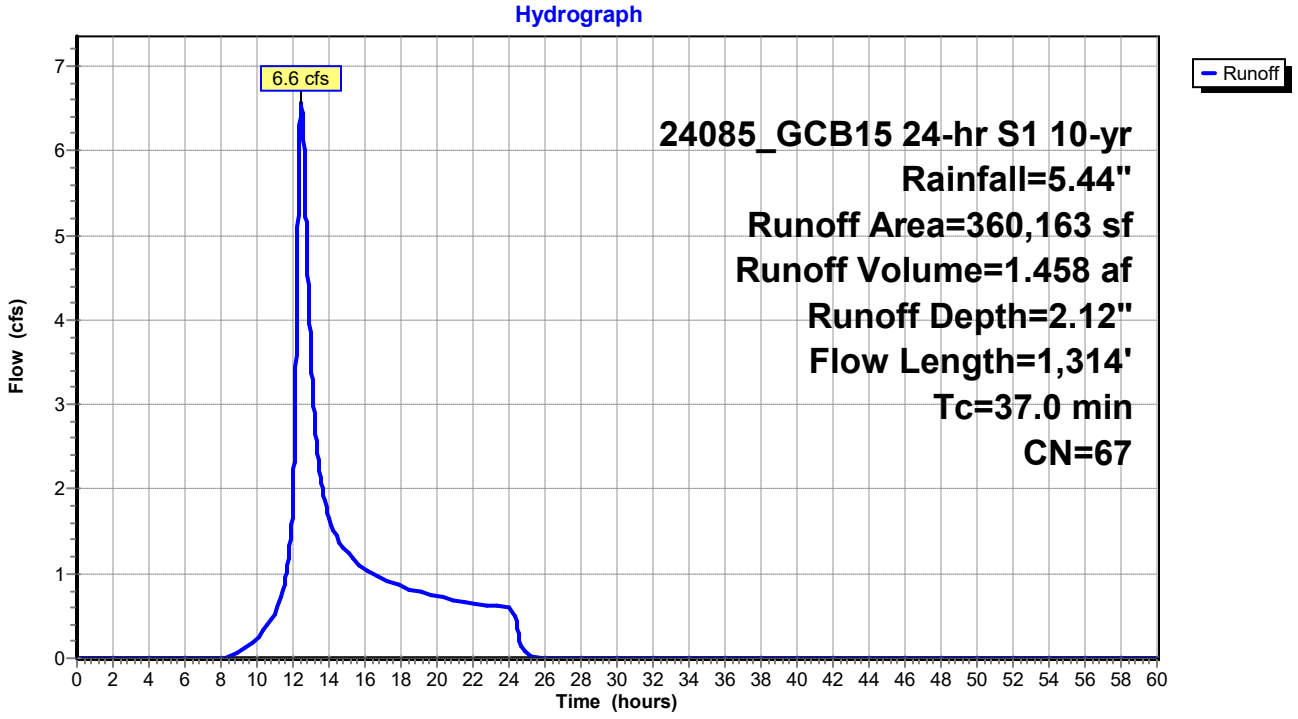
Runoff = 6.6 cfs @ 12.46 hrs, Volume= 1.458 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
253,585	61	>75% Grass cover, Good, HSG B
8,114	96	Gravel surface, HSG B
98,464	80	>75% Grass cover, Good, HSG D
360,163	67	Weighted Average
360,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
16.1	479	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.1	735	0.0050	4.00	35.96	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.50' Z= 2.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
37.0	1,314	Total			

Subcatchment A: A



Summary for Subcatchment B: B

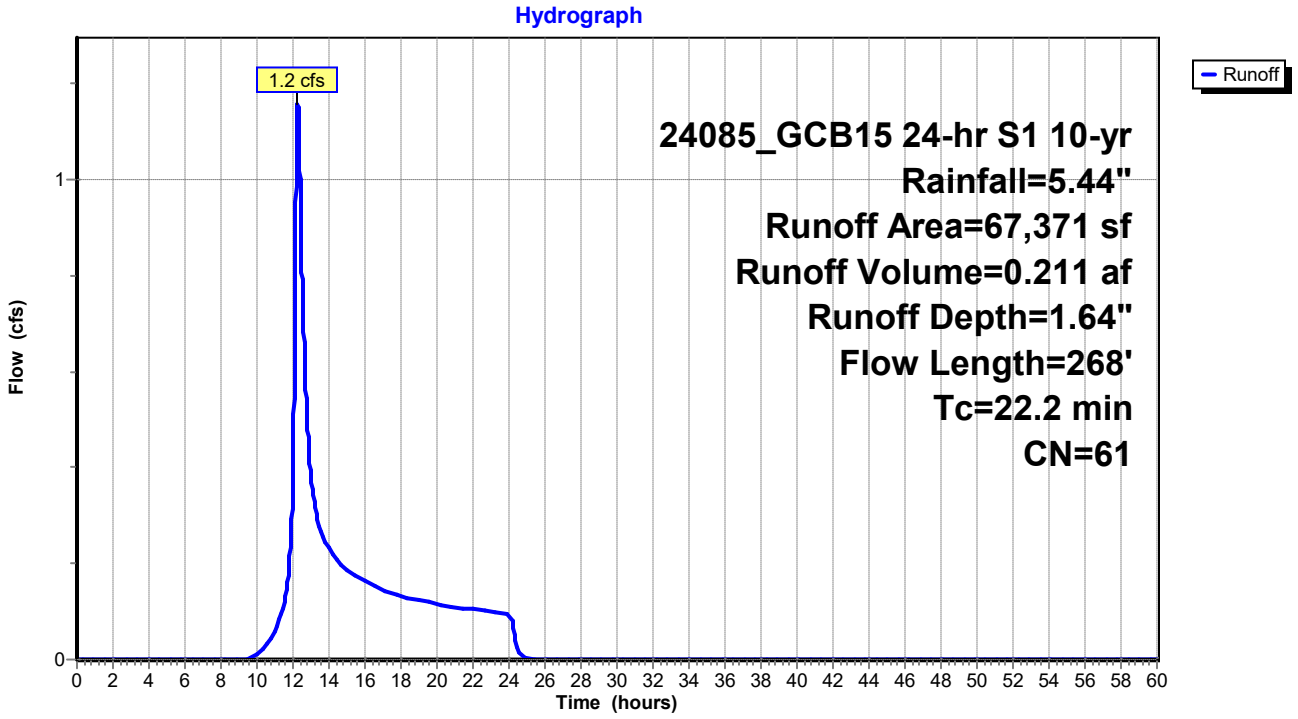
Runoff = 1.2 cfs @ 12.26 hrs, Volume= 0.211 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
67,371	61	>75% Grass cover, Good, HSG B
67,371		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0120	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
5.7	168	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.2	268	Total			

Subcatchment B: B



Summary for Subcatchment C: C

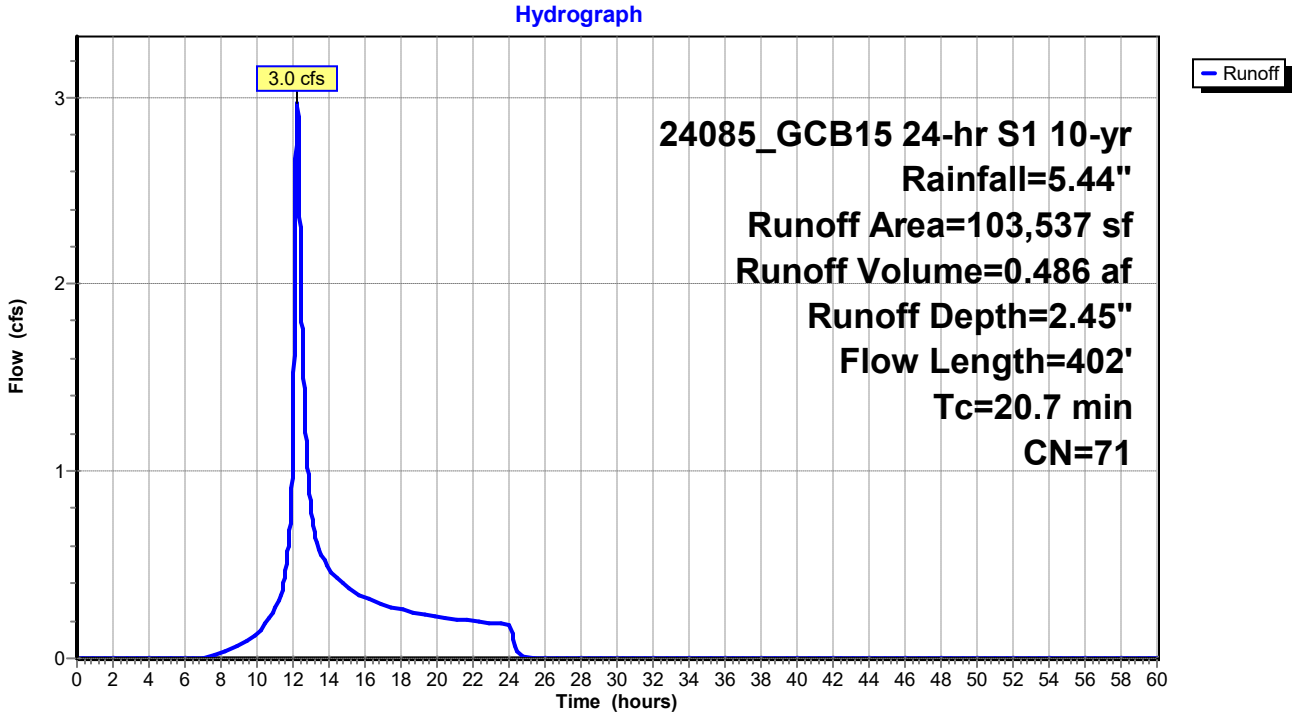
Runoff = 3.0 cfs @ 12.24 hrs, Volume= 0.486 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
51,429	61	>75% Grass cover, Good, HSG B
52,108	80	>75% Grass cover, Good, HSG D
103,537	71	Weighted Average
103,537		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
7.2	302	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	402	Total			

Subcatchment C: C



A – 1

NODE LISTING – 25-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=9.8 cfs 2.213 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.8 cfs 0.337 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=402' Tc=20.7 min CN=71 Runoff=4.2 cfs 0.718 af

Total Runoff Area = 12.192 ac Runoff Volume = 3.268 af Average Runoff Depth = 3.22"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

NODE LISTING – 50-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=4.31"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=12.7 cfs 2.972 af

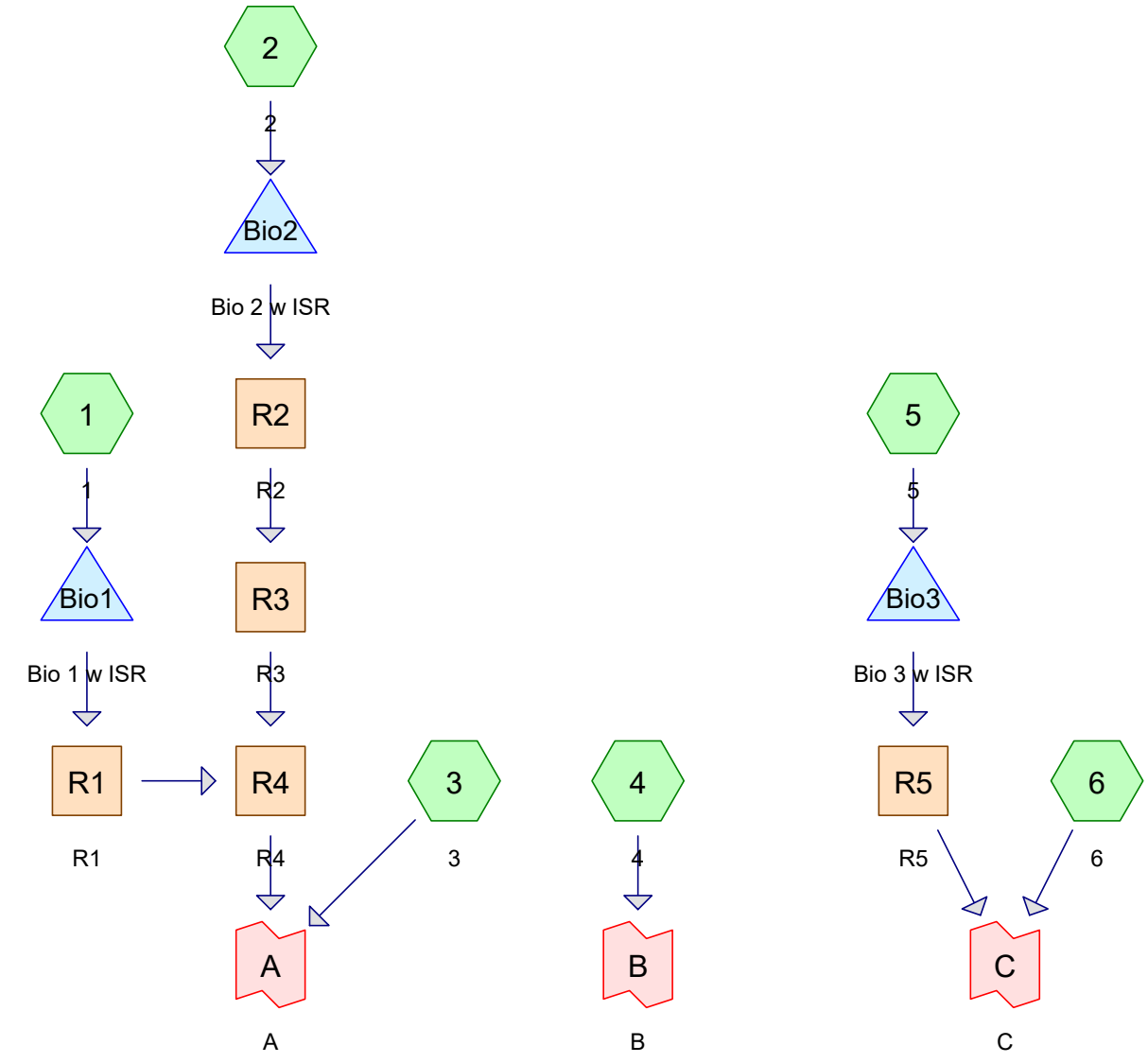
Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=2.5 cfs 0.467 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=4.78"
Flow Length=402' Tc=20.7 min CN=71 Runoff=5.3 cfs 0.947 af

Total Runoff Area = 12.192 ac Runoff Volume = 4.385 af Average Runoff Depth = 4.32"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 2

DEVELOPED WATERSHEDS



Subcat Reach Pond Link

Routing Diagram for 24085 - Post
Prepared by Civilworks New England
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.025	61	>75% Grass cover, Good, HSG B (1, 2, 3, 4, 5, 6)
3.517	80	>75% Grass cover, Good, HSG D (1, 2, 3, 5, 6)
0.576	96	Gravel surface, HSG B (2, 5)
0.017	96	Gravel surface, HSG D (5)
0.524	98	Paved parking, HSG B (2, 5)
0.008	98	Paved parking, HSG D (5)
0.305	98	Paved roads w/curbs & sewers, HSG B (1)
0.220	98	Roofs, HSG B (1, 2)
12.192	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.650	HSG B	1, 2, 3, 4, 5, 6
0.000	HSG C	
3.541	HSG D	1, 2, 3, 5, 6
0.000	Other	
12.192		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	7.025	0.000	3.517	0.000	10.542	>75% Grass cover, Good	1, 2, 3, 4, 5, 6
0.000	0.576	0.000	0.017	0.000	0.593	Gravel surface	2, 5
0.000	0.524	0.000	0.008	0.000	0.531	Paved parking	2, 5
0.000	0.305	0.000	0.000	0.000	0.305	Paved roads w/curbs & sewers	1
0.000	0.220	0.000	0.000	0.000	0.220	Roofs	1, 2
0.000	**8.650**	**0.000**	**3.541**	**0.000**	**12.192**	**TOTAL AREA**	

A – 2

NODE LISTING – 2-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=2.27"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=1.2 cfs 0.102 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=2.02"
Flow Length=468' Tc=14.5 min CN=84 Runoff=2.4 cfs 0.293 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=2.3 cfs 0.520 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.3 cfs 0.055 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=2.54"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=0.8 cfs 0.054 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=402' Tc=20.7 min CN=72 Runoff=1.3 cfs 0.207 af

Reach R1: R1 Avg. Flow Depth=0.04' Max Vel=0.44 fps Inflow=0.0 cfs 0.102 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.0 cfs 0.102 af

Reach R2: R2 Avg. Flow Depth=0.10' Max Vel=1.28 fps Inflow=0.3 cfs 0.293 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=0.3 cfs 0.293 af

Reach R3: R3 Avg. Flow Depth=0.12' Max Vel=0.72 fps Inflow=0.3 cfs 0.293 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=0.3 cfs 0.293 af

Reach R4: R4 Avg. Flow Depth=0.16' Max Vel=0.61 fps Inflow=0.3 cfs 0.395 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=0.3 cfs 0.395 af

Reach R5: R5 Avg. Flow Depth=0.08' Max Vel=0.44 fps Inflow=0.1 cfs 0.054 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.1 cfs 0.054 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.52' Storage=2,961 cf Inflow=1.2 cfs 0.102 af
Outflow=0.0 cfs 0.102 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.30' Storage=6,200 cf Inflow=2.4 cfs 0.293 af
Outflow=0.3 cfs 0.293 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.41' Storage=1,126 cf Inflow=0.8 cfs 0.054 af
Outflow=0.1 cfs 0.054 af

Link A: A Inflow=2.5 cfs 0.915 af
Primary=2.5 cfs 0.915 af

Link B: B Inflow=0.3 cfs 0.055 af
Primary=0.3 cfs 0.055 af

Link C: C

Inflow=1.4 cfs 0.261 af
Primary=1.4 cfs 0.261 af

Total Runoff Area = 12.192 ac Runoff Volume = 1.231 af Average Runoff Depth = 1.21"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

NODE LISTING – 10-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=3.98"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=1.8 cfs 0.179 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=3.68"
Flow Length=468' Tc=14.5 min CN=84 Runoff=3.8 cfs 0.532 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=2.20"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=5.4 cfs 1.192 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=1.64"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.8 cfs 0.145 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=4.30"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.1 cfs 0.092 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=2.54"
Flow Length=402' Tc=20.7 min CN=72 Runoff=2.7 cfs 0.443 af

Reach R1: R1 Avg. Flow Depth=0.13' Max Vel=0.85 fps Inflow=0.3 cfs 0.179 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.3 cfs 0.179 af

Reach R2: R2 Avg. Flow Depth=0.18' Max Vel=1.85 fps Inflow=0.9 cfs 0.532 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=0.9 cfs 0.532 af

Reach R3: R3 Avg. Flow Depth=0.23' Max Vel=1.07 fps Inflow=0.9 cfs 0.532 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=0.9 cfs 0.532 af

Reach R4: R4 Avg. Flow Depth=0.33' Max Vel=0.94 fps Inflow=1.1 cfs 0.711 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=1.1 cfs 0.711 af

Reach R5: R5 Avg. Flow Depth=0.14' Max Vel=0.64 fps Inflow=0.3 cfs 0.092 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.3 cfs 0.092 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.68' Storage=3,572 cf Inflow=1.8 cfs 0.179 af
Outflow=0.3 cfs 0.179 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.55' Storage=9,733 cf Inflow=3.8 cfs 0.532 af
Outflow=0.9 cfs 0.532 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.72' Storage=1,548 cf Inflow=1.1 cfs 0.092 af
Outflow=0.3 cfs 0.092 af

Link A: A Inflow=6.3 cfs 1.903 af
Primary=6.3 cfs 1.903 af

Link B: B Inflow=0.8 cfs 0.145 af
Primary=0.8 cfs 0.145 af

Link C: C

Inflow=3.0 cfs 0.535 af
Primary=3.0 cfs 0.535 af

Total Runoff Area = 12.192 ac Runoff Volume = 2.583 af Average Runoff Depth = 2.54"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

10-YR STORM SUMMARY

Summary for Subcatchment 1: 1

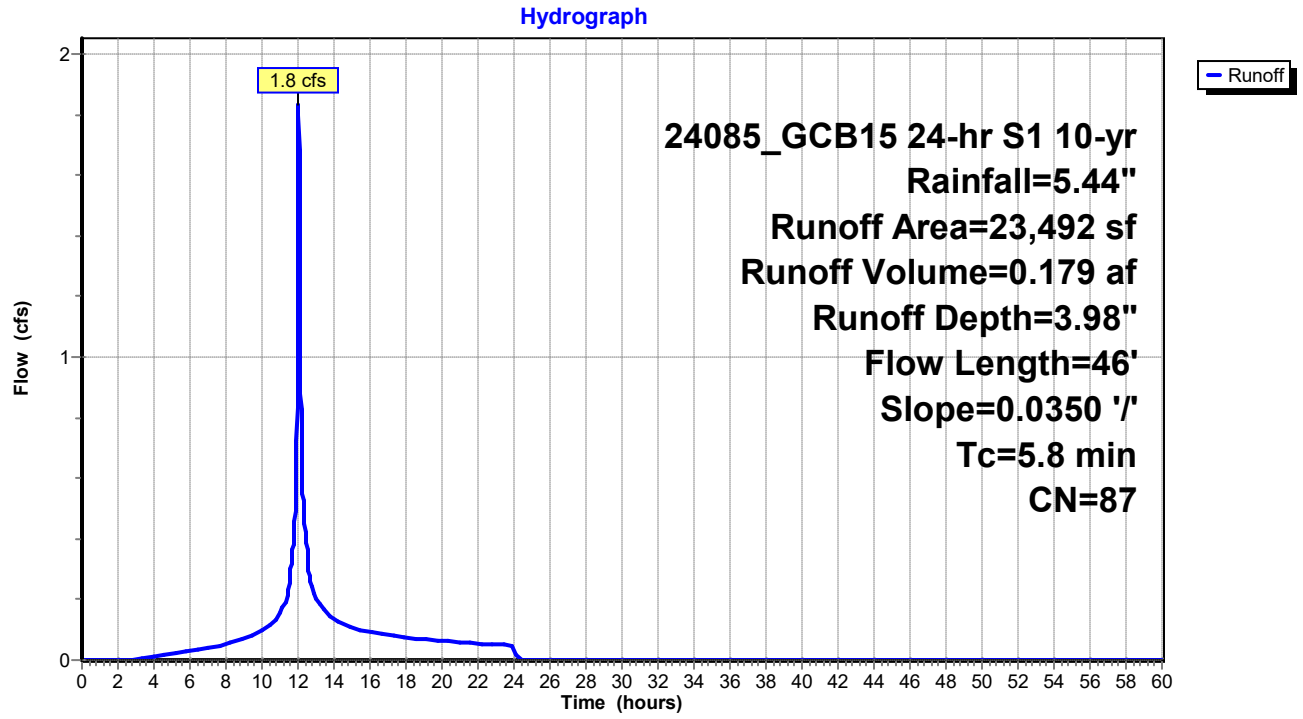
Runoff = 1.8 cfs @ 12.03 hrs, Volume= 0.179 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
6,277	61	>75% Grass cover, Good, HSG B
13,295	98	Paved roads w/curbs & sewers, HSG B
2,400	98	Roofs, HSG B
1,520	80	>75% Grass cover, Good, HSG D
23,492	87	Weighted Average
7,797		33.19% Pervious Area
15,695		66.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"

Subcatchment 1: 1



Summary for Subcatchment 2: 2

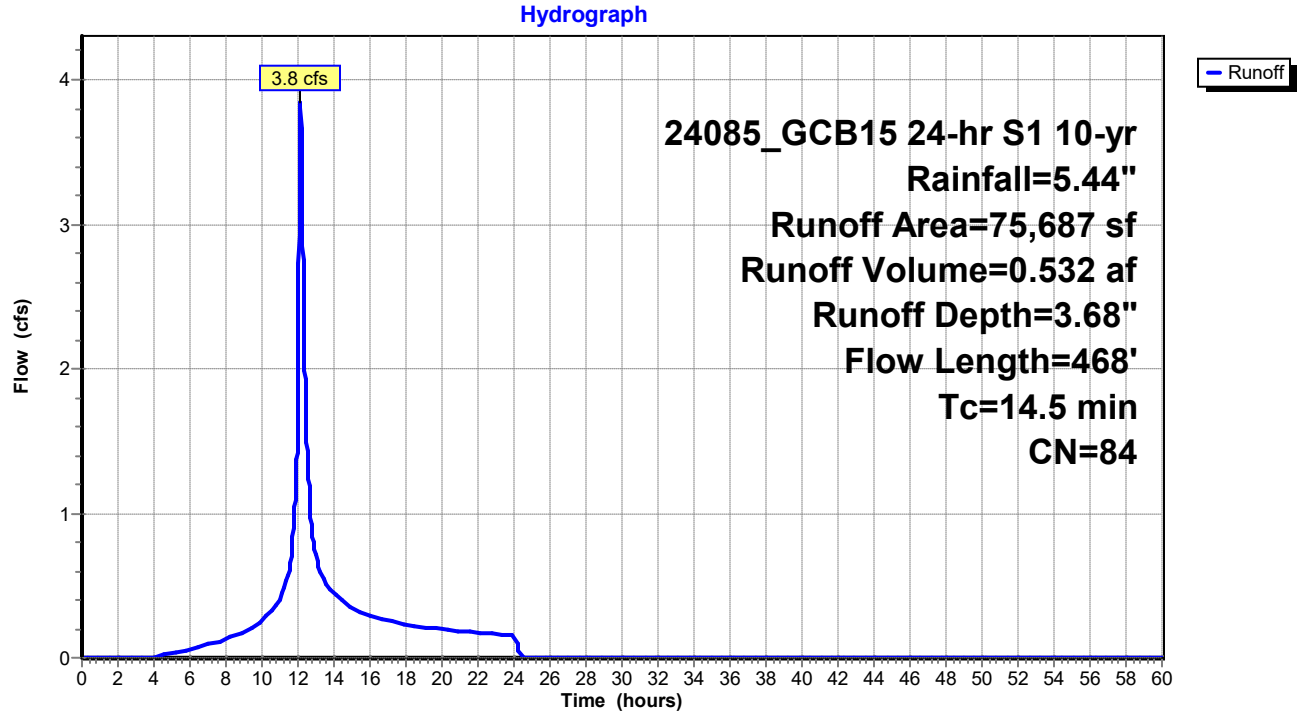
Runoff = 3.8 cfs @ 12.15 hrs, Volume= 0.532 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
26,404	61	>75% Grass cover, Good, HSG B
22,500	96	Gravel surface, HSG B
17,963	98	Paved parking, HSG B
7,200	98	Roofs, HSG B
1,620	80	>75% Grass cover, Good, HSG D
75,687	84	Weighted Average
50,524		66.75% Pervious Area
25,163		33.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	65	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
2.4	403	0.0040	2.80	16.81	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
14.5	468	Total			

Subcatchment 2: 2



Summary for Subcatchment 3: 3

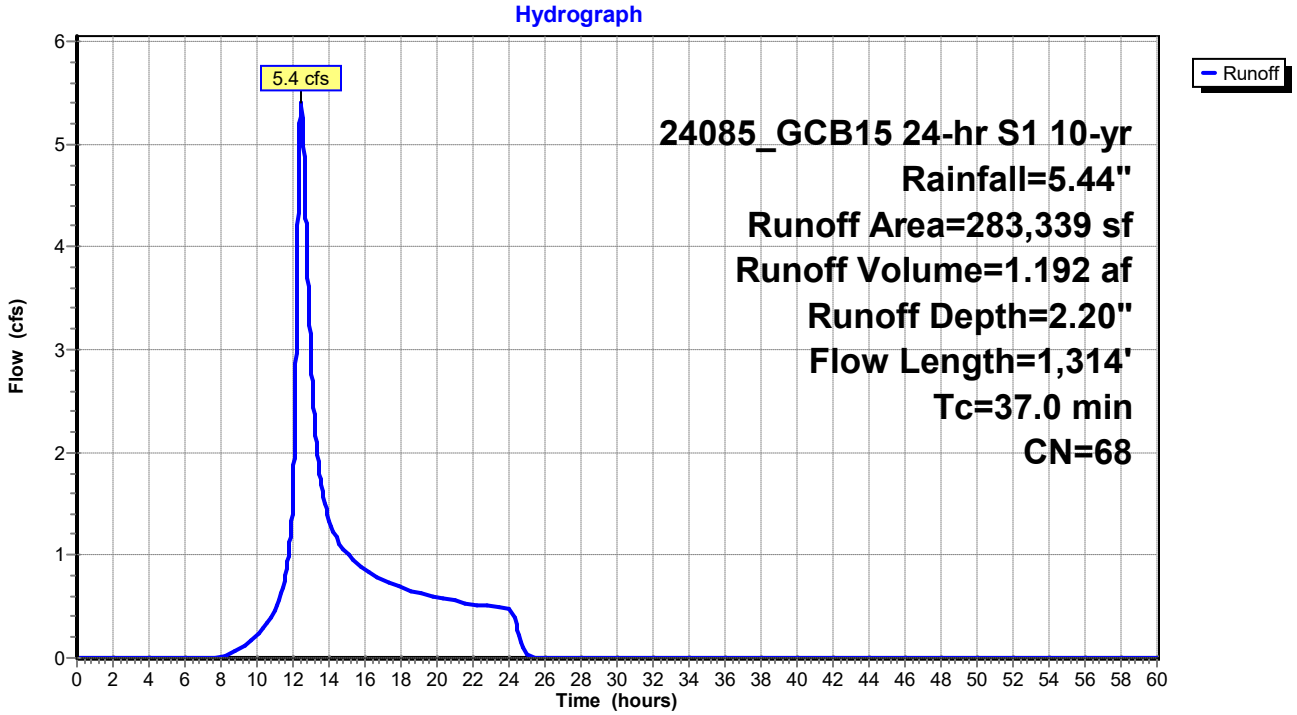
Runoff = 5.4 cfs @ 12.46 hrs, Volume= 1.192 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
184,875	61	>75% Grass cover, Good, HSG B
98,464	80	>75% Grass cover, Good, HSG D
283,339	68	Weighted Average
283,339		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
16.1	479	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.1	735	0.0050	4.00	35.96	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.50' Z= 2.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
37.0	1,314	Total			

Subcatchment 3: 3



Summary for Subcatchment 4: 4

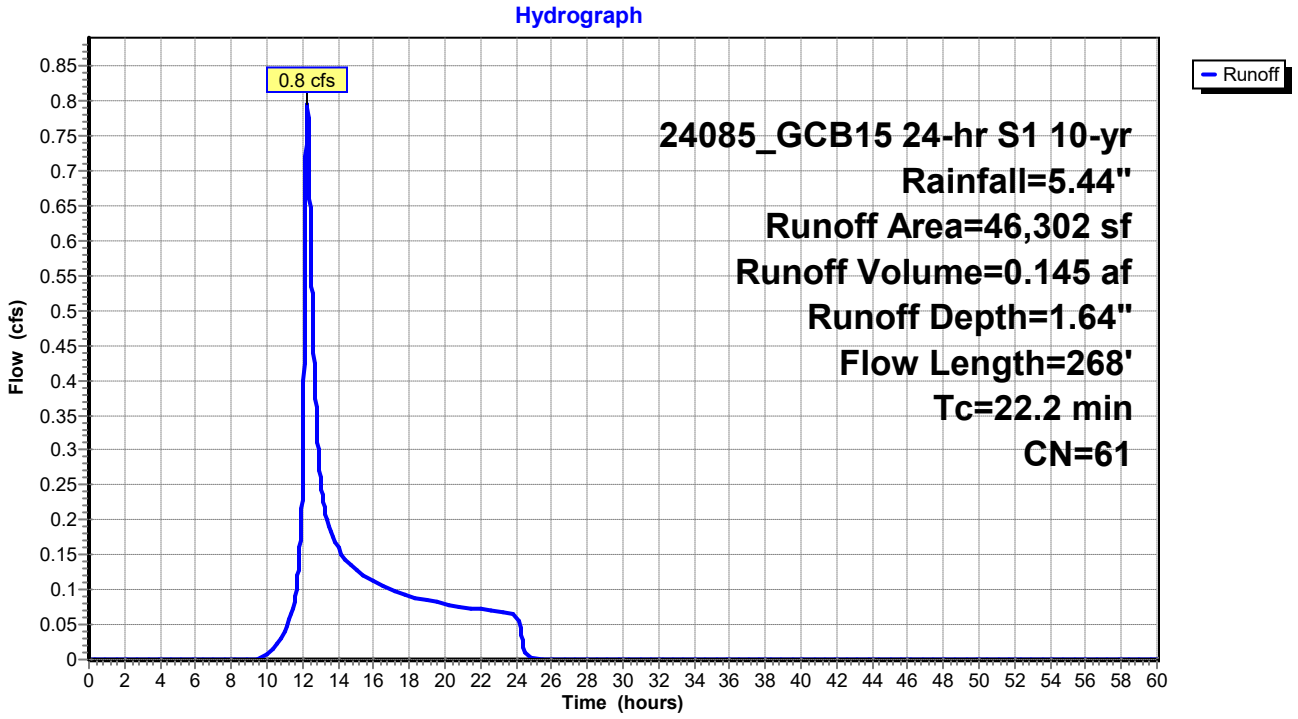
Runoff = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
46,302	61	>75% Grass cover, Good, HSG B
46,302		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0120	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
5.7	168	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.2	268	Total			

Subcatchment 4: 4



Summary for Subcatchment 5: 5

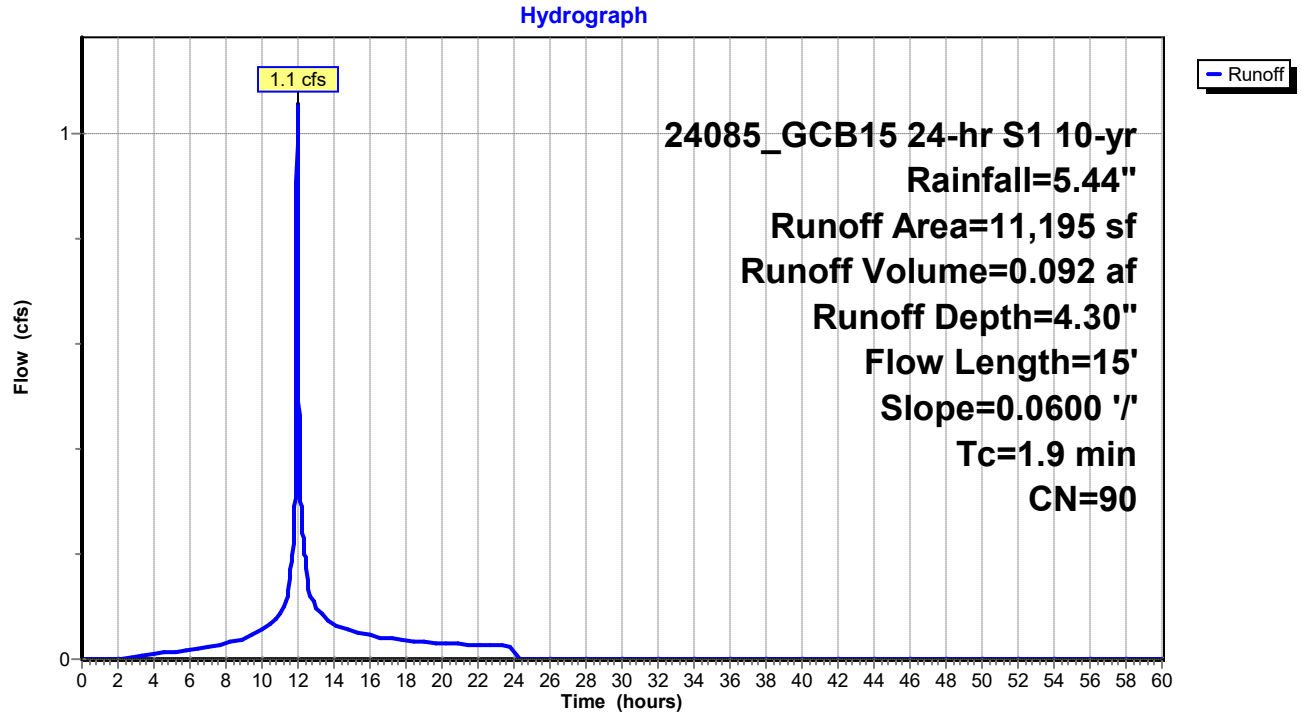
Runoff = 1.1 cfs @ 12.00 hrs, Volume= 0.092 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
1,995	61	>75% Grass cover, Good, HSG B
2,606	96	Gravel surface, HSG B
4,843	98	Paved parking, HSG B
678	80	>75% Grass cover, Good, HSG D
743	96	Gravel surface, HSG D
330	98	Paved parking, HSG D
11,195	90	Weighted Average
6,022		53.79% Pervious Area
5,173		46.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	15	0.0600	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"

Subcatchment 5: 5



Summary for Subcatchment 6: 6

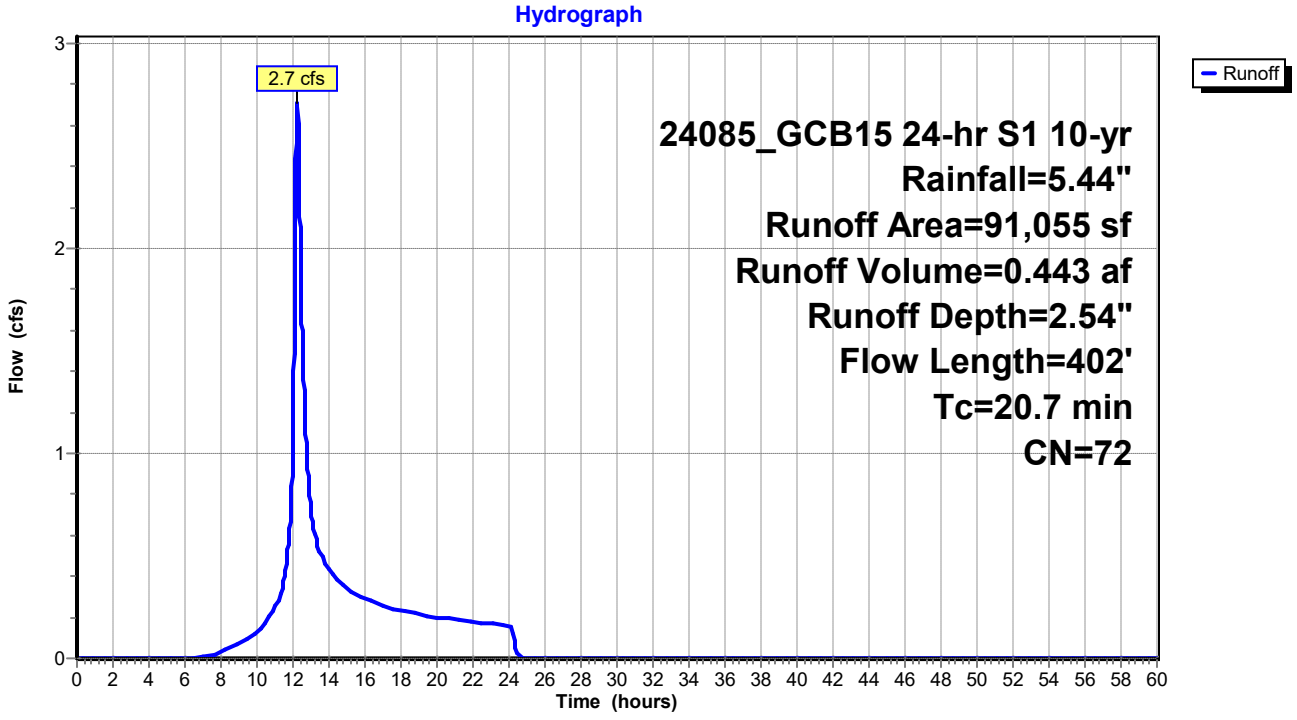
Runoff = 2.7 cfs @ 12.24 hrs, Volume= 0.443 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
40,145	61	>75% Grass cover, Good, HSG B
50,910	80	>75% Grass cover, Good, HSG D
91,055	72	Weighted Average
91,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
7.2	302	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	402	Total			

Subcatchment 6: 6



Summary for Reach R1: R1

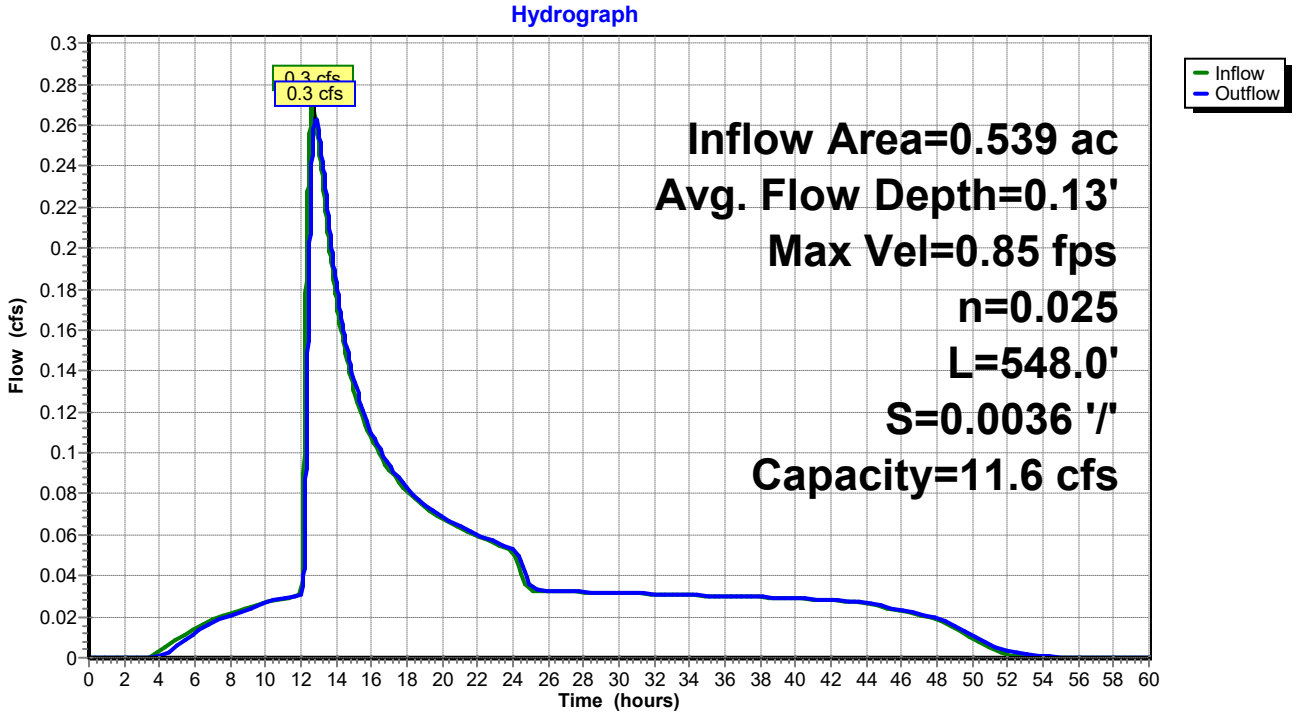
Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth > 3.98" for 10-yr event
Inflow = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af
Outflow = 0.3 cfs @ 12.84 hrs, Volume= 0.179 af, Atten= 3%, Lag= 11.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.85 fps, Min. Travel Time= 10.8 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 24.2 min

Peak Storage= 171 cf @ 12.84 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 2.67'
Bank-Full Depth= 1.00' Flow Area= 4.5 sf, Capacity= 11.6 cfs

2.00' x 1.00' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 7.00'
Length= 548.0' Slope= 0.0036 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'

Reach R1: R1



Summary for Reach R2: R2

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth > 3.67" for 10-yr event
Inflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af, Atten= 0%, Lag= 0.4 min

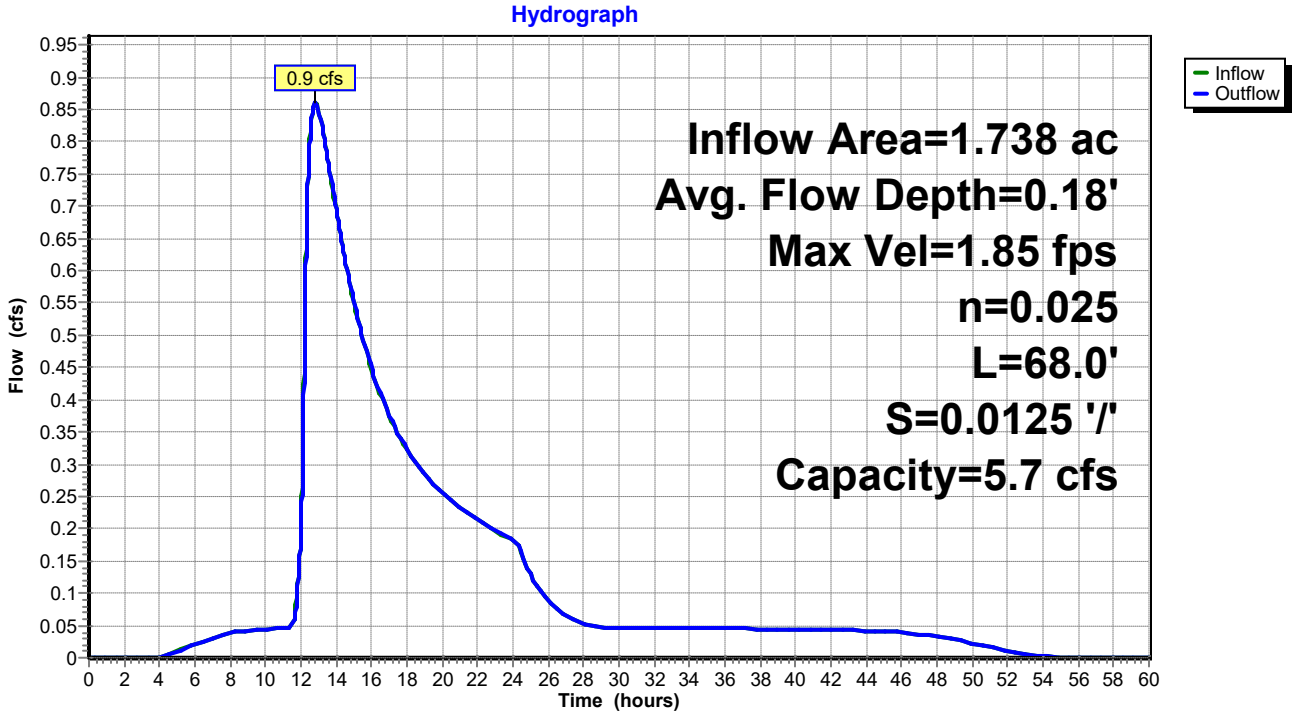
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 1.5 min

Peak Storage= 32 cf @ 12.80 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 3.09'
Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 5.7 cfs

2.00' x 0.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 5.00'
Length= 68.0' Slope= 0.0125 '/'
Inlet Invert= 92.75', Outlet Invert= 91.90'

‡

Reach R2: R2



Summary for Reach R3: R3

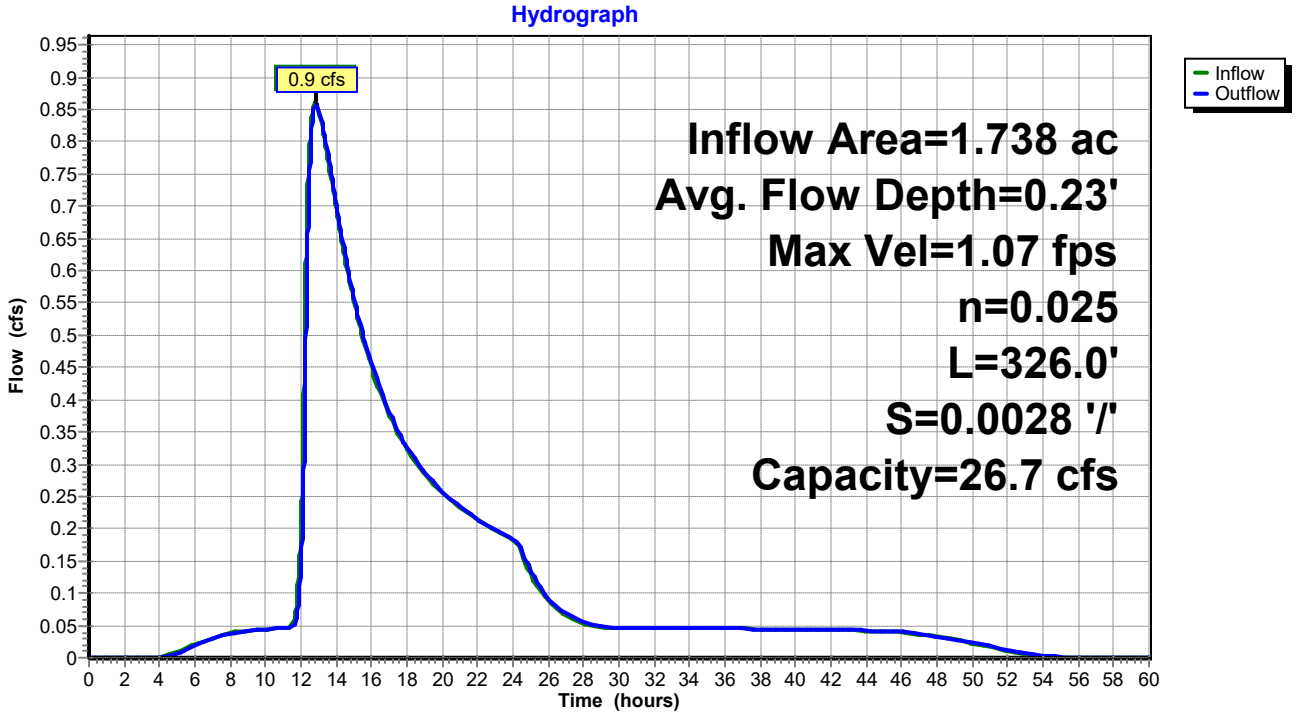
Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth > 3.67" for 10-yr event
Inflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.87 hrs, Volume= 0.532 af, Atten= 0%, Lag= 4.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.07 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 12.8 min

Peak Storage= 263 cf @ 12.87 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 3.93'
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 26.7 cfs

3.00' x 1.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 326.0' Slope= 0.0028 '/'
Inlet Invert= 91.90', Outlet Invert= 91.00'

Reach R3: R3



Summary for Reach R4: R4

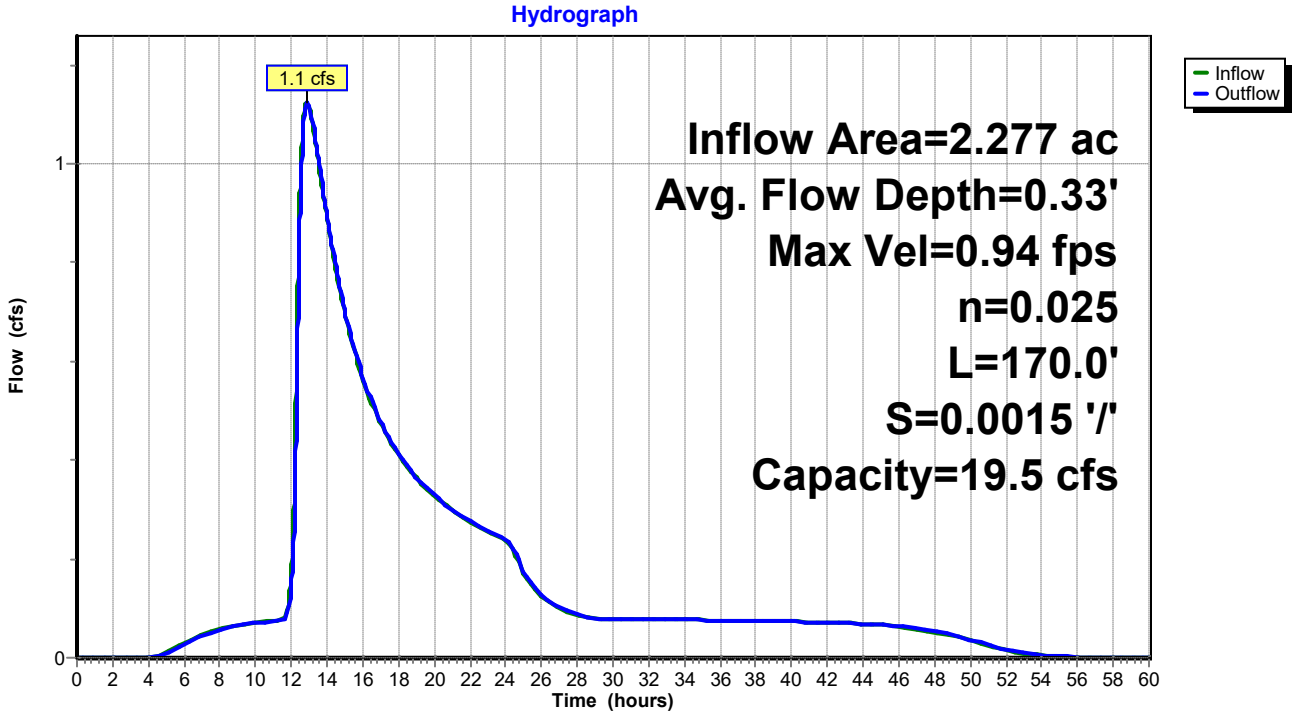
Inflow Area = 2.277 ac, 41.20% Impervious, Inflow Depth > 3.75" for 10-yr event
Inflow = 1.1 cfs @ 12.86 hrs, Volume= 0.711 af
Outflow = 1.1 cfs @ 12.90 hrs, Volume= 0.711 af, Atten= 0%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.94 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 7.3 min

Peak Storage= 202 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 4.30'
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 19.5 cfs

3.00' x 1.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 170.0' Slope= 0.0015 '/'
Inlet Invert= 91.00', Outlet Invert= 90.75'

Reach R4: R4



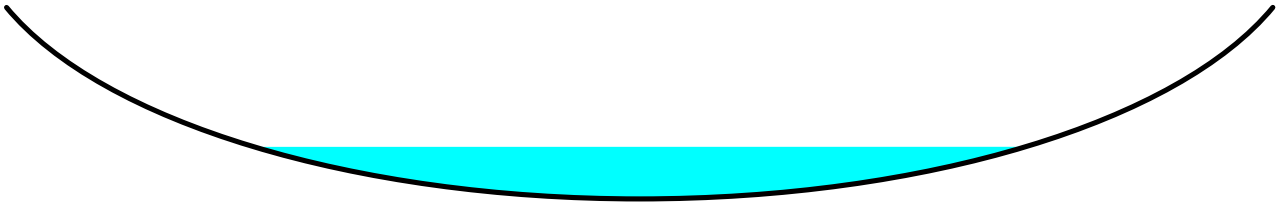
Summary for Reach R5: R5

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 4.30" for 10-yr event
Inflow = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af
Outflow = 0.3 cfs @ 12.23 hrs, Volume= 0.092 af, Atten= 1%, Lag= 5.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.64 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.22 fps, Avg. Travel Time= 11.3 min

Peak Storage= 72 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 5.22'
Bank-Full Depth= 0.50' Flow Area= 3.3 sf, Capacity= 5.1 cfs

10.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 151.0' Slope= 0.0056 '/'
Inlet Invert= 92.75', Outlet Invert= 91.90'



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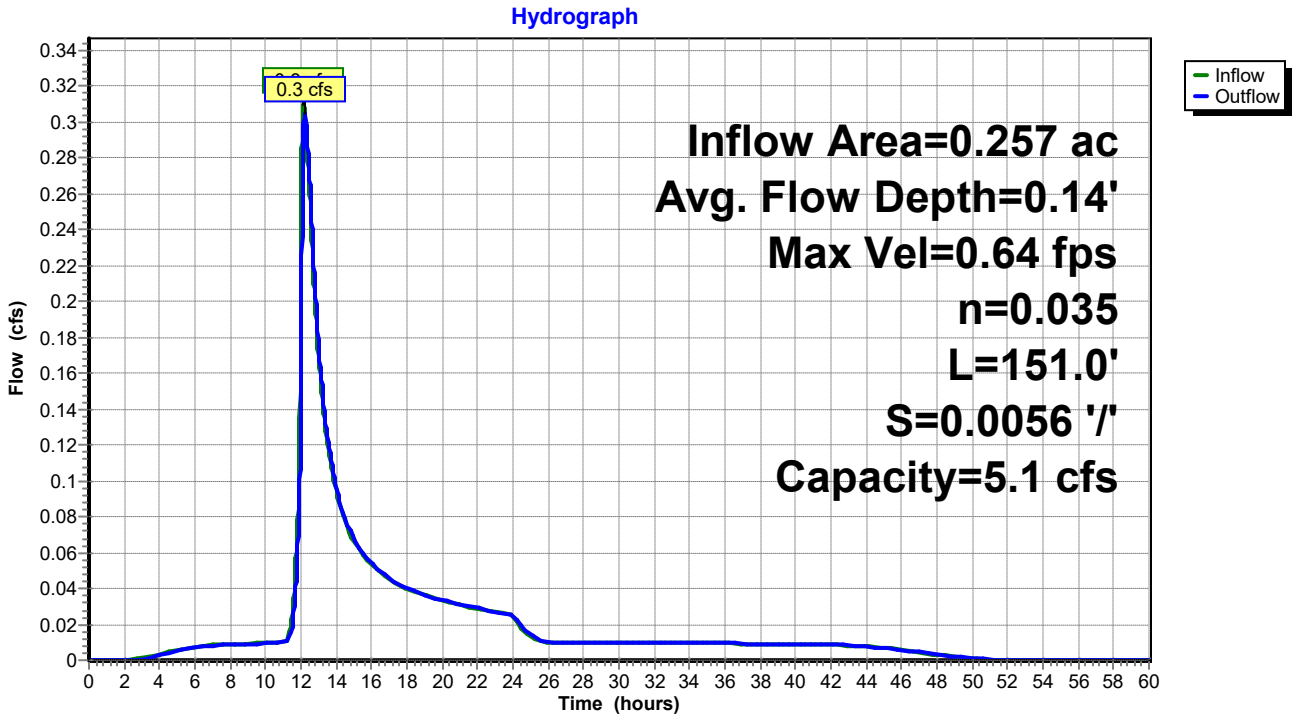
Reach R5: R5



Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 1.8 cfs @ 12.03 hrs, Volume= 0.179 af
Outflow = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af, Atten= 85%, Lag= 37.3 min
Primary = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.68' @ 12.66 hrs Surf.Area= 3,982 sf Storage= 3,572 cf (3,229 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 601.0 min calculated for 0.171 af (96% of inflow)
Center-of-Mass det. time= 533.0 min (1,354.8 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

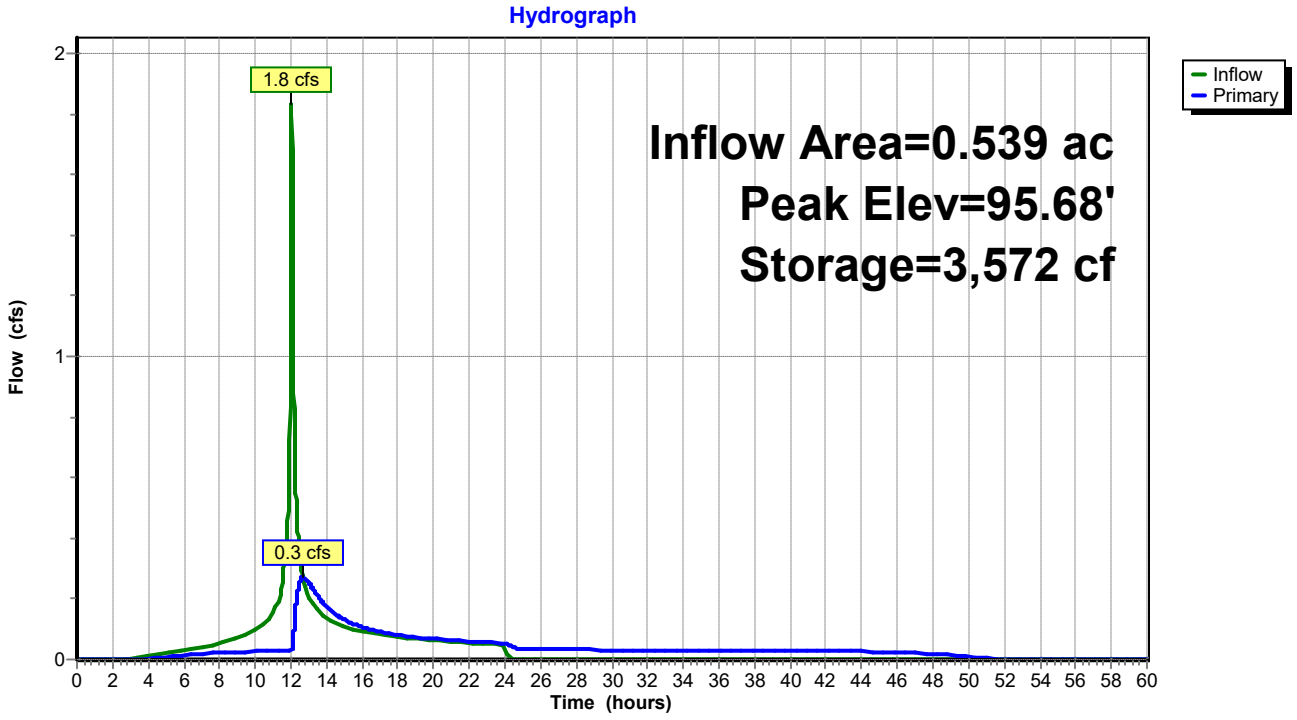
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.3 cfs @ 12.66 hrs HW=95.68' TW=93.13' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.3 cfs of 5.4 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.67 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 0.8 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.2 cfs @ 1.35 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio1: Bio 1 w ISR



Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 3.68" for 10-yr event
Inflow = 3.8 cfs @ 12.15 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af, Atten= 78%, Lag= 38.8 min
Primary = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.55' @ 12.80 hrs Surf.Area= 14,356 sf Storage= 9,733 cf (9,163 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 394.3 min calculated for 0.519 af (98% of inflow)
Center-of-Mass det. time= 361.2 min (1,205.2 - 844.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

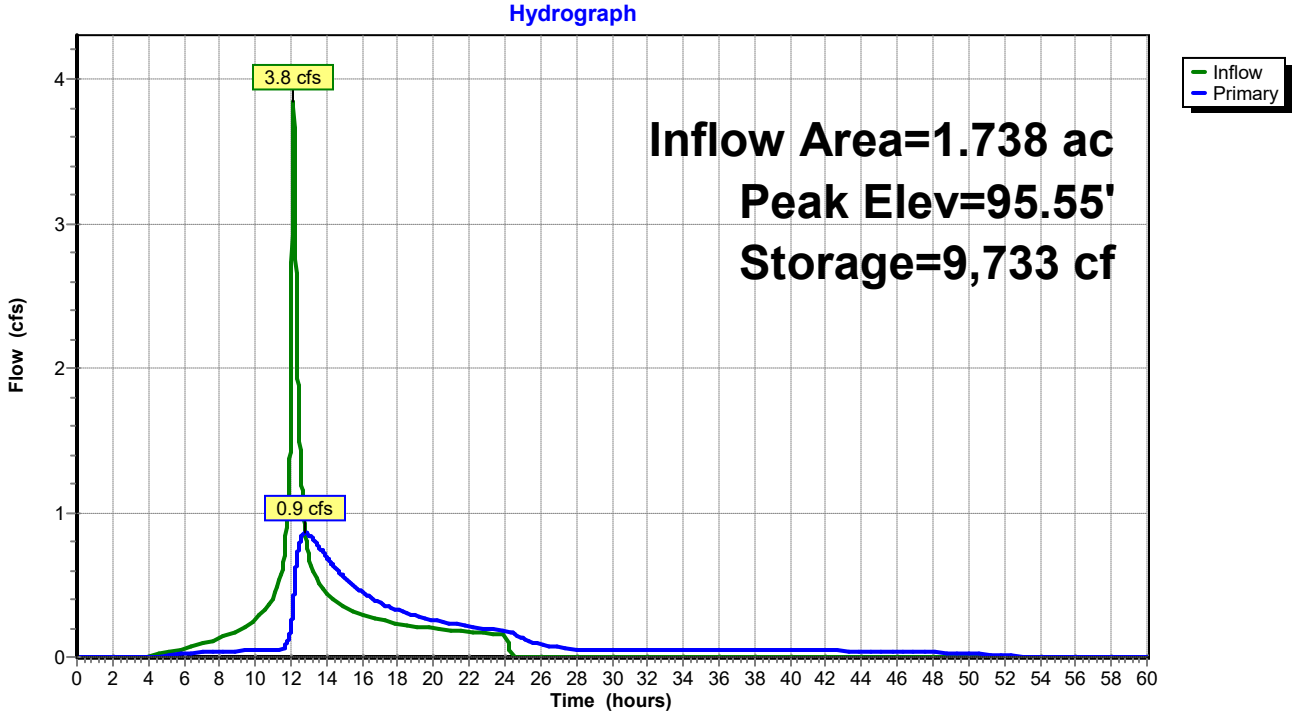
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.9 cfs @ 12.80 hrs HW=95.55' TW=92.93' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.9 cfs of 5.6 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 7.79 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.8 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio2: Bio 2 w ISR



Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 4.30" for 10-yr event
Inflow = 1.1 cfs @ 12.00 hrs, Volume= 0.092 af
Outflow = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af, Atten= 71%, Lag= 8.8 min
Primary = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.72' @ 12.14 hrs Surf.Area= 1,501 sf Storage= 1,548 cf (1,408 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 376.5 min calculated for 0.089 af (97% of inflow)
Center-of-Mass det. time= 328.6 min (1,131.2 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

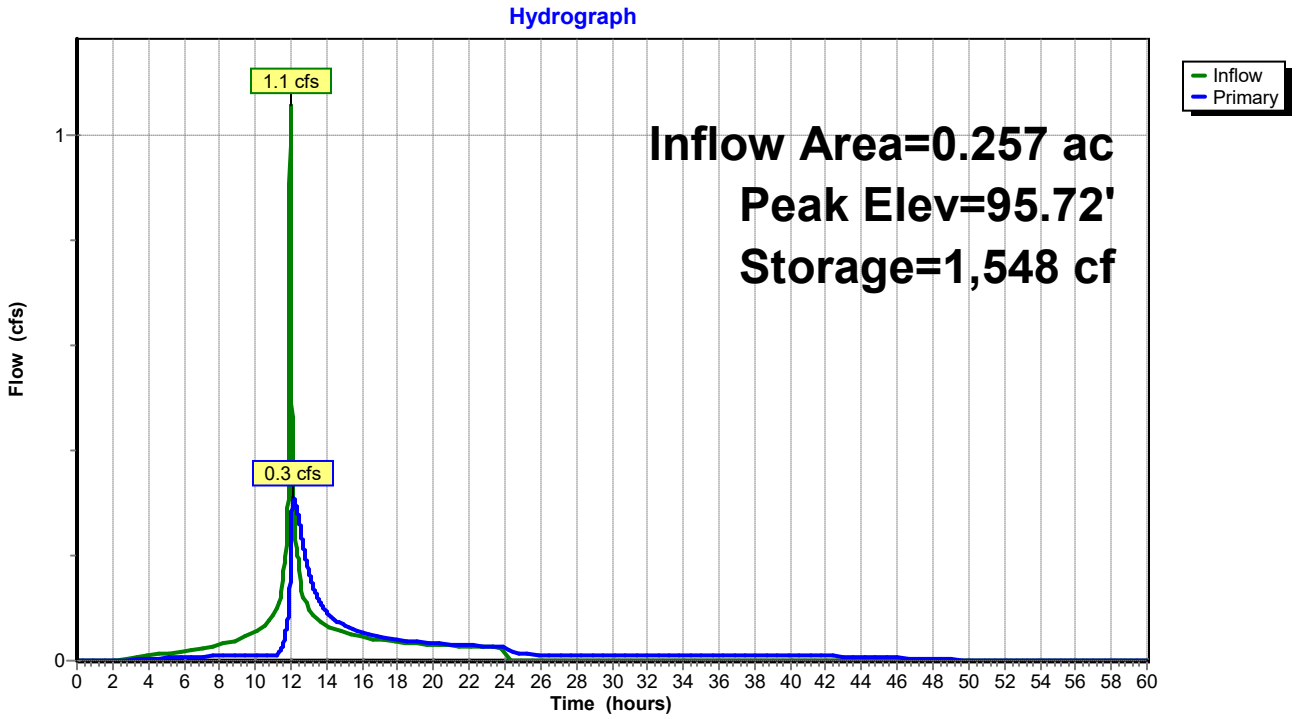
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.3 cfs @ 12.14 hrs HW=95.72' TW=92.88' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.3 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.10 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.7 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.3 cfs @ 2.31 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio3: Bio 3 w ISR

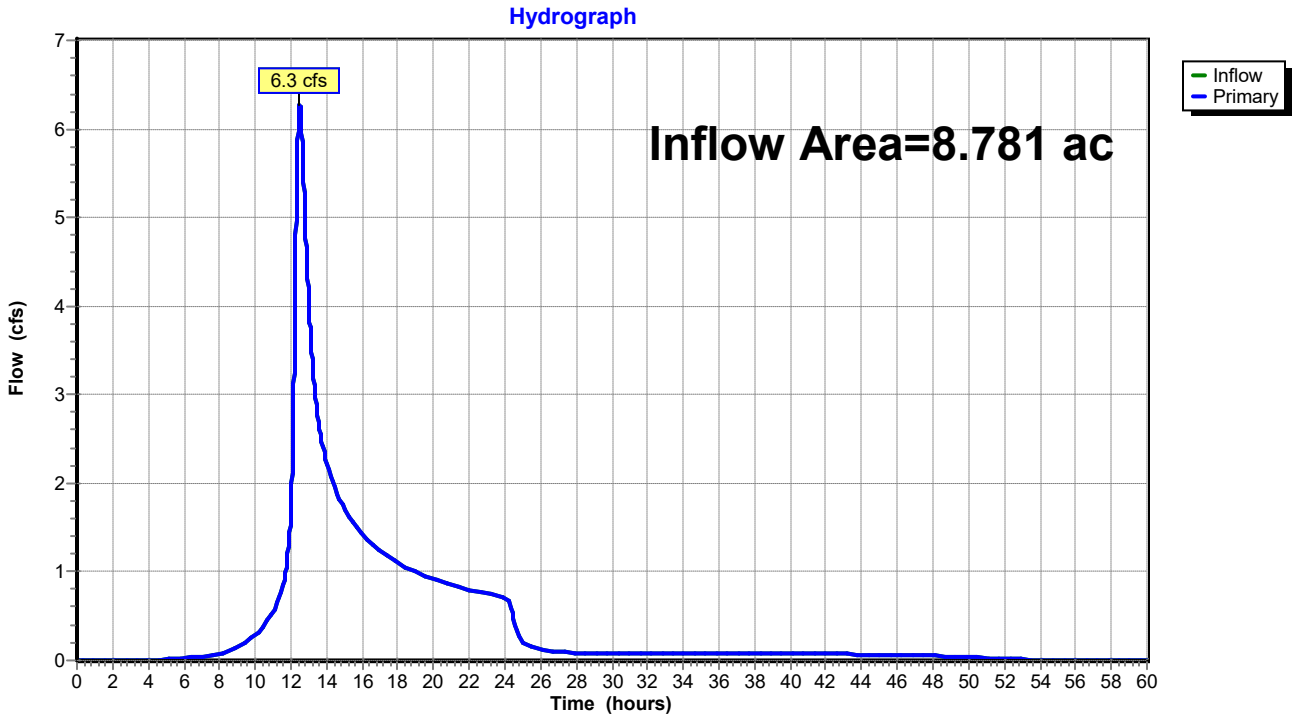


Summary for Link A: A

Inflow Area = 8.781 ac, 10.68% Impervious, Inflow Depth = 2.60" for 10-yr event
Inflow = 6.3 cfs @ 12.50 hrs, Volume= 1.903 af
Primary = 6.3 cfs @ 12.50 hrs, Volume= 1.903 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link A: A

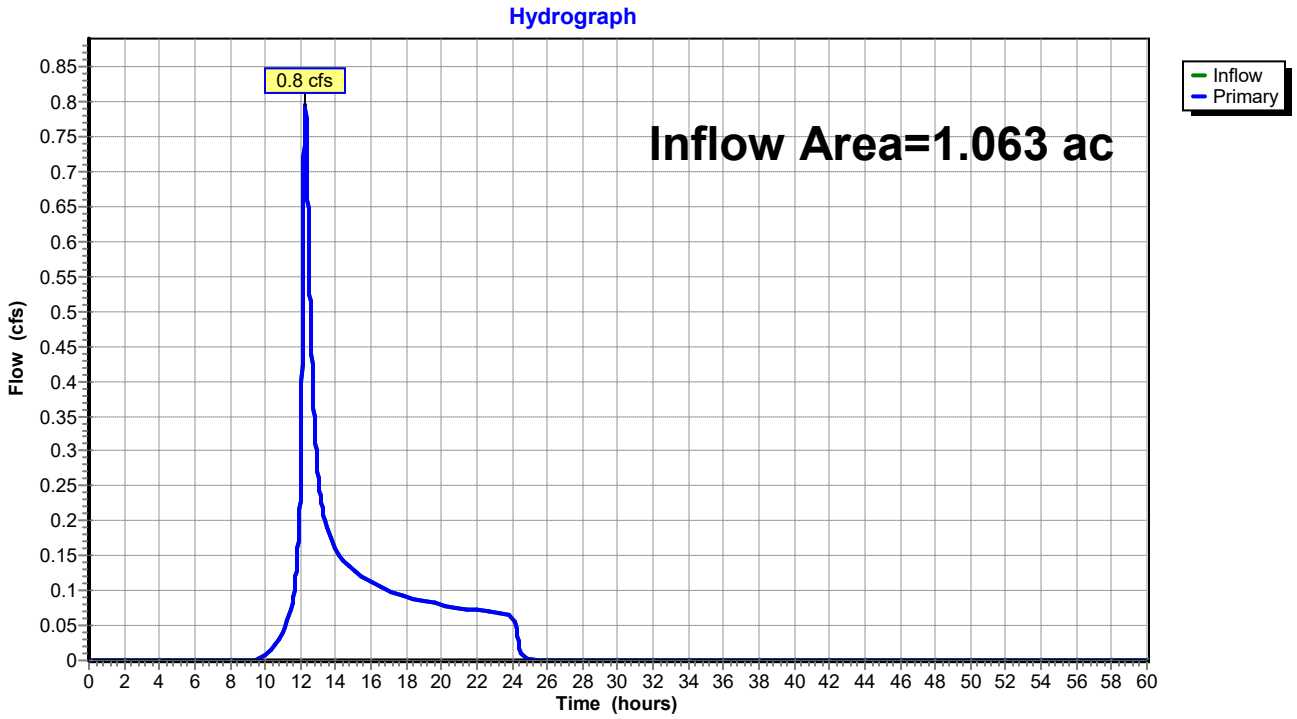


Summary for Link B: B

Inflow Area = 1.063 ac, 0.00% Impervious, Inflow Depth = 1.64" for 10-yr event
Inflow = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af
Primary = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link B: B

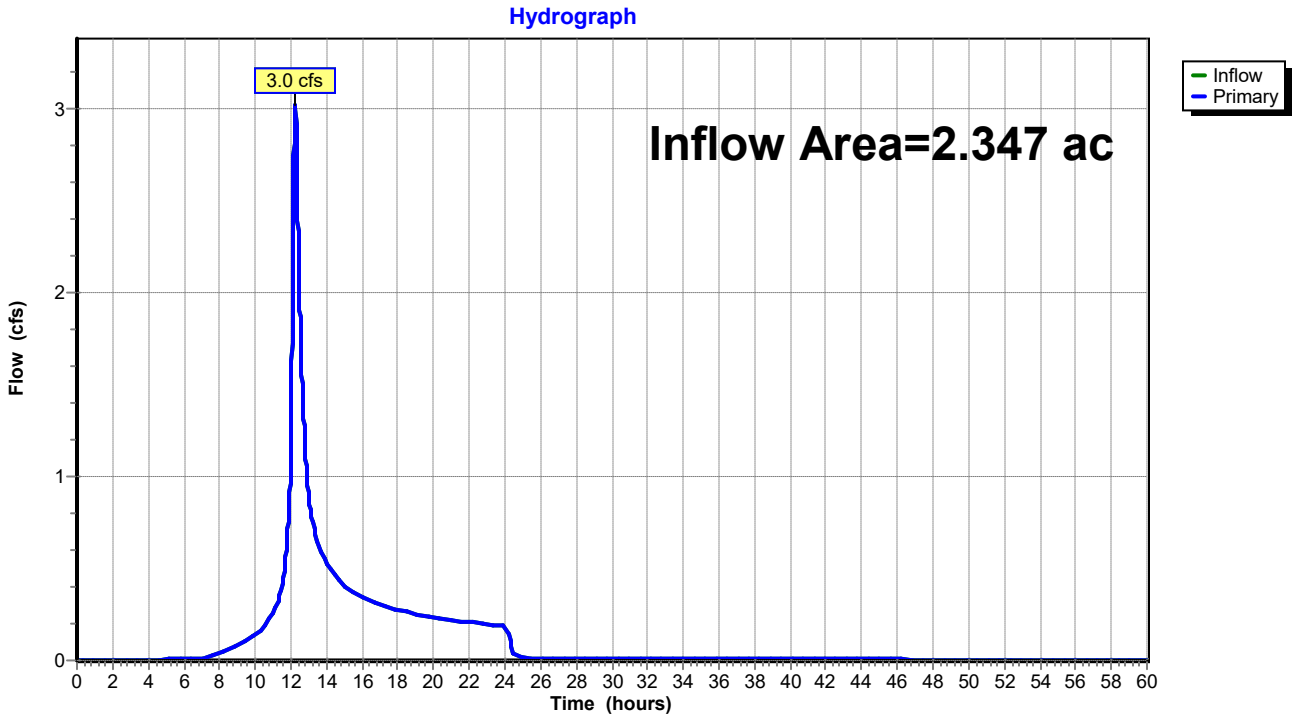


Summary for Link C: C

Inflow Area = 2.347 ac, 5.06% Impervious, Inflow Depth = 2.73" for 10-yr event
Inflow = 3.0 cfs @ 12.24 hrs, Volume= 0.535 af
Primary = 3.0 cfs @ 12.24 hrs, Volume= 0.535 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link C: C



A – 2

NODE LISTING – 25-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=5.36"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=2.3 cfs 0.241 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=5.03"
Flow Length=468' Tc=14.5 min CN=84 Runoff=4.9 cfs 0.728 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=3.31"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=7.9 cfs 1.796 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.3 cfs 0.232 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=5.71"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.3 cfs 0.122 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=3.73"
Flow Length=402' Tc=20.7 min CN=72 Runoff=3.8 cfs 0.649 af

Reach R1: R1 Avg. Flow Depth=0.22' Max Vel=1.12 fps Inflow=0.6 cfs 0.241 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.6 cfs 0.241 af

Reach R2: R2 Avg. Flow Depth=0.23' Max Vel=2.10 fps Inflow=1.3 cfs 0.728 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=1.3 cfs 0.728 af

Reach R3: R3 Avg. Flow Depth=0.29' Max Vel=1.22 fps Inflow=1.3 cfs 0.728 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=1.3 cfs 0.728 af

Reach R4: R4 Avg. Flow Depth=0.43' Max Vel=1.11 fps Inflow=1.9 cfs 0.969 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=1.9 cfs 0.969 af

Reach R5: R5 Avg. Flow Depth=0.16' Max Vel=0.72 fps Inflow=0.4 cfs 0.122 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.4 cfs 0.122 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.83' Storage=4,231 cf Inflow=2.3 cfs 0.241 af
Outflow=0.6 cfs 0.241 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.74' Storage=12,418 cf Inflow=4.9 cfs 0.728 af
Outflow=1.3 cfs 0.728 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.86' Storage=1,770 cf Inflow=1.3 cfs 0.122 af
Outflow=0.4 cfs 0.122 af

Link A: A Inflow=9.7 cfs 2.765 af
Primary=9.7 cfs 2.765 af

Link B: B Inflow=1.3 cfs 0.232 af
Primary=1.3 cfs 0.232 af

Link C: C

Inflow=4.2 cfs 0.771 af
Primary=4.2 cfs 0.771 af

Total Runoff Area = 12.192 ac Runoff Volume = 3.768 af Average Runoff Depth = 3.71"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

NODE LISTING – 50-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=6.67"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=2.6 cfs 0.300 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=6.32"
Flow Length=468' Tc=14.5 min CN=84 Runoff=5.8 cfs 0.915 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=4.43"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=10.3 cfs 2.401 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.7 cfs 0.321 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=7.03"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.5 cfs 0.151 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=4.90"
Flow Length=402' Tc=20.7 min CN=72 Runoff=4.8 cfs 0.853 af

Reach R1: R1 Avg. Flow Depth=0.28' Max Vel=1.28 fps Inflow=1.0 cfs 0.300 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=1.0 cfs 0.300 af

Reach R2: R2 Avg. Flow Depth=0.25' Max Vel=2.22 fps Inflow=1.5 cfs 0.914 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=1.5 cfs 0.914 af

Reach R3: R3 Avg. Flow Depth=0.33' Max Vel=1.30 fps Inflow=1.5 cfs 0.914 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=1.5 cfs 0.914 af

Reach R4: R4 Avg. Flow Depth=0.50' Max Vel=1.20 fps Inflow=2.4 cfs 1.214 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=2.4 cfs 1.214 af

Reach R5: R5 Avg. Flow Depth=0.18' Max Vel=0.76 fps Inflow=0.5 cfs 0.151 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.5 cfs 0.151 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.95' Storage=4,792 cf Inflow=2.6 cfs 0.300 af
Outflow=1.0 cfs 0.300 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.91' Storage=14,772 cf Inflow=5.8 cfs 0.915 af
Outflow=1.5 cfs 0.914 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.95' Storage=1,917 cf Inflow=1.5 cfs 0.151 af
Outflow=0.5 cfs 0.151 af

Link A: A Inflow=12.7 cfs 3.615 af
Primary=12.7 cfs 3.615 af

Link B: B Inflow=1.7 cfs 0.321 af
Primary=1.7 cfs 0.321 af

Link C: C

Inflow=5.3 cfs 1.004 af
Primary=5.3 cfs 1.004 af

Total Runoff Area = 12.192 ac Runoff Volume = 4.940 af Average Runoff Depth = 4.86"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

APPENDIX B

DESIGN

B – 1

STORMWATER BEST MANAGEMENT PRACTICES

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 1 w/ ISR (Bio 1 w ISR)**

Enter the node name in the drainage analysis if applicable.

0.54 ac	A = Area draining to the practice	
0.36 ac	A_I = Impervious area draining to the practice	
0.67 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.65 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.35 ac-in	WQV= 1" x Rv x A	
1,274 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
127 cf	10% x WQV (check calc for sediment forebay)	
319 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
1,065 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
1,498 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
343 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.03 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.42 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.03 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
24.41 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
Top Grate	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.95 ft	Peak elevation of the 50-year storm event (E_{50})	
96.25 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 6.67" for 50-yr event
Inflow = 2.6 cfs @ 12.03 hrs, Volume= 0.300 af
Outflow = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af, Atten= 62%, Lag= 10.8 min
Primary = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.95' @ 12.21 hrs Surf.Area= 6,011 sf Storage= 4,792 cf (4,449 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 399.5 min calculated for 0.292 af (97% of inflow)
Center-of-Mass det. time= 361.0 min (1,163.0 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

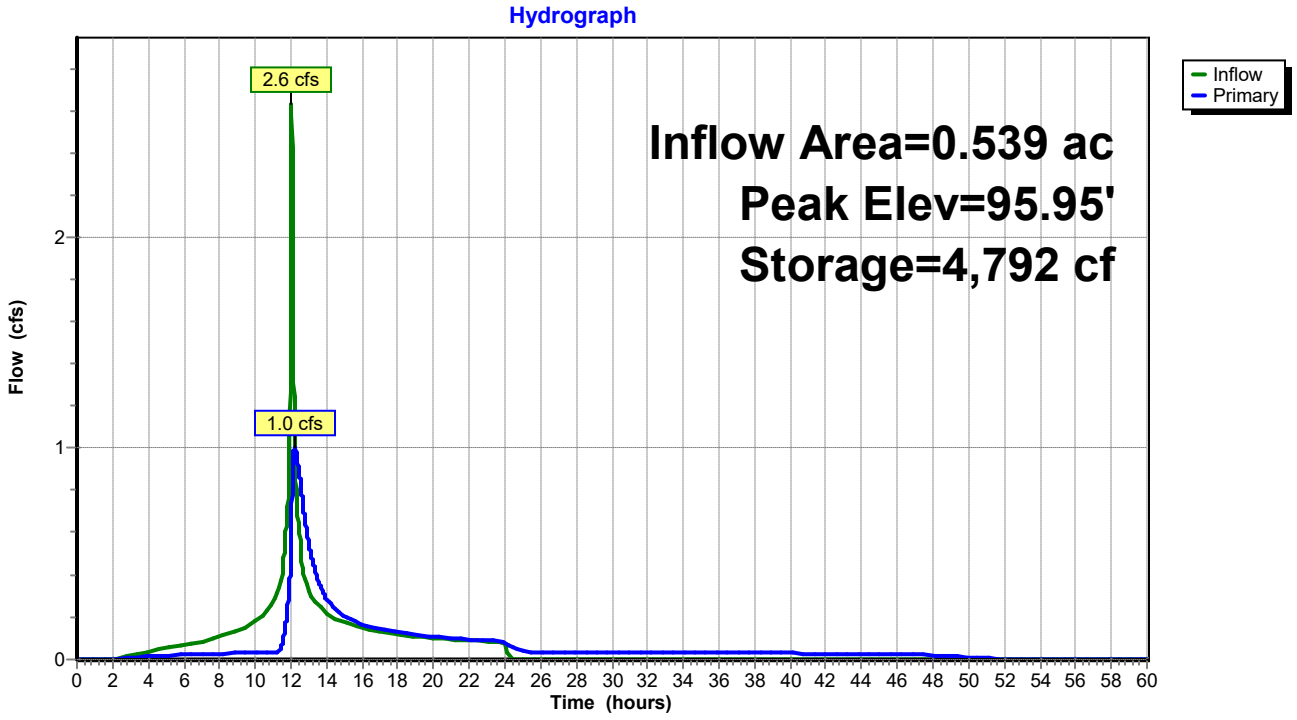
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.21 hrs HW=95.95' TW=93.26' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.0 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.89 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio1: Bio 1 w ISR



Stage-Discharge for Pond Bio1: Bio 1 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.0
92.60	0.0	95.20	0.0
92.65	0.0	95.25	0.0
92.70	0.0	95.30	0.0
92.75	0.0	95.35	0.0
92.80	0.0	95.40	0.0
92.85	0.0	95.45	0.0
92.90	0.0	95.50	0.0
92.95	0.0	95.55	0.1
93.00	0.0	95.60	0.1
93.05	0.0	95.65	0.2
93.10	0.0	95.70	0.3
93.15	0.0	95.75	0.4
93.20	0.0	95.80	0.6
93.25	0.0	95.85	0.7
93.30	0.0	95.90	0.8
93.35	0.0	95.95	1.0
93.40	0.0	96.00	1.2
93.45	0.0	96.05	1.9
93.50	0.0	96.10	3.1
93.55	0.0	96.15	4.6
93.60	0.0	96.20	6.1
93.65	0.0	96.25	**6.2**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		
94.20	0.0		
94.25	0.0		
94.30	0.0		
94.35	0.0		
94.40	0.0		

Stage-Area-Storage for Pond Bio1: Bio 1 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.85	686	0
91.90	686	14
91.95	686	27
92.00	686	41
92.05	686	55
92.10	686	69
92.15	686	82
92.20	686	96
92.25	686	110
92.30	686	123
92.35	686	137
92.40	686	151
92.45	686	165
92.50	686	178
92.55	686	192
92.60	686	206
92.65	686	220
92.70	686	233
92.75	686	247
92.80	686	261
92.85	686	274
92.90	686	288
92.95	686	302
93.00	686	316
93.05	686	329
93.10	686	343
93.15	686	353
93.20	686	364
93.25	686	374
93.30	686	384
93.35	686	394
93.40	686	401
93.45	686	408
93.50	686	415
93.55	686	422
93.60	686	429
93.65	686	436
93.70	686	442
93.75	824	449
93.80	838	463
93.85	852	478
93.90	867	494
93.95	883	510
94.00	899	527
94.05	912	545
94.10	926	564
94.15	940	583
94.20	955	603
94.25	970	623
94.30	985	645
94.35	1,001	667
94.40	1,017	690
94.45	1,034	714
94.50	1,051	739
94.55	1,069	764
94.60	1,086	791
94.65	1,105	818
94.70	1,123	846
94.75	1,142	875
94.80	1,162	906
94.85	1,182	937
94.90	1,786	1,036
94.95	2,391	1,136
95.00	2,996	1,237
95.05	3,054	1,392
95.10	3,114	1,549
95.15	3,174	1,708
95.20	3,236	1,869
95.25	3,299	2,032
95.30	3,363	2,197
95.35	3,428	2,364
95.40	3,494	2,534
95.45	3,589	2,710
95.50	3,703	2,891
95.55	3,780	3,081
95.60	3,859	3,274
95.65	3,939	3,469
95.70	4,021	3,666
95.75	4,103	3,866
95.80	5,798	4,091
95.85	5,869	4,325
95.90	5,940	4,560
95.95	6,012	4,795
96.00	6,083	5,030
96.05	6,226	5,291
96.10	6,369	5,552
96.15	6,513	5,813
96.20	6,656	6,074
96.25	**6,799**	**6,335**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 2 w/ ISR (Bio 2 w ISR)**

Enter the node name in the drainage analysis if applicable.

1.74 ac	A = Area draining to the practice	
0.58 ac	A_I = Impervious area draining to the practice	
0.33 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.35 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.61 ac-in	WQV= 1" x Rv x A	
2,203 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
220 cf	10% x WQV (check calc for sediment forebay)	
551 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
724 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
2,334 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
570 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.05 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.09 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.05 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
26.04 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
Grates	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.91 ft	Peak elevation of the 50-year storm event (E_{50})	
96.25 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 6.32" for 50-yr event
Inflow = 5.8 cfs @ 12.15 hrs, Volume= 0.915 af
Outflow = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af, Atten= 73%, Lag= 34.6 min
Primary = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.91' @ 12.72 hrs Surf.Area= 16,279 sf Storage= 14,772 cf (14,202 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 295.4 min calculated for 0.901 af (99% of inflow)
Center-of-Mass det. time= 275.6 min (1,098.1 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

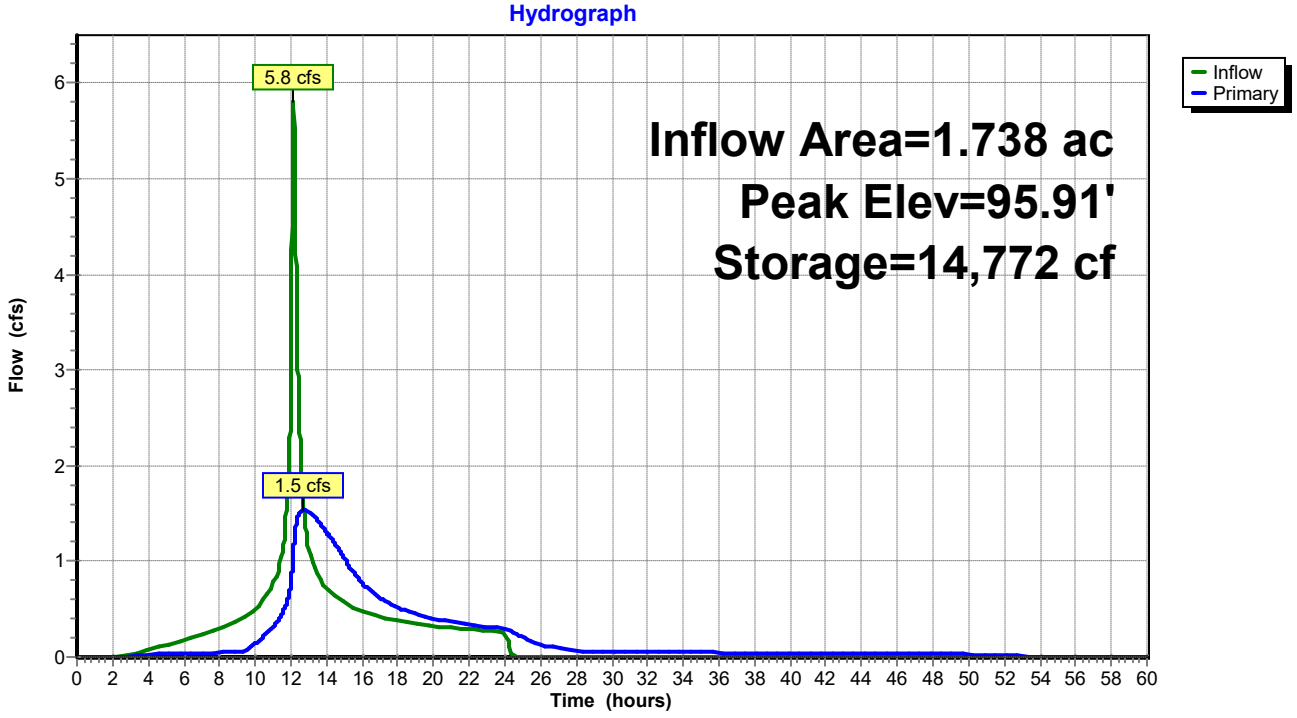
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.5 cfs @ 12.72 hrs HW=95.91' TW=93.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 8.21 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.4 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.58 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio2: Bio 2 w ISR



Stage-Discharge for Pond Bio2: Bio 2 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.60	0.0	94.20	0.0
91.65	0.0	94.25	0.0
91.70	0.0	94.30	0.0
91.75	0.0	94.35	0.0
91.80	0.0	94.40	0.0
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.1
92.60	0.0	95.20	0.1
92.65	0.0	95.25	0.2
92.70	0.0	95.30	0.3
92.75	0.0	95.35	0.4
92.80	0.0	95.40	0.5
92.85	0.0	95.45	0.6
92.90	0.0	95.50	0.7
92.95	0.0	95.55	0.9
93.00	0.0	95.60	1.0
93.05	0.0	95.65	1.1
93.10	0.0	95.70	1.2
93.15	0.0	95.75	1.3
93.20	0.0	95.80	1.4
93.25	0.0	95.85	1.5
93.30	0.0	95.90	1.5
93.35	0.0	95.95	1.6
93.40	0.0	96.00	1.7
93.45	0.0	96.05	2.3
93.50	0.0	96.10	3.4
93.55	0.0	96.15	4.9
93.60	0.0	96.20	6.4
93.65	0.0	96.25	**6.4**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		

Stage-Area-Storage for Pond Bio2: Bio 2 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.60	1,140	0
91.65	1,140	23
91.70	1,140	46
91.75	1,140	68
91.80	1,140	91
91.85	1,140	114
91.90	1,140	137
91.95	1,140	160
92.00	1,140	182
92.05	1,140	205
92.10	1,140	228
92.15	1,140	251
92.20	1,140	274
92.25	1,140	296
92.30	1,140	319
92.35	1,140	342
92.40	1,140	365
92.45	1,140	388
92.50	1,140	410
92.55	1,140	433
92.60	1,140	456
92.65	1,140	479
92.70	1,140	502
92.75	1,140	524
92.80	1,140	547
92.85	1,140	570
92.90	1,140	587
92.95	1,140	604
93.00	1,140	621
93.05	1,140	638
93.10	1,140	656
93.15	1,140	667
93.20	1,140	678
93.25	1,228	690
93.30	1,235	706
93.35	1,242	722
93.40	1,250	739
93.45	1,258	756
93.50	1,266	773
93.55	1,274	791
93.60	1,283	809
93.65	1,291	828
93.70	1,301	847
93.75	1,310	867
93.80	1,320	887
93.85	1,330	908
93.90	1,340	929
93.95	1,350	951
94.00	1,361	973
94.05	1,378	996
94.10	1,395	1,019
94.15	1,413	1,044
94.20	1,432	1,070
94.25	1,451	1,096
94.30	1,471	1,123
94.35	1,491	1,152
94.40	1,512	1,181
94.45	1,534	1,212
94.50	1,556	1,244
94.55	1,579	1,276
94.60	1,602	1,310
94.65	2,402	1,524
94.70	3,203	1,738
94.75	4,005	1,954
94.80	4,807	2,171
94.85	5,609	2,390
94.90	6,413	2,610
94.95	7,217	2,831
95.00	8,021	3,054
95.05	8,876	3,492
95.10	9,734	3,940
95.15	10,605	4,469
95.20	11,476	4,999
95.25	11,576	5,576
95.30	13,025	6,246
95.35	13,291	6,942
95.40	13,556	7,637
95.45	13,822	8,333
95.50	14,087	9,028
95.55	14,353	9,724
95.60	14,618	10,420
95.65	14,884	11,115
95.70	15,149	11,811
95.75	15,415	12,506
95.80	15,680	13,202
95.85	15,946	13,898
95.90	16,211	14,593
95.95	16,477	15,289
96.00	16,742	15,984
96.05	16,983	16,811
96.10	17,223	17,637
96.15	17,464	18,463
96.20	17,704	19,289
96.25	**17,945**	**20,115**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 3 w/ ISR (Bio 3 w ISR)**

Enter the node name in the drainage analysis if applicable.

0.26	ac	A = Area draining to the practice	
0.12	ac	A_I = Impervious area draining to the practice	
0.46	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
435	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
43	cf	10% x WQV (check calc for sediment forebay)	
109	cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay		Method of Pretreatment	
247	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
477	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
140	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.01	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.16	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.01	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
24.15	hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
Grate		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.95	ft	Peak elevation of the 50-year storm event (E_{50})	
96.25	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 7.03" for 50-yr event
Inflow = 1.5 cfs @ 12.00 hrs, Volume= 0.151 af
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af, Atten= 64%, Lag= 7.7 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.95' @ 12.13 hrs Surf.Area= 1,942 sf Storage= 1,917 cf (1,777 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 266.2 min calculated for 0.147 af (98% of inflow)
Center-of-Mass det. time= 236.9 min (1,021.7 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

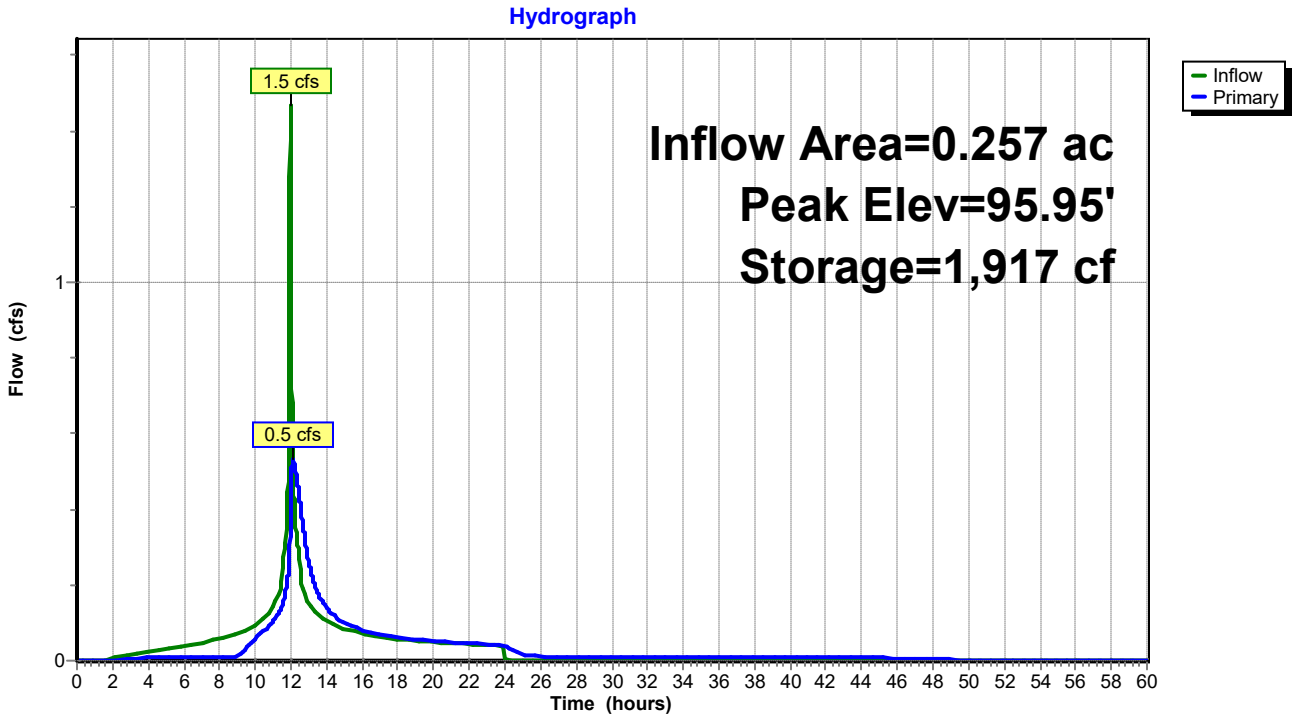
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=95.95' TW=92.92' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.38 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.3 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.5 cfs @ 2.78 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio3: Bio 3 w ISR



Stage-Discharge for Pond Bio3: Bio 3 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.60	0.0	94.20	0.0
91.65	0.0	94.25	0.0
91.70	0.0	94.30	0.0
91.75	0.0	94.35	0.0
91.80	0.0	94.40	0.0
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.0
92.60	0.0	95.20	0.0
92.65	0.0	95.25	0.0
92.70	0.0	95.30	0.0
92.75	0.0	95.35	0.1
92.80	0.0	95.40	0.1
92.85	0.0	95.45	0.1
92.90	0.0	95.50	0.1
92.95	0.0	95.55	0.2
93.00	0.0	95.60	0.2
93.05	0.0	95.65	0.3
93.10	0.0	95.70	0.3
93.15	0.0	95.75	0.3
93.20	0.0	95.80	0.4
93.25	0.0	95.85	0.4
93.30	0.0	95.90	0.5
93.35	0.0	95.95	0.5
93.40	0.0	96.00	0.6
93.45	0.0	96.05	1.2
93.50	0.0	96.10	2.3
93.55	0.0	96.15	3.7
93.60	0.0	96.20	5.4
93.65	0.0	96.25	**6.4**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		

Stage-Area-Storage for Pond Bio3: Bio 3 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.60	280	0
91.65	280	6
91.70	280	11
91.75	280	17
91.80	280	22
91.85	280	28
91.90	280	34
91.95	280	39
92.00	280	45
92.05	280	50
92.10	280	56
92.15	280	62
92.20	280	67
92.25	280	73
92.30	280	78
92.35	280	84
92.40	280	90
92.45	280	95
92.50	280	101
92.55	280	106
92.60	280	112
92.65	280	118
92.70	280	123
92.75	280	129
92.80	280	134
92.85	280	140
92.90	280	144
92.95	280	148
93.00	280	153
93.05	280	157
93.10	280	161
93.15	280	164
93.20	280	167
93.25	280	169
93.30	280	172
93.35	280	175
93.40	280	178
93.45	280	181
93.50	280	183
93.55	280	186
93.60	280	189
93.65	280	192
93.70	280	195
93.75	301	197
93.80	304	201
93.85	307	205
93.90	310	210
93.95	313	214
94.00	317	219
94.05	321	223
94.10	325	228
94.15	329	233
94.20	333	239
94.25	337	244
94.30	342	250
94.35	347	256
94.40	352	262
94.45	357	269
94.50	362	276
94.55	368	283
94.60	374	290
94.65	503	323
94.70	633	356
94.75	764	389
94.80	894	423
94.85	1,025	457
94.90	1,050	512
94.95	1,075	566
95.00	1,101	621
95.05	1,126	676
95.10	1,152	732
95.15	1,178	788
95.20	1,206	847
95.25	1,234	913
95.30	1,262	979
95.35	1,290	1,046
95.40	1,318	1,113
95.45	1,346	1,180
95.50	1,375	1,248
95.55	1,404	1,317
95.60	1,433	1,386
95.65	1,462	1,455
95.70	1,491	1,525
95.75	1,521	1,595
95.80	1,859	1,674
95.85	1,887	1,756
95.90	1,915	1,837
95.95	1,942	1,919
96.00	1,970	2,000
96.05	2,085	2,099
96.10	2,200	2,198
96.15	2,315	2,296
96.20	2,430	2,395
96.25	**2,545**	**2,494**

B – 2

POLLUTANT REMOVAL

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

B – 3

OUTLET PROTECTION

OUTLET PROTECTION DESIGN CALCS

DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 1

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of outlet pipe (ft)
D= Width of channel (ft)
z= Channel side slope (H:V ft/ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	93
Tailwater elev:	93.26
Tw:	0.26
Q:	1
D_0:	1.00
D:	2
z:	3

Apron Dimensions

w_1=	**8**	(ft)
w_2=	**2**	(ft)
La=	**9**	(ft)

Apron Length:

$Tw > .5D_0$	$Tw < .5D_0$
La: 10.000	La: 8.800

Apron Width:

w_2: 2

w_1: 8

w_1=	8.00
w_2=	2.00
La=	8.8

RipRap Sizing

d_{50}=	0.08	(ft)
d_{50}=	0.92	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.12	TO	0.15	100
0.10	TO	0.14	85
0.08	TO	0.12	50
0.02	TO	0.04	15

Minimum Depth of Rock= 0.23 (ft)

Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 6.67" for 50-yr event
Inflow = 2.6 cfs @ 12.03 hrs, Volume= 0.300 af
Outflow = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af, Atten= 62%, Lag= 10.8 min
Primary = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.95' @ 12.21 hrs Surf.Area= 6,011 sf Storage= 4,792 cf (4,449 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 399.5 min calculated for 0.292 af (97% of inflow)
Center-of-Mass det. time= 361.0 min (1,163.0 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.21 hrs HW=95.95' TW=93.26' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.0 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.89 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

OUTLET PROTECTION DESIGN CALCS

NON DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 2

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of the pipe (ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	92.75
Tailwater elev:	93
Tw:	0.25
Q:	1.6
D_0:	1

Apron Dimensions

w_1=	**3**	(ft)
w_2=	**13**	(ft)
La=	**10**	(ft)

Apron Length:

$Tw > .5D_0$		$Tw < .5D_0$
La: 11.800		La: 9.880

Apron Width:

$Tw > .5D_0$		$Tw < .5D_0$
w_2: 7.72		w_2: 12.88

w_1: 3

w_1=	3.00
w_2=	12.88
La=	9.88

RipRap Sizing

d_{50}=	0.15	(ft)
d_{50}=	1.80	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.22	TO	0.30	100
0.19	TO	0.27	85
0.15	TO	0.22	50
0.04	TO	0.07	15

Minimum Depth of Rock= 0.45 (ft)

Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 6.32" for 50-yr event
Inflow = 5.8 cfs @ 12.15 hrs, Volume= 0.915 af
Outflow = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af, Atten= 73%, Lag= 34.6 min
Primary = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.91' @ 12.72 hrs Surf.Area= 16,279 sf Storage= 14,772 cf (14,202 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 295.4 min calculated for 0.901 af (99% of inflow)
Center-of-Mass det. time= 275.6 min (1,098.1 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.5 cfs @ 12.72 hrs HW=95.91' TW=93.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 8.21 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.4 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.58 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

OUTLET PROTECTION DESIGN CALCS

NON DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 3

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of the pipe (ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	92.75
Tailwater elev:	92.92
Tw:	0.17
Q:	0.5
D_0:	1

Apron Dimensions

w_1=	**3**	(ft)
w_2=	**11**	(ft)
La=	**8**	(ft)

Apron Length:

$Tw > .5D_0$		$Tw < .5D_0$
La: 8.500		La: 7.900

Apron Width:

$Tw > .5D_0$		$Tw < .5D_0$
w_2: 6.40		w_2: 10.90

w_1: 3

w_1=	3.00
w_2=	10.9
La=	7.9

RipRap Sizing

d_{50}=	0.05	(ft)
d_{50}=	0.56	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.07	TO	0.09	100
0.06	TO	0.08	85
0.05	TO	0.07	50
0.01	TO	0.02	15

Minimum Depth of Rock= 0.14 (ft)

Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 7.03" for 50-yr event
Inflow = 1.5 cfs @ 12.00 hrs, Volume= 0.151 af
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af, Atten= 64%, Lag= 7.7 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.95' @ 12.13 hrs Surf.Area= 1,942 sf Storage= 1,917 cf (1,777 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 266.2 min calculated for 0.147 af (98% of inflow)
Center-of-Mass det. time= 236.9 min (1,021.7 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=95.95' TW=92.92' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.38 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.3 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.5 cfs @ 2.78 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

APPENDIX C

INSPECTION AND MAINTENANCE

C – 1

STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN

Stormwater Management System Inspection & Maintenance Plan

Prepared for:

LOT 2 SITE DEVELOPMENT
Map G, Lot 2-1

Crosby Road
Dover, New Hampshire
Strafford County

AUGUST 2024

Owner of Record:

DEL SOL DOVER, LLC
340 Central Avenue
Suite 202
Dover, New Hampshire 03820

Prepared By:

CIVILWORKS NEW ENGLAND
P.O. Box 1166
181 Watson Road
Dover, New Hampshire 03821

Introduction

Civilworks NE, has prepared the following Stormwater Management System Inspection & Maintenance Plan for **Del Sol Dover, LLC.** The intent of this plan is to provide a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this site.

The inspection and maintenance requirements outlined in this document are required to be performed in perpetuity. In the event the property is sold, future owners will be responsible for implementing the responsibilities outlined in this document.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will also help to minimize potential environmental impacts to the areas surrounding the developed site. By following the enclosed procedures, the property owners, and maintenance personnel will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

This plan also requires the Owner/Operator to prepare and implement a salt minimization plan to reduce salt usage on-site and ultimately within the watershed. This plan will allow the owner/operator to monitor and modify how much salt is needed, when it should be applied, where it needs to be applied, with the ultimate goal of reducing salt-use without compromising safety. It is expected that salt-use reduction will lead to long-term cost-savings as a result of purchasing less salt and reduced impacts on vegetation (e.g., landscaping) and corrosion of infrastructure.

The salt minimization plan should include the retention of a contractor who has completed the Green SnowPro Training course and obtained NHDES Salt Application Certification.

It is anticipated that this be a living document that will be updated at regular intervals (recommend updating annually in advance of the winter season in order to facilitate adjustments).

Owner:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

In the event of a change in ownership, this Inspection and Maintenance Plan shall be transferred to the new party; transfer shall be documented to NH DES in writing.

Contact / Responsible Party:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Chad Kageleiry
Phone: (603) 749 2800
Email: chad@summitlanddev.com

The contact information for the Contact / Responsible Party shall be kept current; transfer shall be documented to NHDES in writing.

Management Company:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

The contact information for the Management Party shall be kept current.

Inspection Schedule / Record Retention

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NHDES. See the Inspection and Maintenance Plan for frequency requirements. Inspections shall include a photograph of each practice that is subject to the I&M requirements each time it is inspected. A copy of the completed Stormwater Management System's Inspection & Maintenance Log, inspection photographs, and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law. All Inspection and Maintenance records must be provided to NHDES upon request and to the City of Dover Community Services Department annually before Dec 15th.

Stormwater Management System Components

The Stormwater Management System associated with the project is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)
- Bioretention Basin w/ Internal Storage Reservoir (ISR)
- Grassed Lined Conveyance Swale
- Stone Lined Conveyance Swale
- Pre-Treatment Structures
  - Sediment Forebay
- Pavement
- Litter / Trash Removal

Design elements are identified in the design plans, a copy of which shall be maintained with this Inspection and Maintenance Plan.

Control of Invasive Species

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. Invasive plants shall be controlled to prevent them from reproducing, spreading, or re-growing. See the University of New Hampshire – Cooperative Extension's "Method for Disposing Non-Native Invasive Plants", included at the end of this manual, for guidance on the removal and disposal of invasive species.

Inspection and Maintenance Plan

By implementing the following procedures, the owners will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

PIPES/CULVERTS:

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

OUTLET STRUCTURE(S):

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

ENERGY DISSIPATION STRUCTURES (RIP RAP):

- Inspect at least once a year.
- Inspect for sediment accumulation.
- Remove all debris immediately.
- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- If stones become displaced from the riprap areas, they should be replaced immediately and chinked in to assure stability. Add additional riprap as needed. Vegetation growing through the riprap should be eliminated at least yearly.

BIORETENTION BASIN W/ ISR:

- Inspection, by a **qualified professional**, of the Bioretention Basin at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection. If the Bioretention Basin systems do not drain within 72-hours following a rainfall event, a **qualified professional** should assess the condition and determine measures required to restore filtration practice (as applicable).
- Inlet and outlet pipes, inlet and outlet structures, containment structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Vegetation should be inspected at least annually and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed at least once annually. The vegetation should be maintained in a healthy condition, as appropriate to the function of the facility and type of vegetation, to prevent the establishment of woody vegetation.

- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

GRASS LINED CONVEYANCE SWALE:

- Inspect once per year.
- Inspect for erosion, sediment accumulation, vegetation loss, and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and dead vegetation.
- Perform periodic mowing of swale (at least twice annually), maintain a 4" stand of vegetative growth.

STONE LINED CONVEYANCE SWALE

- Inspect once per year.
- Inspect for erosion, sediment accumulation, woody vegetation and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and woody vegetation.
- Reset any dislodged stones.

PRE-TREATMENT STRUCTURES:

SEDIMENT FOREBAY:

- Vegetated areas shall be mowed to maintain a 4" start of vegetative growth.
- Inspect at least once per year.
- Inspect for sediment accumulation.
- Remove all debris immediately.

PAVEMENT:

- Minimize sanding.
- Minimize application of salt for ice control.
- Clean periodically (1-2 times per year) using a sweeper or vacuum sweeper. Vacuum sweeping is the preferred method.

LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

DE-ICING AGENTS:

- To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends that the Owner/Operator develop a Road Salt and Deicing Minimization Plan for the parking lots and roadways. The plan should develop the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. The plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. (See Deicing Salt Quantity Use Log).
- Use sand as primary agent for driveway and access way safety during ice and snow conditions.
- Minimize the use of salt during the winter.

- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Recommend using a certified Winter Operator (Green SnowPro Trained) for applying de-icing agents.
- Monitor weather and apply de-icing agents based on weather conditions and temperatures.

ANTI-ICING AND SALT MINIMIZATION:

- Owner to develop a Road Salt and Deicing Minimization Plan.
- Provide a written policy that the “Development” will keep in place to minimize salt and other deicer use after the project has been completed.
- Use the attached form to track the use of salt and other deicers for each storm event and compiling salt use data annually.

Inspection & Maintenance Table

System Component / BMP	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Pipes/Culverts	Annually	• Check for clogging • Check for sediment accumulation	Remove when noticed Clean when necessary
Outlet Structure(s)	Annually	• Inspect once per year. • Inspect for clogging and sediment accumulation. • Remove all debris immediately and sediment accumulations ≥ 2 inches.	≥ 2 in. sediment Remove immediately
Energy Dissipation (ED) Structures (Rip Rap)	Annually	• Check for erosion • Check for displaced stones • Check for woody vegetation • Check for sediment accumulation	≥ 3 in. sediment Remove annually Replace/ reset Dislodged stones immediately
Bioretention Basin w/ ISR • Inlet/Outlet Piping • Pond • Sediment • Drawdown • Trash/Debris • Vegetation (Veg.) • Embankments	Bi-Annually “ “ Annually Periodically “ “ “ “	• Check for erosion, settlement, seepage, etc. • Check for sediment accum. in pond • Check drainage time • Check for and remove trash/debris • Maintain >75% veg. (pond & slopes) Maintain healthy stand of veg.	Repair immediately ≥ 2 in sediment >72 hours Remove all trash/debris Restore veg. in-kind Mow when ≥ 6 in
Grass Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Ensure swale is stabilized • Maintain healthy stand of veg., min 4” • Inspect for invasive species	≥ 1 in. sediment Repair immediately Restore vegetation in-kind Mow twice per year Remove/Dispose of accordingly
Stone Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Inspect for woody/ invasive vegetation • Check for dislodged stones	≥ 1 in. sediment Repair immediately Remove/Dispose of accordingly
Pre-Treatment Structures: Sediment Forebay	Annually	• Check for sediment accumulation • Check for woody vegetation growth • Check for debris • Vegetated areas shall be mowed to maintain a 4” start of vegetation growth.	Remove/ Dispose of accordingly Mow twice per year
Pavement: • Sanding • Salt Applications • Sweep/Vacuum • Trash/Debris	Limit use As required 1 - 2 x’s Year Periodically	• Minimize use to prevent tracking issues • RECORD APPLICATION RATES • Sweep or vacuum to prevent tracking issues • Check for trash/debris	Sweep to prevent issues Minimize (as required) Sweep/Vac as needed Remove when noticed
Litter / Trash Removal	Periodically	• Check for litter and trash	Remove when noticed

Inspection & Maintenance Checklist/Log

The following pages contain a blank copy of the Stormwater Management System's Inspection & Maintenance Log and a Deicing Salt Quantity Use Log. These forms are provided to assist the owners with the inspection and maintenance of the aforementioned Stormwater Management System.

Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance_____ Inspector:_____

System Component / BMP	Cleaning / Repair Needed (List Items / Comments)	Date of Cleaning/Repair	Performed By

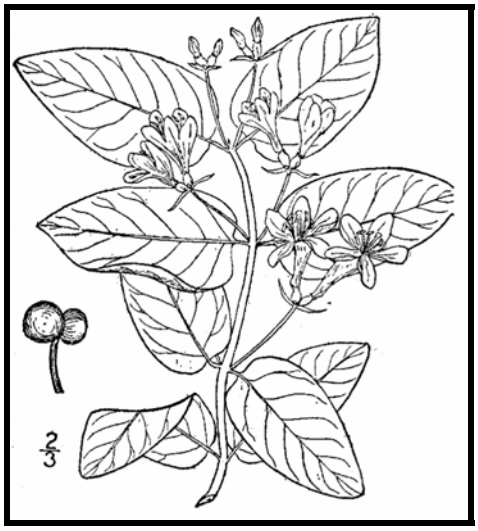
Deicing Salt Quantity Use Log

Date	Amount of Material Applied	Comments

University of New Hampshire Cooperative Extension

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

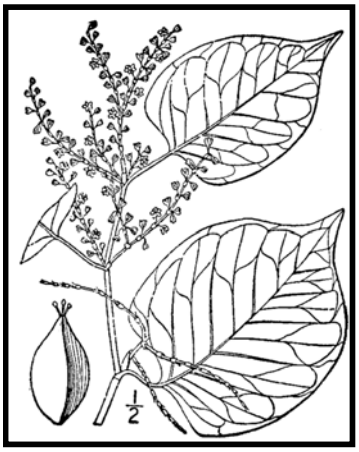
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

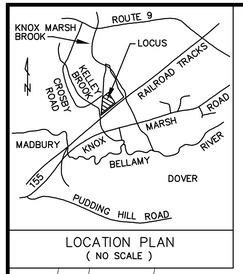
This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds** 	**Prior to flowering** Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	**Small infestation** ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. **Large infestation** ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

UNH Cooperative Extension programs and policies are consistent with pertinent Federal and State laws and regulations, and prohibits discrimination in its programs, activities and employment on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sex, sexual orientation, or veteran's, marital or family status. College of Life Sciences and Agriculture, County Governments, NH Dept. of Resources and Economic Development, Division of Forests and Lands, NH Fish and Game ,and U.S. Dept. of Agriculture cooperating.



LOCATION PLAN
(NO SCALE)

LEGEND:

= SEDIMENT FOREBAY

= ENERGY DISSIPATION STRUCTURES (RIP RAP)

= BIO-RETENTION BASIN W/ ISR

= STONE LINED CONVEYANCE SWALE

= GRASSED LINED CONVEYANCE SWALE

FORMER HANSON ROAD

50' WETLAND BUFFER

WATER - DOVER PARA01-020-WI

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

GAS 4"ø PP

WATER

DOVER PARA01-025-WI

HYDRANT #319

BIORETENTION POND 1 W/ ISR (BIO1 W/ ISR)

EDGE OF PAVEMENT

PROPOSED 9,600 S.F. BUILDING

EDGE OF PAVEMENT

PROPOSED GRAVEL 125'x180' LAYDOWN AREA

EDGE OF GRAVEL

BIORETENTION POND 2 W/ ISR (BIO2 W/ ISR)

BIORETENTION POND 3 W/ ISR (BIO3 W/ ISR)

EXISTING GRASSED LINED CONVEYANCE SWALE

C / 2-1

NEW PARCEL AREA
273,596 S.F.
6.28 Ac.

NH STATE PLANE NAD 83 - GAS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: MJM
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

BMP LOCATION PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

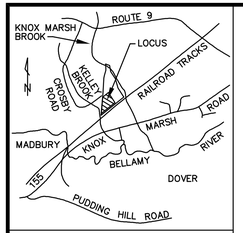
BMP

APPENDIX D

WATERSHED PLANS

D – 1

PRE-DEVELOPMENT CONDITIONS



LOCATION PLAN
(NO SCALE)

NH STATE PLANE
NAD 83 - GPS OBS.

DISCHARGE PT. B

DISCHARGE PT. C

DISCHARGE PT. A

PRE-DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
A	8.27	1,314	37.0
B	1.55	268	22.2
C	2.38	402	20.7

FORMER HANSON ROAD

G / 1-E
VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

G / 2-1B
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820
5075 / 142

CATCH BASIN
#7080 RIM = 96.0'
CATCH BASIN
#7081 RIM = 95.9'

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
[75' WIDE R.O.W.]

G / 1-C2

G / 1-C3
WILLIAM C. COLBATH
211 CROSBY ROAD
DOVER, NH 03820
2171 / 590

GRAVEL LANDING AREA

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

NHFG WILDIFE RESTRICTED AREA

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

G / 2-1

G / 2-1A
DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NH 03820
5075 / 142

G / 5
BOSTON & MAINE RR

NHFG WILDIFE RESTRICTED AREA

A

B

C

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EDGE OF WETLAND
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- (A) SUBCATCHMENT DESIGNATION

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-2024
SCALE: 1"=50'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: DRN.DWG

PRE-DEVELOPMENT WATERSHED PLAN

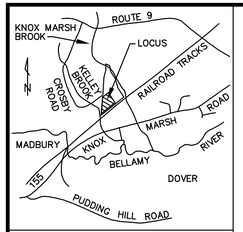
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

WS-1

D – 2

POST-DEVELOPMENT CONDITIONS



LOCATION PLAN
(NO SCALE)

NH STATE PLANE
NAD 83 - GPS OBS.

POST-DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
1	0.54	46	5.8
2	1.74	468	14.5
3	6.50	1314	37.0
4	1.06	268	22.2
5	0.26	15	1.9
6	2.09	402	20.7

DISCHARGE PT. B

DISCHARGE PT. C

DISCHARGE PT. A

FORMER HANSON ROAD

G / 1-E
VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

G / 2-1B
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820
5075 / 142

CATCH BASIN
#7080 RIM = 96.0'

CATCH BASIN
#7081 RIM = 95.9'

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
[75' WIDE R.O.W.]

G / 1-C2

G / 1-C3
WILLIAM C. COLBATH
211 CROSBY ROAD
DOVER, NH 03820
2171 / 590

BIO-RETENTION BASIN 1 W/ ISR

PROPOSED 80'x120' BUILDING

BIO-RETENTION BASIN 2 W/ ISR

BIO-RETENTION BASIN 3 W/ ISR

NHFG WILDLIFE RESTRICTED AREA

REACH R1

REACH R2

REACH R3 AND LFP 3

REACH R4 AND LFP 3

REACH R5

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

G / 2-1

G / 2-1A
DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NH 03820
5075 / 142

G / 5
BOSTON & MAINE RR

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EDGE OF WETLAND
- 154 PROPOSED FINISH GRADE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BUILDING
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- ④ SUBCATCHMENT DESIGNATION

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-2024
SCALE: 1"=50'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: DRN.DWG

POST-DEVELOPMENT WATERSHED PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

WS-2

City of Dover, New Hampshire
CONDITIONAL USE PERMIT APPLICATION

[Revision Date: October 19, 2020]

Office Use Only	Project #:		Date Received:	
	Amount Paid:		Time Received:	

APPLICANT AND OWNER INFORMATION

Name of Applicant: Del Sol Dover, LLC Telephone # 603-749-0443

Address of Applicant: 340 Central Avenue, Suite 202 Dover, NH 03820

E-Mail Address: chad@summitlanddev.com

Name of Property Owner (if different from applicant): _____ Telephone #_____

Address of Property Owner: _____

PROPERTY INFORMATION

Assessor's Map # G Lot(s) # 2-1

Address of Property: Crosby Road (Extension)

Zoning District(s) CM Overlay District(s) None

Existing Use of Property: Vacant, Industrial Park

CONDITIONAL USE PERMIT INFORMATION

Type of Conditional Use Permit (Check All That Apply):

☐ Conservation District	☐ RCM Use Overlay District	☐ Gateway District
☐ Groundwater Protection	☐ Off-Street Parking and Loading	☐ Alternative Treatment Center
☒ Wetland Protection District	☐ Central Business District	☐ Heritage Residential District

Describe Proposed Use or Activity That Requires Conditional Use Permit and Describe Any Impacts:

Site development including a 9,600 s.f. warehouse building with contractor laydown area and associated parking, utility and drainage improvements, resulting in wetland buffer impacts totalling 786.5 s.f.

List Any Associated State or Federal Permits That Have Been or Will Be Applied For and Indicate Their Status: NH DES Alteration of Terrain (pending)

Name of Professional That Prepared Plans: Stephen J. Haight, PE - Civilworks New England

Address P.O. Box 1166 Dover, NH 03821 Telephone #: 603-749-0443

Professional License #: NH PE #7978 E-mail address: shaight@civilworksne.com

SIGNATURES

I/We hereby submit this application to the City of Dover Planning Board and attest that to the best of my knowledge all of the information on this application form and in the accompanying application materials and documentation is true and accurate. As applicant or as agent, I attest that I am duly authorized to act in this capacity.

Signature of Property Owner: _____ Date: 8/5/24

Signature of Applicant (if different from owner): _____ Date: _____

Signature of Agent: _____ Date: _____

AUTHORIZATION TO ENTER SUBJECT PROPERTY

I, and my successors, hereby authorize members of the Dover Planning Board, Planning Department and other pertinent City Departments and boards to enter my property for the purpose of evaluating this application, including performing inspections during the application phase, post-approval phase, construction phase and occupancy phase. It is understood that these individuals must use all reasonable care, courtesy, and diligence when on the property.

Signature of Property Owner: _____ Date: 8/5/24

CITY OF DOVER CONDITIONAL USE
LIST OF ABUTTERS

Pursuant to RSA 676:4, the State Law of New Hampshire, the City of Dover is required to notify the applicant, abutters (including holders of conservation easements), and any professional whose seal is on the plan, of the public hearing by certified mail, return receipt requested. Staff will provide the abutter information, while the applicant must provide accurate contact information for the owner, applicant and professional agents representing the project.

Owner:

TAX MAP	LOT #	PROPERTY OWNER	MAILING ADDRESS
G	2-1	Del Sol Dover, LLC	340 Central Avenue, Suite 202 Dover, NH 03820

Applicant (if different from owner):

APPLICANT NAME	APPLICANT COMPANY	MAILING ADDRESS

Surveyor and/or Engineer/Professional Agent:

NAME	COMPANY	MAILING ADDRESS
Stephen J. Haight, PE	Civilworks New England	P.O. Box 1166 Dover, NH 03821
Kevin McEneaney	McEneaney Survey Associates	P.O. Box 1166 Dover, NH 03821
Bruce A. Gilday, CSS, CWS	BAG Land Consultants	43 Rockingham Street Concord, NH 03301

Conservation Easement Holder:

TAX MAP	LOT #	NAME OF EASEMENT HOLDER	MAILING ADDRESS

PLANNING BOARD FEE SCHEDULE/INVOICE

(Revised July 24, 2023)

Below are the fees associated with plan review and are subject to a nonrefundable application fee to cover administrative expenses. Please complete the information below and provide payment with your application submittal. **Plan review fees shall be paid prior to technical review committee (TRC) being scheduled.** For plans not requiring TRC review, **fees are due 21 days prior** to the Planning Board meeting. Staff will coordinate abutter/notice fees, which will be invoiced and must be paid 28 hours before the Planning Board meeting for an application to be heard. Fees shall be paid by cash or check made payable to "City of Dover".

A. Plan Review Fees

1. Application fee for the following (SELECT ALL THAT APPLY):

- ☐ SUBDIVISION Application fee $200.00 + $150.00 x # _____ new lots created = $_____
- ☐ LOT LINE ADJUSTMENT Application fee $200.00 + $100.00 X # ___ of lots involved = $_____
- ☐ TRANSFER OF DEVELOPMENT RIGHTS Application fee $200.00 = $_____
- ☐ SITE REVIEW – RESIDENTIAL Application fee $200.00+ $100.00 x # __ per dwelling unit =$_____
- ☐ SITE REVIEW – NON-RESIDENTIAL Application fee $200.00 + (not to exceed $10,000)
  - New construction $.15 sq. ft. x # _____ sq. ft.= $_____
  - Additions (new floor space) $.10 per sq. ft. x # _____sq. ft.= $_____
- ☐ MOTEL/HOTEL $35.00 x # ___ per lodging unit= $_____
- ☐ CHANGE OF USE Application fee $200.00 + (not to exceed $5,000)
  - Existing floor spaces $.10 per sq. ft. x # _____ sq. ft. = $_____
- X CONDITIONAL USE PERMIT Application fee $200.00 x # 1 per Application = $ 200.00
- ☐ GRAVEL PIT/ EXCAVATIONS
  - Application fee $50.00= $_____
  - Permit fee $75.00= $_____
- ☐ EXTENSIONS/AMENDMENTS/WAIVERS FOR AN APPROVED PLAN Application fee $200.00 = $_____
- ☐ REQUEST FOR REZONING Application fee $200.00 = $_____
- ☐ DRIVEWAY WAIVER Application fee $200.00 = $_____
- ☐ **TOTAL IMPERVIOUS PAVED AREA** (for new development, roadways or additions to existing parking lots, (not to exceed $10,000)) Application fee of $200.00 is N/A if it is part of a Site Review or Subdivision Plan. $200.00 + $.07 per sq. ft. x # _____ sq. ft. = $_____

SUBTOTAL PLAN REVIEW FEE = $ 200.00

AND

B. Abutter Notification/Mailing Labels - this office will create and print the abutter list and provide labels in triplicate for each abutter. The applicant/owner will review the list for accuracy and provide to us the engineer, architect, licensed land surveyor (LLS), licensed landscape architect (LLA) and/or soil scientist whose professional seal appears on the plan with names and addresses for notices.

- ☐ Applicant & Owner, engineer, architect, LLS, LLA and/or soil scientist
  - Certified letters fee # _____ of x $10.00= $_____
- ☐ Certified letters fee: # of abutters _____ X $10.00= $_____
- ☐ First Class Mail fee (for individual owner of units within a condominium or other collective form of ownership): # of abutters _____ X $1.00= $_____
- ☐ Creating/Printing Abutter Labels in triplicate per sheet _____ x $10.00= $_____

C. Foster's newspaper public notice fee $120.00 x # _____ applications = $_____

SUBTOTAL = $_____

TOTAL INVOICE AMOUNT = $_____

PLAN REVIEW FEE COLLECTED/PAID = $ _____

BALANCE DUE = $ _____

The amount due must be paid 28 hours prior to the Planning Board Meeting, to be heard.

DEL SOL DOVER, LLC
340 Central Avenue, Suite 202
Dover, New Hampshire 03820

August 5, 2024

City of Dover
Planning Board
288 Central Avenue
Dover, NH 03820

Re: Crosby Road Extension Site Plan
Tax Map G, Lot 2-1, Crosby Road Extension
Dover, New Hampshire

LETTER OF AUTHORIZATION

As Owner and Applicant for the above referenced project, I hereby authorize Civilworks New England and McEneaney Survey Associates to represent Del Sol Dover, LLC to the State of New Hampshire, the City of Dover Planning Board and any other Dover Boards or Committees relative to the pursuit of permits for the development of the subject parcel.

Respectfully,

Charles P. Kageleiry, Manager
DEL SOL DOVER, LLC

PERMIT SNAPSHOT REPORT COND-2024-0026
FOR CITY OF DOVER, N.H.

Permit Type	Conditional Use	**Project:**		**App Date:**	08/06/2024
Work Class:	Environmental	**District:**	None	**Exp Date:**	NOT AVAILABLE
Status:	Fees Paid	**Square Feet:**	0.00	**Completed:**	NOT COMPLETED
Valuation:	$0.00	**Assigned To:**	Blonigen, Rachel	**Approval Expire Date:**	
Description:	Wetland Buffer Impact 786.5 s.f.				

Parcel:	G0002-001000 Main	**Address:**	Littleworth Road Dover, NH 03820 Main	**Zone:**	CM(Non-Residential - Commercial Manuf

Surveyor
Kevin McEneaney
Business: (603) 742-0911

Plan Preparer
Stephen Haight
Business: (603) 749-0443

Wetlands Scientist
Bruce Gilday
Business: (603) 228-5775

Applicant
Civilworks New England
Steve Haight
181 Watson Road PO Box 1166
Dover, NH 03820
Business: (603) 749-0443
Mobile: (603) 817-6651

Owner
Chad Kageleiry
Business: (603) 749-2800

Applicant
Chad Kageleiry
Business: (603) 749-2800

Permit Custom Fields

Select Permit Type	Wetland Protection District	General Purpose	New Construction	Project Zone	Non-Residential
What is the parcel zoned?	CM	New Change in Impervious/Paved Area (sq ft)	18095	Work	Wetland buffer impacts totaling 786.5 s.f to accommodate site development construction of building, parking, utility and drainage improvements.
permitstatefed	NH DES Alteration of Terrain (pending)				

Attachment File Name	Added On	Added By	Attachment Group	Notes
Signature_Steve_Haight_8/6/2024.jpg	08/06/2024 19:21	Haight, Steve		Uploaded via CSS
Permit Snapshot Report.pdf	08/06/2024 19:21	Service, EnerGov		Attached by IO - ATTACH: Initial Permit Snapshot

Invoice No.	Fee	Fee Amount	Amount Paid
INV-00008890	Planning Impervious Paved Area Fee	$1,266.65	$1,266.65
	Planning General Application Fee	$200.00	$200.00
	Total for Invoice INV-00008890	**$1,466.65**	**$1,466.65**
	Grand Total for Permit	**$1,466.65**	**$1,466.65**

Workflow Step / Action Name	Action Type	Start Date	End Date
Review v.1			
Confirm application complete v.1	Generic Action		
Conditional Use Review v.1	Receive Submittal		
Planning Board v.1			
Planning Board Agenda v.1	Task		
Invoice for Notices v.1	Task		
Send Notices v.1	Task		
Planner Creates Staff Recommendations v.1	Permit Activity		
Distribute Planning Board Materials v.1	Task		

Planning Board Hearing v.1	Hold Hearing
Planning Board Decision v.1	Permit Activity
NOD Sent to Applicant v.1	Create Report
Issue Permit v.1	
Verify Fees Prior to Permit v.1	Generic Action
Issue and Review Permit v.1	Generic Action
Print and Email Permit v.1	Generic Action
Plans uploaded to Treeno v.1	Generic Action
Internal Notification of Plan Completion v.1	Generic Action
Recording v.1	Task

PROJECT NARRATIVE

for

DEL SOL DOVER, LLC

Site Plan Application

Lot 2 Development

Tax Map G, Lot 2-1

PROJECT OVERVIEW & SITE CHARACTERISTICS

The project parcel is shown on Tax Map G, as Lot 2-1, is located within the CM District and consists of 20.80± acres, currently undeveloped. This project proposes a minor (3 lot) subdivision, and the development of Lot 2.

These lots will be accessed from a proposed 75' wide right-of-way being shown as an extension of Crosby Road which is currently 75' wide. The intent is that, when completed, the 75' wide extension will be accepted by the City of Dover as a public right-of-way. The proposed road extension design will include associated drainage improvements and public utilities. The proposed lots, when developed, will be served by proposed utilities extending from the existing Crosby Road ROW, including municipal water and sewer connections, underground electric service, and natural gas service. There will be wetland buffer impacts associated with the ROW extension and development of Lot 2. Please see Conditional Use Permit application and narrative.

The construction of the road and lot 2 will be in conjunction. The construction consists of an 807 foot, 24-foot-wide paved road (Crosby Road extension) and the full build out of one (Tax Map G Lot 2-1, Lot 2) of the three (3) commercial lots. The commercial development consists of the construction of a 9,600-sf building, site access from the newly constructed Crosby Road extension, associated parking, gravel lay down area, underground utilities, and grading and drainage improvements. Total disturbance from the roadway and site development will be 142,500 sf.

WETLAND SETBACK IMPACT TYPE

The project will require a Conditional Use Permit from the City of Dover. Approximately 786.5 s.f. of wetland buffer will be impacted by construction Lot 2 development, and its associated drainage and grading. The project does not impact bogs, marshes, sand dunes, tidal wetlands, cedar swamps, undisturbed tidal buffer zone, or involve any work within 50 feet of a salt marsh. The project is not located within 100 feet of prime wetlands.

DRAINAGE

The parcel is located at the end of Crosby Road within an established industrial park. The proposed subdivision of the 20.80-acre lot abuts other commercial properties to the west, an active railroad track to the south and Knox Marsh Brook to the east. The site is currently undeveloped. The 20.80-acre watershed of the parcel includes the project site as well as a portion of Crosby Road. On site soils are a mix of Scantic, Deerfield, and Deerfield Variant soils. The Scantic series soils are HSG D with Deerfield and Deerfield Variant series soils being classified as HSG B.

To effectively analyze the pre-development subject parcel and proposed roadway, a 12.19 ac area was analyzed. The proposed drainage system incorporates grassed and stone lined swales for stormwater conveyance, sediment forebays for pre-treatment, and three (3) bioretention basins with internal storage reservoirs (ISR's) for stormwater treatment. A large portion of stormwater runoff from the proposed roadway is designed to drain into the stormwater drainage structures located on Lot 2-1 while the last 50+/- ft will be treated within the proposed right-of-way and proposed Lot 2-1A. The proposed stormwater system captures, stores, and treats the stormwater runoff from the site and roadway, then redirects it to the existing discharge points.

The post development watershed is modeled utilizing the same points of analysis as the predevelopment watershed, allowing direct comparison of the peak runoff between the pre- and post- developed conditions (see drainage report). Bioretention Basins with ISR's were utilized for stormwater treatment as the site is located within a "Class A – All Features" watershed as identified on the NHDES OneStop Data Mapper. This analysis indicates that the proposed stormwater measures, and stormwater management plan will treat and mitigate stormwarer runoff in general accordance with ENV-Wq 1500 of the New Hampshire Code of Administrative Rules and the City of Dover's Subdivision and Site Review Regulations.

UTILITIES

The proposed project will connect to City of Dover water and sewer as well as Unitil for natural gas, and Eversource for electricity. Water, sewer, electric lines, and natural gas lines are currently located within Crosby Road. Building connections will be made per the City's Community Services Utility Division and Fire Department requirements and standards.

CONDITIONAL USE NARRATIVE
§170-27.1
WETLAND PROTECTION DISTRICT
for
DEL SOL DOVER, LLC
Lot 2 Development
Tax Map G, Lot 2-1

F. Conditional use approval.

(1) Conditional use approval may be granted by the PLANNING BOARD (RSA 674:21II) after proper public notice and public hearing, for construction within the Wetland Protection District or buffer. Said construction may include but is not limited to a road or other accessway, utility right-of-way, communication lines, power lines and pipelines, STRUCTUREs, and parking LOTs provided that the proposed construction complies with the following standards:

(a) Practicable Alternative: There is no practicable alternative that would have a less adverse impact on the area. **The proposed driveways, buildings, side slopes, and bio-retention basin location were chosen to avoid wetland impacts and to minimize wetland buffer impacts. The areas of impervious impact to the wetland buffer were minimized by utilizing the site characteristics including existing slope information to minimize additional side slope impacts.**

(b) Avoidance: The potential impacts have been avoided to the maximum extent practicable. The APPLICANT will demonstrate by plan and example that the proposed construction represents the least impacting alternative. **There are 786.5 sf of wetland buffer impacts associated with the grading and drainage and development of Lot 2 for the project. The design incorporates unique site characteristics including existing slope, and soil type to minimize wetland buffer impacts.**

(c) Minimization: Any unavoidable impacts have been minimized. No reasonable Alternative to the proposed construction exists which does not impact a wetland, or which has less detrimental impact on a wetland. Design, construction, and maintenance methods will be prepared by a registered engineer to minimize detrimental impacts to the wetlands and will include restoration of the site as nearly as possible to its original grade. **There are 786.5 sf of wetland buffer impacts for the development of Lot 2, with associated grading, drainage, and utilities. All impacts have been minimized to the greatest extent practicable.**

(d) Mitigation: If the APPLICANT is required by State rules to prepare a compensatory mitigation plan, the APPLICANT shall provide the Conservation Commission and PLANNING BOARD with one copy each of said plan for their review. **Mitigation is not required.**

(e) Approval for the wetlands impact has been received from the NHDES Wetlands Bureau pursuant to Section G (3), below. **A NHDES wetland permit application is not applicable.**

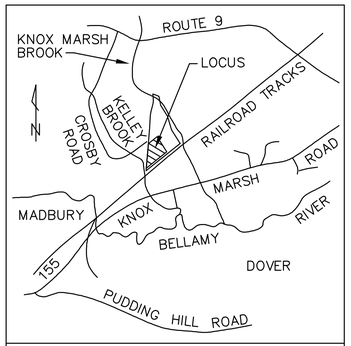
(f) To assess and summarize the wetlands' functions and values as denoted in the NH Method and Section 170.27.1(B)(2). **The function of the abutting wetland serves as a passage for runoff from the Crosby Road industrial park and Crosby Road. The existing ditches serve the City of Dover's drainage system by allowing continuous stormwater flows and eliminating flooding on Crosby Road. No changes are proposed to the wetland; therefore, this project prevents the destruction of and prevents significant changes to the wetland. The main function of these wetlands are as stormwater and stream conveyance and allowing unobstructed continued flow from Crosby Road areas. Due to low soil conductivity, recharging to groundwater is limited. It is our opinion that this project complies with Section 170.27.1(B)(2).**

SITE PLAN - LOT 2
FOR
DEL SOL DOVER, LLC
TAX MAP G, LOT No. 2-1

CROSBY ROAD

DOVER, NH

AUGUST 2024



LOCATION PLAN
(NO SCALE)

OWNER

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

OWNER SIGNATURE

SITE CIVIL ENGINEER

CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

LAND SURVEYOR

MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND
P.O. BOX 1166
181 WATSON ROAD
DOVER, NH 03821
(603) 742-0911

WETLAND/SOIL SCIENTIST

BRUCE A. GILDAY, CWS
BAG LAND CONSULTANTS
43 ROCKINGHAM STREET
CONCORD, NH 03301
(603) 228-5775

PERMIT SUMMARY/ WAIVER SUMMARY:

1. THE FOLLOWING FEDERAL AND STATE PERMITS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY:

   NHDES ALTERATION OF TERRAIN: PENDING

2. LIST ANY VARIANCES OR SPECIAL EXCEPTIONS GRANTED BY THE ZONING BOARD OF ADJUSTMENT OR CONDITIONAL USE PERMITS GRANTED BY THE PLANNING BOARD FOR THE PROPOSED USE OR STRUCTURE, INCLUDING THE CASE NUMBER AND DATE OF DECISION AND ANY CONDITIONS.

   SITE PLAN: PENDING

   CONDITIONAL USE PERMIT: PENDING

2. WAIVERS REQUESTED: THE PLANNING BOARD HAS FOUND THE CRITERIA OF CHAPTER 153-21 HAVE BEEN MET AND HAVE BEEN APPROVED THE FOLLOWING WAIVERS:

   * A WAIVER REQUEST FROM 153-13A (12) TO ALLOW A LANDSCAPE PLAN NOT SIGNED BY A NH LANDSCAPE ARCHITECT.

   * A WAIVER REQUEST FROM 153-13K (1)(b) TO ALLOW PARKING IN FRONT OF BUILDING.

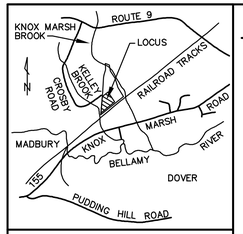
   * A WAIVER REQUEST FROM 153--13A (17) TO ALLOW RELIEF FROM PROVIDING STREETSCAPE PLANS.

WILDLIFE PROTECTION NOTES:

- ALL OBSERVATIONS OF THREATENED OR ENDANGERED SPECIES SHALL BE REPORTED IMMEDIATELY TO THE NEW HAMPSHIRE FISH AND GAME DEPARTMENT NONGAME AND ENDANGERED WILDLIFE ENVIRONMENTAL REVIEW PROGRAM BY PHONE AT 603-271-2461 AND BY EMAIL AT NHFGREVIEW@WILDLIFE.NH.GOV, EMAIL SUBJECT LINE: NHBXX-XXXX, DEL SOL DOVER LLCE, WILDLIFE SPECIES OBSERVATION.
- PHOTOGRAPHS OF THE OBSERVED SPECIES AND NEARBY ELEMENTS OF HABITAT OR AREAS OF LAND DISTURBANCE SHALL BE PROVIDED TO NHF&G IN DIGITAL FORMAT AT THE ABOVE EMAIL ADDRESS FOR VERIFICATION AS FEASIBLE.
- IN THE EVENT A THREATENED OR ENDANGERED SPECIES IS OBSERVED ON THE PROJECT SITE DURING THE TERM OF THE PERMIT, THE SPECIES SHALL NOT BE DISTURBED, HANDLED, OR HARMED IN ANY WAY PRIOR TO CONSULTATION WITH NHF&G AND IMPLEMENTATION OF CORRECTIVE ACTIONS RECOMMENDED BY NHF&G, IF ANY, TO ASSURE THE PROJECT DOES NOT APPRECIABLY JEOPARDIZE THE CONTINUED EXISTENCE OF THREATENED AND ENDANGERED SPECIES AS DEFINED IN FIS 1002.04.
- THE NHF&G, INCLUDING ITS EMPLOYEES AND AUTHORIZED AGENTS, SHALL HAVE ACCESS TO THE PROPERTY DURING THE TERM OF THE PERMIT.

SHEET IND	SHEET
COVER SHEET	1
EXISTING CONDITIONS PLAN (BY MCENEANEY SURVEY)	2
NEIGHBORHOOD PLAN	3
NOTE SHEET	4
DEMOLITION PLAN	5
SITE PLAN	6
GRADING, DRAINAGE & EROSION CONTROL PLAN	7
UTILITY PLAN	8
LIGHTING PLAN	9
LIGHTING DETAILS	10
LANDSCAPING PLAN	11
EROSION CONTROL NOTES	12
EROSION CONTROL DETAILS	13 - 14
DETAILS	15 - 19
TRUCK MOVEMENT PLAN	20

PLANNING FILE NO.: ....



LOCATION PLAN
(NO SCALE)

REFERENCE PLANS:

1.) SUBDIVISION PLAN OF LAND PREPARED FOR DEL SOL DOVER, LLC TAX MAP G, LOT No. 2–1, CROSBY ROAD, CITY of DOVER, COUNTY of STRAFFORD, STATE of NEW HAMPSHIRE. SCALE: 1" = 100'; DATED: AUGUST 5, 2024; BY THIS OFFICE.

INFORMATION FROM CITY OF DOVER G.I.S.
– WATER MAIN LOCATION AND IDENTIFICATIONS
– CATCH BASIN AND SEWER MANHOLE IDENTIFICATIONS

GAS LOCATION FROM SURFACE PAINT MARKINGS

FORMER HANSON ROAD

SMH 2876
RIM = 96.5'
INV. IN = 88.8' 8" PVC [NORTH]
INV. OUT = 88.6' 8" PVC
NEXT SMH 2875

WATER – DOVER FARAD1–020–MI
SEWER MAIN 169' SMH TO SMH

C / 1–E

VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

DMH RIM = 95.7'

36" RCP
INV. IN = 91.2'

18" RCP CULVERT
INV. IN = 92.7'
INV. OUT = 92.6'

UTILITY POLE
364A/1 1140–22

C / 2–1B

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820
5075 / 142

50' WETLAND BUFFER

SMH 2875
RIM = 96.0'
INV. IN = 88.0' 8" SMH 2876
INV. OUT = 87.9' 8" (SITE)
INV. OUT = 87.6' 8"
NEXT SMH 2874

CATCH BASIN
#7081 RIM = 95.9'
#7080 RIM = 96.0'

EXISTING EDGE OF PAVEMENT

UTILITY POLE
364A/1Y UGU DROP

SMH 2874
RIM = 95.1'
INV. IN = 86.62' 8" PVC SMH 2875
INV. OUT = 86.42' 8" PVC
NEXT = [NORTH]

UTILITY POLE

SEWER 8"ø

CROSBY ROAD
{75' WIDE R.O.W.}

PROPOSED
75' WIDE R.O.W.

915B

N36°37'58"E
93.78'

N50°00'07"E
154.91'

C1

SEWER MAIN 321' SMH TO SMH

GAS 4"ø PP

WATER – DOVER FARAD1–020–MI

HYDRANT #319

C / 1–C1

C / 1–C2

SEE NOTE 13 (TYP.)

SEE NOTE 12 (TYP.)

TP 1
EL. 95.1'

C / 1–C3

WILLIAM C. COLBATH
211 CROSBY ROAD
DOVER, NH 03820
2171 / 590

GRAVEL LANDING AREA

MON WELL 1

MON WELL 2

MON WELL 3

233B/P

313B

SITE SPECIFIC SOIL DELINEATION (TYP.)

687.64'

N03°21'27"E

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

TP 2A
EL. 92.5'

TP 2
EL. 92.7'

TP 3
EL. 94.7'

TP 5
EL. 94.1'

TP 4
EL. 93.0'

WETLAND BAG 2024

50' WETLAND BUFFER

SITE SPECIFIC SOIL BOUNDARY (TYP.)

C / 2–1

PARCEL AREA
267,845 S.F.
6.15 Ac.

NHFG DEED RESTRICTED WILDLIFE AREA #3
AREA = 92,619 S.F.
(2.13± Ac.)

533.24'
S34°14'00"E

313B

C / 2–1A

DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NH 03820
5075 / 142

50' WILDLIFE CORRIDOR

C / 5

S49°58'51"W 742.71'

BOSTON & MAINE RR
IRON HORSE PARK
500 WATER STREET J–910
JACKSONVILLE, FL 32202

NW STATE PLANE NAD 83 / GPS OBS.

SITE SPECIFIC SOIL MAP UNIT KEY

SYMBOL	SOIL TAXONOMIC NAME	HSG CLASS	DRAINAGE CLASS
233B/P	SCANTIC	D	POORLY DRAINED (P)
313B	DEERFIELD	B	MODERATELY–WELL DRAINED
915B	DEERFIELD VARIANT	B	SOMEWHAT POORLY DRAINED

SLOPE

SLOPE DESIGNATION	PERCENT SLOPE
B	0 TO 8 PERCENT

LEGEND

- S.F. – SQUARE FEET
- Ac. – ACRE
- (TYP.) – TYPICAL
- ± – MORE OR LESS
- ø – DIAMETER
- S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
- UP – UTILITY POLE
- SMH – SEWER MANHOLE
- WV – WATER SHUT–OFF
- WG – WATER GATE VALVE
- FH – FIRE HYDRANT
- —92— – CONTOUR LINE – 1' INTERVAL
- SITE SPECIFIC SOIL LINE
- 313B – SITE SPECIFIC SOIL TYPE
- EDGE OF WETLAND
- WETLAND
- WETLAND BUFFER

NOTES:

1.) OWNERS OF RECORD:
DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NEW HAMPSHIRE 03820
S.C.R.D. VOL. 5075, PAGE 142

2.) C / 2–1 – DENOTES TAX MAP AND PARCEL NUMBER.

3.) PLAN INTENT: TO DEPICT THE PARCEL EXISTING CONDITIONS.

4.) PARCEL AREA = 267,845 S.F. / 6.15 Ac.

5.) ZONING DISTRICT: COMMERCIAL MANUFACTURING (CM) DISTRICT:

MINIMUM LOT SIZE	= 20,000 S.F.
LOT COVERAGE	= 50 PERCENT
MINIMUM FRONTAGE	= 100 FEET
FRONT SETBACK	= 35 FEET
SIDE SETBACK	= 10 FEET MIN.
REAR SETBACK	= 10 FEET MIN.
BUILDING HEIGHT	= 50 FEET MAX.

6.) THE SUBJECT PARCEL IS LOCATED OUTSIDE OF THE 0.2 PERCENT ANNUAL CHANCE FLOODPLAIN AS SHOWN ON FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 330145; PANELS 0310 & 0320; SUFFIX E; MAP NUMBERS 33017C0310E & 33017C0320E; EFFECTIVE DATE SEPTEMBER 30, 2015.

7.) BASIS OF BEARING IS NH STATE PLANE (NAD83) BASED ON GPS OBSERVATION DATED JANUARY 22, 2021.

8.) PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND DURING JANUARY 2021 WITH AN ERROR NOT GREATER THAN 1 IN 10,000

9.) HANSON ROAD (A/K/A HANSON WAY) IS AN UNIMPROVED 33' WIDE ROAD. THE CITY OF DOVER DISCONTINUED HANSON ROAD AS A PUBLIC WAY WITH THE 2008 RESOLUTION, R–2008.05.14–80. PER ACCEPTED PRACTICE, TITLE TO THE UNDERLYING LAND OF THE ROAD EXTENDS TO THE CENTERLINE FOR ABUTTING PARCELS. THE USE RIGHTS OF THE ENTIRE WIDTH OF HANSON ROAD MAY EXIST FOR ABUTTING OWNERS.

10.) WETLANDS ONSITE WERE IDENTIFIED UTILIZING THE 1987 FEDERAL TECHNICAL REPORT. THE DELINEATION WAS PERFORMED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CWS 088); 43 ROCKINGHAM STREET, CONCORD, NH 03301.

11.) SITE SPECIFIC SOIL MAPPING WAS PERFORMED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012); 43 ROCKINGHAM STREET, CONCORD, NH 03301. SEE REPORT DATED MAY 29, 2024.

12.) MONITOR WELLS 1, 2 & 3 MAINTAINED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012, CWS 088); 43 ROCKINGHAM STREET, CONCORD, NH 03301.

13.) SOIL TEST PITS 1 THROUGH 5 OBSERVED AUGUST 5, 2024 BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012, CWS 088); 43 ROCKINGHAM STREET, CONCORD, NH 03301.
ESTIMATED SEASONAL HIGH WATER TABLE (ESHWT) DEPTHS:
TPIT 1 = 22 INCHES, TPIT 2 = 13 INCHES, TPIT 2A = 24 INCHES
TPIT 3 = 21 INCHES, TPIT 4 = 12 INCHES, TPIT 5 = 19 INCHES.

No.	Central Angle	Radius	Arc Length	Chord Length	Chord Bearing
C1	13°22'09"	337.50	78.75	78.57	N43°19'02"E

NO.	DATE	DESCRIPTION	BY	CHK

CNE 18043 REVISIONS

24–2210	EXIST. COND.	–	–
PROJECT NO	TYPE	FIELDBOOK & PAGES	

EXISTING CONDITIONS PLAN
PREPARED FOR
DEL SOL DOVER, LLC
TAX MAP G, LOT No. 2–1
CROSBY ROAD
CITY of DOVER
COUNTY of STRAFFORD
STATE of NEW HAMPSHIRE

DOVER PLANNING FILE No. SITE 2024

DRAWN BY: RJM	FILE: 2210\D\G–2–13LOTROAD40sc
SCALE: 1" = 40'	DATE: AUGUST 5, 2024

40 20 0 20 40 80 120 160

STATE OF NEW HAMPSHIRE No. 661 KEVIN M. McENEANEY LICENSED LAND SURVEYOR SIGNATURE

McEneaney Survey Associates of NEW ENGLAND
P.O. Box 1166 – 181 WATSON ROAD
DOVER, NH 03820 (603) 742–0911

SURVEYING – PLANNING – CONSULTING

8/7/2024 09:06:31 File: M:\2210\Drawings\G-2-1 3LOT ROAD 40sc.dwg Layout: G-2-1 EC 2024

ABUTTERS LIST
(WITHIN 200 FT)

TAX MAP	LOT NO.	NAME & ADDRESS
G 2-1-0	2-1-0	DEL SOL DOVER LLC 340 CENTRAL AVE STE 202Y DOVER, NH 03820
G 2-0-0	2-0-0	WESTFIELD LLC 340 CENTRAL AVE STE 202 DOVER, NH 03820
G 1-L-0	1-L-0	CHAUVIN ARNOUX INC. 15 FARADAT DRIVE DOVER, NH 03820
G 1-E-0	1-E-0	VIRTOUS REALITYLLC C/O TURBOCAM INC. 607 CALEF HIGHWAY #200 BARRINGTON, NH 03825-7237
G 1-D-0	1-D-0	BETTS-LEVINE DEREK S TRUSTEE R AND R REAL ESTATE TRUST FARADAY DRIVE DOVER, NH 0382
G 1-B-0	1-B-0	MCQUADE REALTY INC. P.O. BOX 1409 DOVER, NH 03820
G 1-C-1	1-C-1	AI SOLUTIONS INC 1735 FIFTH AVENUE MCKEESPORT, PA 15132
G 1-C-2	1-C-2	AI SOLUTIONS INC 1735 FIFTH AVENUE MCKEESPORT, PA 15132
G 1-C-3	1-C-3	COLBATH WILLIAM C 211 CROSBY ROAD DOVER, NH 03820
G 5-0-0	5-0-0	BOSTON & MAINE RR IRON HORSE PARK 500 WATER STREET J-910 JACKSON, FL 32202
H 38-0-0	38-0-0	CRAGIN PATRICK J TRUSTEE CRAGIN PATRICK J LIVING REV TRUST P.O. BOX 250 DOVER, NH 03820
H 37-A-0	37-A-0	239 KNOX MARSH REALTY LLC P.O. OX 720 MIDDLETON, MA 01949
H 36-B-1	36-B-1	NSA OPTIVEST ACQUISITION HOLDINGS LLC 24901 DANA PT HARBOR DRIVE #200 DANA POINT, CA 92629

GRAPHIC SCALE

80 0 40 80 160 320

(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: 1"=80'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

NEIGHBORHOOD PLAN

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

3

DOVER NOTES:

1. THE OWNERS OF RECORD:
   DEL SOL DOVER, LLC
   340 CENTRAL AVENUE, SUITE 202
   DOVER, NEW HAMPSHIRE 03820
   S.C.R.D. VOL. 5075, PAGE 142
2. D/11-8 – DENOTES TAX MAP AND PARCEL NUMBER.
3. PLAN INTENT: TO DEPICT THE PARCEL EXISTING CONDITIONS.
4. PARCEL AREA = 267,845 S.F. / 6.15 Ac.
5. ZONING DISTRICT: COMMERCIAL MANUFACTURING (CM) DISTRICT:

	REQUIRED	PROPOSED
MINIMUM LOT SIZE	= 20,000 S.F.	267,845
LOT COVERAGE	= 50 PERCENT	±19%
MINIMUM FRONTAGE	= 100 FEET	327 FEET
FRONT SETBACK	= 35 FEET	67 FEET
SIDE SETBACK	= 10 FEET MIN.	77 FEET
REAR SETBACK	= 10 FEET MIN.	353 FEET
BUILDING HEIGHT	= 50 FEET MAX.	24'8"

6. THE SUBJECT PARCEL IS LOCATED OUTSIDE OF THE 0.2 PERCENT ANNUAL CHANCE FLOODPLAIN AS SHOWN ON FLOOD INSURANCE RATE MAP COMMUNITY NUMBER 330145; PANELS 0310 & 0320; SUFFIX E; MAP NUMBERS 33017C0310E & 33017C0320E; EFFECTIVE DATE SEPTEMBER 30, 2015,
7. BASIS OF BEARING IS NH STATE PLANE (NAD83) BASED ON GPS OBSERVATION DATED JANUARY 22, 2021.
8. PROPERTY LINE INFORMATION HAS BEEN OBTAINED FROM A SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATES OF NEW ENGLAND DURING JANUARY 2021 WITH AN ERROR NOT GREATER THAN 1 IN 10,000.
9. HANSON ROAD (A/K/A HANSON WAY) IS AN UNIMPROVED 33'WIDE ROAD. THE CITY OF DOVER DISCONTINUED HANSON ROAD AS A PUBLIC WAY WITH THE 2008 RESOLUTION, R-2008.05.14-80. PER ACCEPTED PRACTICE, TITLE TO THE UNDERLYING LAND OF THE ROAD EXTENDS TO THE CENTERLINE FOR ABUTTING PARCELS. THE USE RIGHTS OF THE ENTIRE WIDTH OF HANSON ROAD MAY EXIST FOR ABUTTING OWNERS.
10. WETLANDS ONSITE WERE IDENTIFIED UTILIZING THE 1987 FEDERAL TECHNICAL REPORT. THE DELINEATION WAS PERFORMED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CWS 018); 43 ROCKINGHAM STREET, CONCORD, NH 03301. JULY 2024.
11. SITE SPECIFIC SOIL MAPPING WAS PERFORMED BY BAG LAND CONSULTANTS (BRUCE A. GILDAY, CSS 012); 43 ROCKINGHAM STREET, CONCORD, NH 03301. SEE REPORT DATED MAY 29, 2024. UPDATED JULY 2024.
12. LIST ANY VARIANCE OR SPECIAL EXCEPTIONS GRANTED BY THE ZONING BOARD OF ADJUSTMENT OR CONDITIONAL USE PERMITS GRANTED BY THE PLANNING BOARD FOR THE PROPOSED USE OR STRUCTURE, INCLUDING THE CASE NUMBER AND DATE OF DECISION AND ANY CONDITIONS. (SEE PROJECT VARIANCE/PERMIT SECTION)
13. AS-BUILT PLANS OF THE SUBDIVISION SHALL BE SUBMITTED ON PAPER AND IN DIGITAL FORMAT AUTOCAD DWG, AUTOCAD DXF OR ESRI FORMAT TO THE CITY OF DOVER ENGINEER'S OFFICE UPON COMPLETION OF PROJECT IF A STREET IS PROPOSED FOR CITY ACCEPTANCE. AS-BUILT PLANS SHALL BE PREPARED AND CERTIFIED CORRECT BY A L.L.S. OR P.E. DIGITAL FILES SHALL BE GEO-REFERENCED TO NEW HAMPSHIRE STATE PLANE COORDINATES NAD83 AND SHALL BE EXPRESSED IN FEET.
14. THE INSTALLATION OF ELECTRIC POWER, CABLE TELEVISION AND TELEPHONE LINES SHALL BE UNDERGROUND THROUGHOUT THE SITE FOR WHICH DEVELOPMENT IS PROPOSED.
15. THE SUBJECT PARCEL IS SERVED BY MUNICIPAL WATER AND SEWER.
16. ALL CONSTRUCTION SHALL CONFORM WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION (NHDOT) "STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION" AND WITH THE CITY OF DOVER COMMUNITY SERVICES REGULATIONS AND STANDARD SPECIFICATION FOR CONSTRUCTION. THE MORE STRINGENT SPECIFICATION SHALL APPLY.
17. EROSION CONTROL NOTES INCLUDE PROVISIONS FOR CONSTRUCTION SEQUENCING, TEMPORARY EROSION CONTROL MEASURES, AND PERMANENT STANDARDS SUCH AS LOAM SPREAD RATE FOR DISTURBED AREAS, RATES OF LIME, TYPE AND RATES FOR FERTILIZER, AND SEED AND MULCH MIXTURE WITH RATES OF APPLICATION.
18. THE LIMITS OF CONSTRUCTION DISTURBANCE THAT ARE LOCATED IN OR WITHIN 50 FT. OF CONSERVATION AND WETLAND DISTRICTS SHALL BE STAKED, FLAGGED AND CLEARLY IDENTIFIED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.
19. ALL TREATMENT SWALES TO BE CONSTRUCTED SHALL HAVE SOD BOTTOMS.
20. A LETTER OF CREDIT FOR THE COST OF REVEGETATING ALL DISTURBED AREAS ON THE SITE SHALL BE SUBMITTED, AND THE APPROVED CONSTRUCTION SIGN INSTALLED PRIOR TO ANY EARTH DISTURBING ACTIVITY OCCURS.
21. A PRE-CONSTRUCTION CONFERENCE WITH THE DEVELOPER, THE DESIGN ENGINEER, THE EARTHWORK CONTRACTOR AND THE CITY ENGINEER SHALL OCCUR PRIOR TO ANY EARTH DISTURBING ACTIVITY.
22. SITE CONSTRUCTION HOURS SHALL BE LIMITED TO MONDAY-FRIDAY 7 AM-6 PM. HOURS OF CONSTRUCTION MUST BE DOCUMENTED ON A SITE CONSTRUCTION SIGN ALONG WITH THE CONTACT INFORMATION FOR THE GENERAL CONTRACTOR. SAID SIGNAGE MUST BE LOCATED AND APPROVED BY THE CITY ENGINEER OR PLANNING DIRECTOR. WORK PRECLUDED ON SUNDAYS AND FEDERAL HOLIDAYS.
23. BUILDING ADDRESSES (INCLUDING APT/UNIT NUMBERS, IF APPLICABLE) SHALL BE ASSIGNED BY THE BUILDING OFFICIAL AT THE TIME OF ISSUANCE OF A BUILDING PERMIT. THE PROPOSED USE FOR THE SITE IS LIGHT MANUFACTURING.
24. THE FOLLOWING FEDERAL AND STATE PERMINTS HAVE BEEN ISSUED FOR THE SUBJECT PROPERTY: (SEE PROJECT VARIANCE/PERMIT SECTION)

DOVER NOTES CONTINUED:

25. COMMERCIAL VEHICLE ROUTE DURING CONSTRUCTION SHALL CONFORM TO DOVER CITY CODE OR BE COORDINATED WITH THE COMMUNITY SERVICES DIRECTOR.
26. ANY RETAINING WALL TALLER THAN FOUR FEET (4') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
27. ANY FENCE TALLER THAN SEVEN FEET (7') REQUIRES THE ISSUANCE OF A BUILDING PERMIT FROM INSPECTION SERVICES.
28. APPLICANT SHALL COMPLETE LAND USE DEVELOPMENT TRACKING FORM, MOST RECENTLY REVISED VERSION, UTILIZING THE ONLINE POLLUTION TRACKING AND ACCOUNTING PILOT PROJECT (PTAPP) PORTAL.
    HTTPS://PTAPP.UNH.EDU/
29. IF APPLICABLE, THE OWNER OF RECORD SHALL RECORD AT THE REGISTRY OF DEEDS DOCUMENTATION SUFFICIENT TO PROVIDE NOTICE TO ALL PERSONS/ENTITIES THAT MAY ACQUIRE ANY PROPERTY SUBJECT TO THE REQUIREMENTS AND RESPONSIBILITIES DESCRIBED IN THE APPROVED STORMWATER MANAGEMENT PLAN. THE NOTICE SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS FOR RECORDING CONTAINED IN RSA 477 AND 478. THE NOTICE NEED NOT SET FORTH THE REQUIREMENTS AT LENGTH, SO LONG AS IT IS SUFFICIENT TO PROVIDE NOTICE TO PROSPECTIVE PURCHASERS TO THE REQUIREMENTS FOR MAINTENANCE AND REPORTING.
30. FIRE DEPARTMENT ACCESS ROAD(S) SHALL BE INSTALLED AND MAINTAINED TO SUPPORT THE IMPOSED LOADS OF FIRE APPARATUS IN ALL WEATHER CONDITIONS AT ALL TIMES.
31. THE MAXIMUM PARKING SPACE CALCULATION IS 59, INCLUDING 3 ACCESSIBLE SPACES, AND 45, INCLUDING 4 ACCESSIBLE SPACES, ARE PROVIDED.
32. EXTERIOR LIGHTING SHALL BE CUT-OFF TYPE FIXTURES PER CHAPTER 153-14-E AND SHALL PROVIDE LIGHTING DIRECTED ON-SITE ONLY.
33. TOPOGRAPHIC SURVEY PERFORMED BY MCENEANEY SURVEY ASSOCIATE, OCTOBER 2022.
34. ELEVATIONS DEPICTED ARE BASED ON INFORMATION OBTAINED FROM THE CITY ENGINEER'S OFFICE AND WAS DERIVED FROM COORDINATES FOR CONTROL STATIONS TR390 AND TR391A. THESE COORDINATES HAVE NOT BEEN ADJUSTED TO 1983 DATUM.
35. A SECURITY SYSTEM SHALL BE INSTALLED AS REQUIRED BY CHAPTER 45, ARTICLE I, SECTION 45-2 OF THE CODE OF THE CITY OF DOVER. (AS APPLICABLE)
36. APPROVED BACKFLOW PREVENTERS SHALL BE PROVIDED FOR BOTH FIRE AND DOMESTIC WATER LINES.
37. THE PROPOSED STRUCTURES SHALL BE SERVED BY A SPRINKLER SYSTEM AS REQUIRED BY CHAPTER 81- 30 OF THE CODE OF THE CITY OF DOVER AND THE ADOPTED STATE OF NH BUILDING AND FIRE CODES.
38. SPRINKLER CONNECTIONS MUST BE FLUSHED IN ACCORDANCE WITH NFPA 24 AND A CONTRACTOR'S MATERIAL AND TEST CERTIFICATE FOR UNDERGROUND PIPING FORM MUST BE COMPLETED AND APPROVED BY INSPECTION SERVICES PRIOR TO CONNECTION OF THE BACKFLOW DEVICE.
39. FIRE DEPARTMENT CONNECTION(S) SHALL BE LOCATED ON THE STREET SIDE OF THE BUILDING PER NFPA 13. ACCESS TO THE FDC SHALL MAINTAIN A CLEAR AND UNOBSTRUCTED PATH AT ALL TIMES.
40. THE SITE LAYOUT IS DESIGNED IN COMPLIANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. THE PROPOSED STRUCTURE WILL ALSO BE DESIGNED IN ACCORDANCE WITH APPLICABLE ACCESSIBILITY REGULATIONS. (I.E. IBC, ANSI-117.1) AND NH RSA 155-A:5.
41. DESIGN ENGINEER SHALL PROVIDE SIGNED LETTER TO CITY ENGINEER CERTIFYING THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS.
42. ALL MANHOLE COVERS SHALL BE LIFTMATE R-1743-LM OR APPROVED EQUAL WITH 90 DEGREE HINGE.
43. REQUIRED BLASTING AND EXCAVATION – DOVER FIRE DEPARTMENT SHALL BE NOTIFIED PRIOR TO ANY BLASTING ACTIVITIES AND A BLASTING PERMIT FROM THE DOVER FIRE DEPARTMENT MUST BE OBTAINED.
44. THE WATER MAIN SHALL BE POLY WRAPPED IN ACCORDANCE WITH THE CITY OF DOVER STANDARDS.
45. ALL SEWER MAINS AND MANHOLES SHALL BE TESTED IN ACCORDANCE WITH NHDES ENV-WQ 700 REQUIREMENTS. COPIES OF TEST RESULTS SHALL BE PROVIDED TO THECITY OF DOVER ENGINEERING DEPARTMENT.
46. WETLAND PLACARDS SHOULD IDENTIFY THE NO CUT WETLAND BUFFER AND SHOULD BE MAINTAINED THROUGHOUT CONSTRUCTION AND AFTER.
47. ALL FITTINGS MUST BE CLASS 140 WATER FITTINGS.
48. ALL GATE VALVES MUST BE MANUFACTURED BY MUELLER OR CLOW.

DEMOLITION NOTES:

1. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
2. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
3. THE CONTRACTOR SHALL NOTIFY "DIG SAFE" PRIOR TO ANY DEMOLITION/ CONSTRUCTION ACTIVITIES. (811).
4. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, UTILITIES AND PAVEMENT ON THE SITE TO THE LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO FAMILIARIZE HIMSELF WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
6. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS NOT ALREADY OBTAINED BY THE OWNER AND ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
8. STONES FROM REMOVED STONEWALLS SHALL REMAIN ON-SITE. STONES SHALL BE REPURPOSED ON-SITE AND SHALL NOT BE USED AS FILL.
9. THE LOCATION OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATION IS NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
10. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES, AND CODES.
11. LEDGE REMOVAL VOLUMES ARE ENGINEERS ESTIMATES. CONTRACTOR IS RESPONSIBLE FOR CONDUCTING ADDITIONAL SUBSURFACE INVESTIGATIONS IF NECESSARY TO DETERMINE ESTIMATED VOLUMES.

SITE NOTES

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO APPLICABLE CITY AND STATE CODES.
3. ALL CONSTRUCTION LAYOUT SHALL BE DONE BY A LICENSED SURVEYOR UNDER CONTRACT WITH THE CONTRACTOR.
4. SEE DETAILS FOR SIGN LEGENDS.
5. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", THE "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICAN WITH DISABILITIES ACT, LATEST EDITIONS.
6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE CONSTRUCTION PROCEDURES AND SEQUENCE TO ENSURE THE SAFETY OF THE FACILITIES AND THEIR COMPONENTS DURING DEMOLITION AND CONSTRUCTION UNLESS OTHERWISE DIRECTED BY THE OWNERS REPRESENTATIVE. THIS INCLUDES THE ADDITION OF NECESSARY SHORING, SHEETING, TEMPORARY BRACING, GUYS OR TIE-DOWNS. SUCH MATERIALS SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AT THE COMPLETION OF THE PROJECT.
7. METHODS OF DEMOLITION, CONSTRUCTION AND ERECTION ARE THE CONTRACTOR'S RESPONSIBILITY UNLESS OTHERWISE SPECIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN ENVIRONMENTAL CONTROLS AS REQUIRED BY FEDERAL, STATE AND MUNICIPAL REGULATIONS AND PERMITS. ENVIRONMENTAL CONTROLS SHALL INCLUDE BUT SHALL NOT BE LIMITED TO DUST CONTROL AND SILT BARRIERS.
8. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE DONE TO STRUCTURES OR UTILITIES OR INJURIES TO THE PUBLIC DURING THE CONSTRUCTION PHASE CAUSED BY HIMSELF, HIS EMPLOYEES, HIS SUBCONTRACTORS OR EMPLOYEES OF SAME. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL TEMPORARY FACILITIES FOR THE PROTECTION OF THE WORK, WORKERS AND PUBLIC SAFETY.
9. THE SITE SHALL BE MAINTAINED TO PROVIDE ACCESSIBILITY IN ALL WEATHER CONDITIONS.
10. REFUSE PICKUP WILL BE BY PRIVATE CONTRACTOR AND WILL BE VIA DUMPSTER ON-SITE.
11. SNOW STORAGE WILL BE ACCORDING TO THE OPERATION AND MAINTENANCE PLAN AND WITHIN AREAS AS INDICATED. ON-SITE SNOW STORAGE SHALL OCCUR ALONG THE EDGES OF PROPOSED PAVEMENT.
12. ALL EXTERIOR DOORS ARE MANUAL AND OPENED FROM THE INTERIOR BY PANIC HARDWARE. ALL EXTERIOR DOORS SHALL COMPLY WITH ADA AND ALL LOCAL BUILDING CODE REQUIREMENTS.

GRADING NOTES:

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. CONTRACTOR SHALL RETAIN A GEOTECHNICAL ENGINEERING CONSULTANT APPROVED BY THE OWNER, TO CONDUCT COMPACTION TESTING AND FILL GRADATION MONITORING.
3. SEE EROSION CONTROL NOTES & DETAIL SHEET FOR TEMPORARY AND PERMANENT EROSION CONTROL MEASURES.
4. ALL DRAINAGE PIPES SHALL BE HDPE OR APPROVED EQUAL UNLESS OTHERWISE NOTED.
5. ALL DISTURBED AREAS NOT OTHERWISE CALLED FOR SURFACE TREATMENT SHALL RECEIVE 6" OF HIGH QUALITY LOAM AND SHALL BE SEEDED WITH GRASS.
6. ALL SITEWORK CONSTRUCTION SHALL BE ADVANCED USING "BEST MANAGEMENT PRACTICES" SANCTIONED BY THE USDA, SCS AND NHDES.
7. TEMPORARY CONSTRUCTION ENTRANCE SHALL BE INSTALLED, UTILIZED AND MAINTAINED UNTIL BASE MATERIALS ARE CONSTRUCTED.
8. CONTRACTOR SHALL PROVIDE A FINISH GRADED SURFACE FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCE AND UNDER RAISED STRUCTURES.
9. PROVIDE INLET PROTECTION BARRIERS AROUND ALL EXISTING AND PROPOSED STORM DRAINAGE INLETS WITHIN THE WORK LIMITS AND AS SHOWN ON PLAN. MAINTAIN FOR THE DURATION OF THE PROJECT UNTIL PAVEMENT HAS BEEN INSTALLED AND UPSTREAM AREAS HAVE BEEN STABILIZED.
10. INSPECT SILT BARRIERS AFTER EACH RAIN STORM OF 1/4 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF THE FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE STRUCTURE HEIGHT.
11. A STORMWATER POLLUTION PREVENTION PLAN (SWPPP) IS REQUIRED FOR THIS PROJECT. THE SWPPP MUST INCLUDE THE APPROPRIATE BEST MANAGEMENT PRACTICES (BMP'S) TO MINIMIZE THE DISCHARGE OF POLLUTANTS FROM THE SITE. PARTIES RESPONSIBLE FOR DEVELOPING THE SWPPP SHOULD REFER TO THE EPA NPDES CONSTRUCTION GENERAL PERMITS NOTICE OF INTENT FOR A COMPLETE OUTLINE OF REQUIRED ELEMENTS. THESE PLANS AND THE STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN PREPARED FOR THIS PROJECT MAY BE UTILIZED IN FULFILLING THE REQUIREMENTS.
12. LIMIT TREE CLEARING TO ONLY THE EXTENT NECESSARY FOR CONSTRUCTION.
13. CONTRACTOR SHALL NOTIFY THE CITY OF DOVER AND THE DESIGN ENGINEER 48 HOURS PRIOR TO THE INSTALLATION OF PERMANENT STORMWATER BMP'S TO PROVIDE THE CITY AND THE ENGINEER THE OPPORTUNITY TO WITNESS THE CONSTRUCTION AND MATERIALS. THE DESIGN ENGINEER MUST CERTIFY THAT THE STORMWATER MANAGEMENT SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH THE APPROVED PLANS.
14. DENSITY REQUIREMENTS:

LOCATION	MINIMUM DENSITY
BELOW PAVED OR CONCRETE AREAS	95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL BELOW LOAM AND SEED AREA	90%

*ALL PERCENTAGES SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH AASHTO STANDARD 180, METHOD C. FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH AASHTO STANDARD T-191, T-204, OR T-238 AND T-239.

UTILITY NOTES

1. REVIEW DOVER NOTES FOR ALL APPLICABLE NOTES.
2. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
5. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
6. ALL WATER MAIN INSTALLATIONS SHALL BE CLASS 52, DOUBLE CEMENT LINED DUCTILE IRON PIPE OR TYPE "K" COPPER, OR CITY APPROVED MATERIAL.
7. ALL WATER MAIN INSTALLATIONS SHALL BE PRESSURE TESTED AND CHLORINATED AFTER CONSTRUCTION PRIOR TO ACTIVATING THE SYSTEM. CONTRACTOR SHALL COORDINATE CHLORINATION AND TESTING WITH THE CITY OF DOVER WATER DEPARTMENT.
8. ALL GRAVITY SEWER PIPE SHALL BE PVC SDR 35 UNLESS OTHERWISE NOTED AND CONFORM TO THE REQUIREMENTS OF THE CITY OF DOVER SEWER DEPARTMENT STANDARDS.
9. EXISTING UTILITIES TO BE REMOVED SHALL BE CAPPED AT THE MAIN AND MEET THE CITY OF DOVER COMMUNITY SERVICES DEPARTMENT STANDARDS FOR CAPPING OF WATER AND SEWER SERVICES.
10. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
11. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE UTILITY COMPANIES.
12. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
13. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
14. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
15. CONTRACTOR SHALL PROVIDE EXCAVATION, BEDDING, BACKFILL AND COMPACTION FOR NATURAL GAS SERVICES. COORDINATE WITH GAS COMPANY.
16. A 10-FOOT MINIMUM EDGE TO EDGE HORIZONTAL SEPARATION SHALL BE PROVIDED BETWEEN ALL WATER AND SANITARY SEWER LINES. AN 18-INCH MINIMUM OUTSIDE TO OUTSIDE VERTICAL SEPARATION SHALL BE PROVIDED AT ALL WATER/SANITARY SEWER CROSSINGS.
17. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
18. SAWCUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
19. GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF DOVER.
20. COORDINATE TESTING OF SEWER CONSTRUCTION WITH THE CITY OF DOVER.
21. CONTRACTOR SHALL COORDINATE ALL ELECTRIC WORK INCLUDING BUT NOT LIMITED TO: CONDUIT CONSTRUCTION, MANHOLE CONSTRUCTION, UTILITY POLE CONSTRUCTION, OVERHEAD WIRE RELOCATION, AND TRANSFORMER CONSTRUCTION WITH POWER COMPANY.
22. CONTRACTOR SHALL PHASE UTILITY CONSTRUCTION, PARTICULARLY WATER MAIN AND GAS MAIN CONSTRUCTION AS TO MAINTAIN CONTINUOUS SERVICE TO ABUTTING PROPERTIES. CONTRACTOR SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED ABUTTER.
23. SITE LIGHTING SPECIFICATIONS, CONDUIT LAYOUT AND CIRCUITRY FOR PROPOSED SITE LIGHTING AND SIGN ILLUMINATION SHALL BE PREPARED BY THE PROJECT ELECTRICAL ENGINEER.
24. THE PROPOSED STRUCTURE SHALL COMPLY WITH CHAPTER 81, ARTICLE IV, SECTION 81-27 AND THE STATE BUILDING CODES OF THE CODE OF THE CITY OF DOVER.
25. FIRE SUPPRESSION PLANS SHALL BE PROVIDED TO THE FIRE/INSPECTION DEPARTMENT PRIOR TO INSTALLATION AS APPROPRIATE.
26. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
27. SEWAGE LOADING
    9,600 S.F. SPECIALTY TRADE CONTRACTOR BUILDING
    4,600 S.F. OFFICE
    5,000 S.F. WAREHOUSE
    ESTIMATED # EMPLOYEES = 30
    PER NHDES ENV-WQ1008.03 TABLE 1008-1:
    UNSPECIFIED OFFICE SPACE = 5 GPD/100 S.F.
    WAREHOUSE = 10 GPD/ PERSON
    DESIGN FLOW
    OFFICE = 4,600 S.F. x 5 GPD/100 S.F. = 230 GPD
    WAREHOUSE = 30 EMP'S x 10 GPD/EMPL. = 300 GPD
    TOTAL = 530 GPD
28. PUMP CHAMBERS ARE UNCLASSIFIED.
29. AN EASEMENT WILL BE GRANTED TO THE CITY ALONG THE WATER LINES TO ALLOW ACCESS FOR OPERATION OF THE WATER INFRASTRUCTURE TO MAINTAIN WATER QUALITY.

UTILITY CONTACTS

NATURAL GAS: –
CONTACT: UNITIL CORPORATION
DAVID MACLEAN
325 WEST ROAD
PORTSMOUTH, NH 03801
TEL: (603)-294-5261
EMAIL: MACLEAND@UNITIL.COM

WATER & SEWER: –
CONTACT: CITY OF DOVER COMMUNITY SERVICES DEPARTMENT
PUBLIC WORKS & UTILITIES
KEN MAVROGEORGE, PE
271 MAST ROAD
DOVER, NH 03820
TEL: (603)-516-6450
EMAIL: K.MAVROGEORGE@DOVER.NH.GOV

ELECTRIC: –
CONTACT: EVERSOURCE
TREVER EMMONS
4 OLD DOVER ROAD
ROCHESTER, NH 03867
TEL: (603)-332-7515
EMAIL: TREVER.EMMONS@EVERSOURCE.COM

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

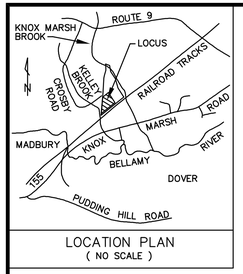
NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: N.T.S
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

NOTE SHEET



LOCATION PLAN
(NO SCALE)

INFORMATION FROM CITY OF DOVER G.I.S.
– WATER MAIN LOCATION AND IDENTIFICATIONS
– CATCH BASIN AND SEWER MANHOLE IDENTIFICATIONS

GAS LOCATION FROM SURFACE PAINT MARKINGS

FORMER HANSON ROAD

50' WETLAND BUFFER

SMH 2876
RIM = 96.5'
INV. IN = 88.8' 8" PVC [NORTH]
INV. OUT = 88.6' 8" PVC
NEXT SMH 2875

WATER – DOVER FARAD1–020–MI

SEWER MAIN

SMH 2875
RIM = 96.0'
INV. IN = 88.0' 8" SMH 2876
INV. IN = 87.9' 8" (SITE)
INV. OUT = 87.6' 8"
NEXT SMH 2874

CATCH BASIN #7080 RIM = 96.0'

CATCH BASIN #7081 RIM = 95.9'

UTILITY POLE 364A/1Y UGU DROP

EXISTING EDGE OF PAVEMENT

UTILITY POLE 364A/1 1140–22

CROSBY ROAD
{75' WIDE R.O.W.}

PUBLIC R.O.W. 75'

74
95.1'
= 86.62' 8" PVC SMH 2875
T = 86.42' 8" PVC
[NORTH]

SEWER 8"ø

SEWER MAIN

PW — GAS 4"PW/PP — PW — PW — PW

LOCATION PLAN
(NO SCALE)

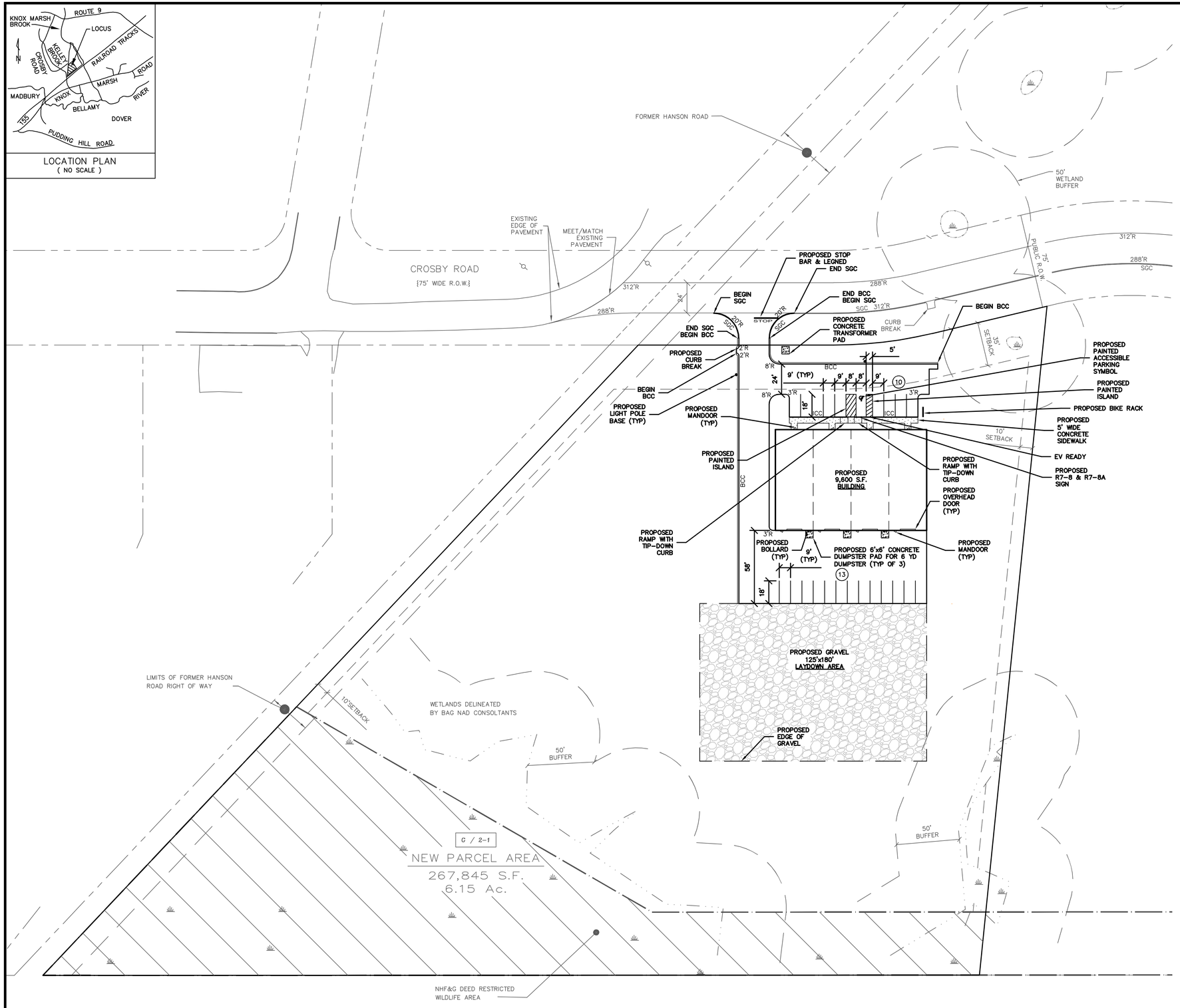
LEGEND

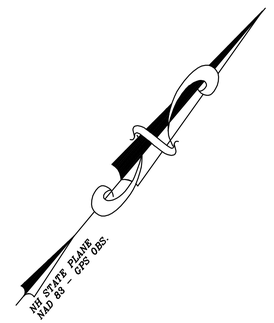
- Ac. – ACRE
- (TYP.) – TYPICAL
- ± – MORE OR LESS
- ⌀ – DIAMETER
- S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
- UP – UTILITY POLE
- FIRE HYDRANT
- WETLAND
- EDGE OF WETLAND
- WETLAND BUFFER
- 312'R – PAVEMENT RADUIS
- SGC – SLOPED GRANITE CURB
- ICC – INTERGRATED CONCRETE CURB
- BCC – BITUMINOUS CONRETE CURB
- ACCESIBLE PARKING SYMBOL
- PROPOSED SIDEWALK
- PROPOSED GRAVEL

PARKING CALCULATIONS

OFFICE 1 SPACE/300 S.F.
INDUSTRIAL 1 SPACE/800 S.F.

OFFICE: 4,600 S.F./300	= 16
INDUSTRIAL: 5,200 S.F./800	= 7
ALLOWED	= 23
PROVIDED	= 23





GRAPHIC SCALE

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(IN FEET)

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CNE
CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
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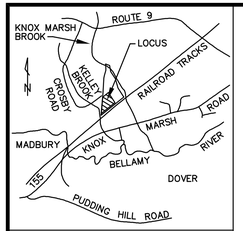
SITE PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

6



LOCATION PLAN
(NO SCALE)

INFORMATION FROM CITY OF DOVER G.I.S.
– WATER MAIN LOCATION AND IDENTIFICATIONS
– CATCH BASIN AND SEWER MANHOLE IDENTIFICATIONS

GAS LOCATION FROM SURFACE PAINT MARKINGS

FORMER HANSON ROAD

WATER – DOVER PARAD1–020–MI

CATCH BASIN #7080 RIM = 96.0'

CATCH BASIN #7081 RIM = 95.9'

TBM RIM =96.0

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

GAS 4"ø PP

WATER – DOVER PARAD1–026–MI

HYDRANT #319

50' WETLAND BUFFER

PUBLIC R.O.W. 75'

PROPOSED CONSTRUCTION ENTRANCE

35' SETBACK

10' SETBACK

BUFFER IMPACT "A"

BUFFER IMPACT "B"

BUFFER IMPACT "C"

BIORETENTION POND 1 W/ ISR (BIO1 W/ ISR)

BIORETENTION POND 2 W/ ISR (BIO2 W/ ISR)

PROPOSED 9,600 S.F. BUILDING
F.F.=98.75

TC=98.65
BC=98.15

H.P.

INV. 93.0

INV. 92.75

PROPOSED RIP–RAP 1

PROPOSED RIP–RAP 2

PROPOSED SILTSOXX

MON WELL 1

MON WELL 2

MON WELL 3

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

WETLANDS DELINEATED BY BAG NAD CONSOLTANTS

TP 2A

TP2

TP3

TP5

50' BUFFER

C / 2–1

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

NHF&G DEED RESTRICTED WILDLIFE AREA

LEGEND

S.F. – SQUARE FEET
Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
ø – DIAMETER
S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
UP – UTILITY POLE
SMH – SEWER MANHOLE
WV – WATER SHUT–OFF
– WATER GATE VALVE
– FIRE HYDRANT
92 – CONTOUR LINE – 1' INTERVAL
– EDGE OF WETLAND
– WETLAND
– WETLAND BUFFER
92.0 – PROPOSED FINISH GRADE
x 92.0 – PROPOSED SPOT ELEVATIONS
PD – PROPOSED DRAIN LINE

CONDITIONAL USE PERMIT
WETLAND BUFFER IMPACTS

IMPACT	AREA
A	104.3 S.F.
B	354.7 S.F.
C	327.5 S.F.
TOTAL	786.5 S.F.

NH STATE PLANE NAD 83 – GPS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

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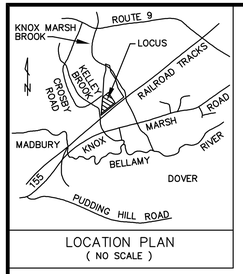
GRADING, DRAINAGE & EROSION CONTROL PLAN

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

7



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INV. OUT = 88.6' 8" PVC
NEXT SMH 2875

SMH 2875
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INV. IN = 88.0' 8" SMH 2876
INV. IN = 87.9' 8" (SITE)
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NEXT SMH 2874

CATCH BASIN
#7080 RIM = 96.0'

CATCH BASIN
#7081 RIM = 95.9'

WATER – DOVER FARAD1–020–MI

SEWER MAIN

UTILITY POLE 364A/1Y UGU DROP

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

74
95.1'
= 86.62' 8" PVC SMH 2875
T = 86.42' 8" PVC
[NORTH]

SEWER 8"ø

SEWER MAIN

GAS 4" HDPE

WATER – DOVER FARAD1–020–MI

HYDRANT #319

8" WATERLINE

PROPOSED OVERHEAD UTILITIES

UTILITY POLE 364A/1 1140–22

PROPOSED 2" TAP WITH SHUT–OFF

PSMH2
RIM97.2
INV.IN=89.6
INV.OUT=89.5
8" SDR35
L=230'
S=.004

PROPOSED UTILITY POLE

PSMH 3
RIM=98.2
INV.IN=90.60
INV.OUT= 90.50

50' WETLAND BUFFER

PUBLIC R.O.W. 75'

PSMH 1
RIM=96.9
INV.IN=89.2
INV.OUT=89.1
8" SDR35
L=66
S=.004

PROPOSED UNDERGROUND UTILITIES

PROPOSED TRANSFORMER

35' SETBACK

PROPOSED 93 LF 6" PVC S=1%

PROPOSED 2" DOMESTIC WATER SERVICE

PROPOSED 2" GAS SERVICE

PROPOSED 9,600 S.F. BUILDING

F.F.=98.75

10' SETBACK

PROPOSED FUTURE EV CHARGING STATION ELECTRICAL LINE

GAS STUB

WATER L STUB

SEWER LINE STUB

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

10' SETBACK

WETLANDS DELINEATED BY BAG NAD CONSOLTANTS

50' BUFFER

50' BUFFER

G / 2–1

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

NHF&G DEED RESTRICTED WILDLIFE AREA

LEGEND

S.F. – SQUARE FEET
Ac. – ACRE
(TYP.) – TYPICAL
± – MORE OR LESS
ø – DIAMETER
S.C.R.D. – STRAFFORD COUNTY REGISTRY OF DEEDS
UP – UTILITY POLE
SMH – SEWER MANHOLE
– WATER SHUT–OFF
– WATER GATE VALVE
– FIRE HYDRANT
– EDGE OF WETLAND
– WETLAND
– WETLAND BUFFER
PD – PROPOSED RAIN LINE
PW – PROPOSED WATER
PE – PROPOSED UTILITY LINES
PS – PROPOSED SEWER LINE
PG – PROPOSED GAS LINE

NH STATE PLANE NAD 83 – GPS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

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GNE
CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

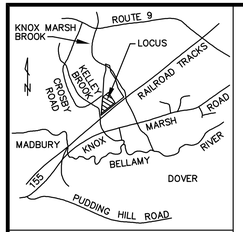
DATE: 8–6–24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

UTILITY PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

8



LOCATION PLAN
(NO SCALE)

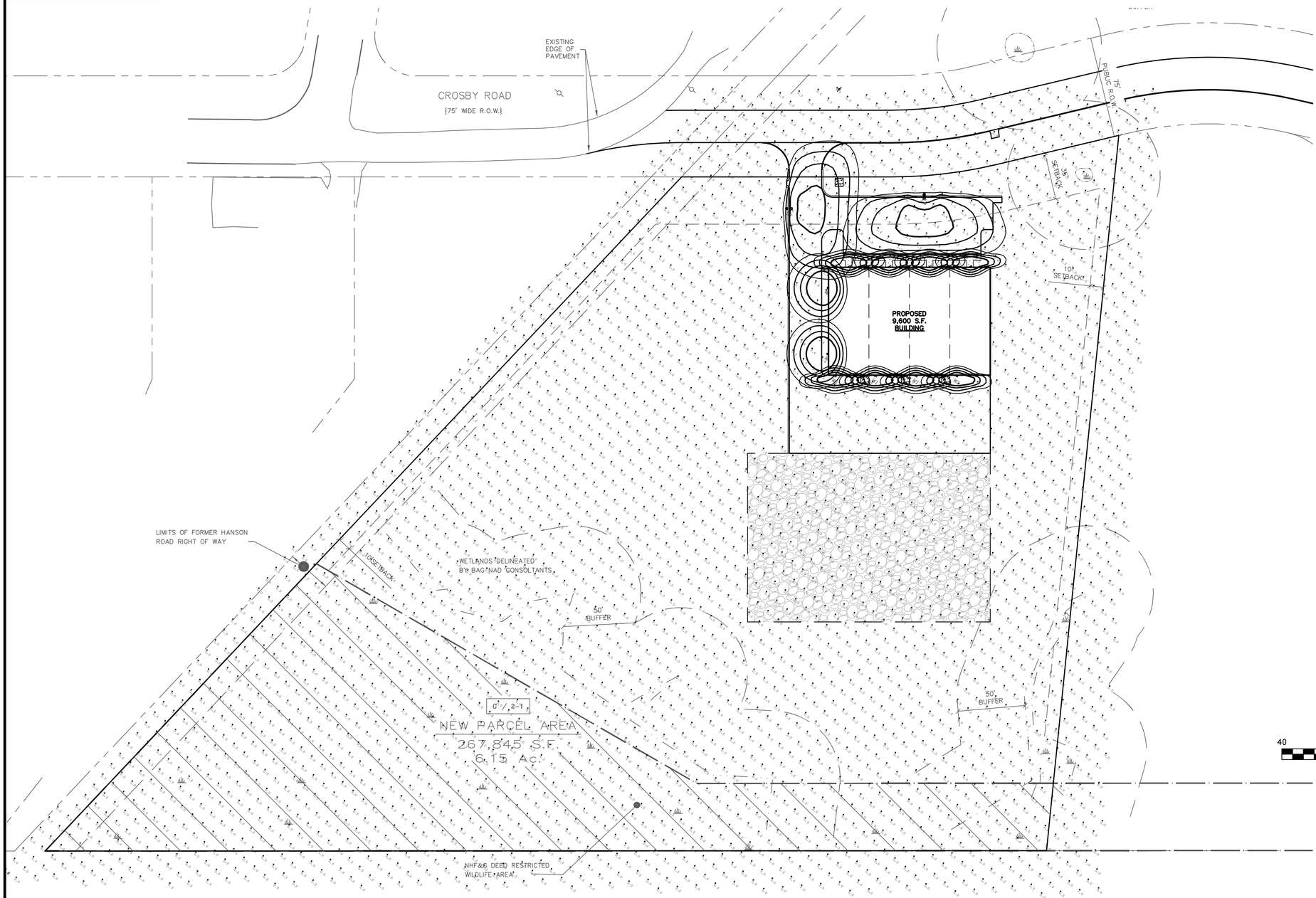
Luminaire Schedule						
Symbol	Qty	Label	Arrangement	Description	Tag	[MANUFAC]
	1	S2	Single	MRM-LED-09L-SIL-FT-UNV-DIM-30-70CRI-IL-CXX / 4SQ B3 S11G20 S AB 4BC	20' POLE	LSI INDUSTRIES, INC.
	1	S3	Single	MRM-LED-09L-SIL-3-UNV-DIM-30-70CRI-IL-CXX / 4SQ B3 S11G20 S AB 4BC	20' POLE	LSI INDUSTRIES, INC.
	2	W	Single	XWS-LED-03L-MTD-UNV-DIM-30-80CRI-CXX	WALL MOUNTED 12' AFG	LSI INDUSTRIES, INC.
	8	W1	Single	EOF1MV3KCXXPSC	WALL MOUNTED 9' AFG	NICOR, Inc.

FRONT PARKING LOT AREA

Illuminance (Fc)
Average = 1.29
Maximum = 2.8
Minimum = 0.5
Avg/Min Ratio = 2.58
Max/Min Ratio = 5.60

REAR PARKING LOT AREA

Illuminance (Fc)
Average = 0.49
Maximum = 6.1
Minimum = 0.0
Avg/Min Ratio = N.A.
Max/Min Ratio = N.A.



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Dover, New Hampshire 03821
603.749.0443

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LIGHTING PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

9

EOF

LED Emergency Outdoor Full Cutoff

Project

Catalog

Type

Date

Product Description

The LED Emergency Outdoor Full Cutoff combines 90-minute emergency lighting with a low-profile, architectural design. The EOF is designed for outdoor use, with an optional cold-weather kit for added reliability in northern climates. The EOF comes standard with a photocell, with an optional motion sensor adding even more energy efficiency. An internal selector switch allows bypassing the photocell to control the unit from a wall switch. A non-emergency unit is available for locations not requiring battery-backup, providing a uniform look for all fixtures.

Construction
- IP65 Rated enclosure
- Durable die-cast Aluminum body
- Separable backplate for easy installation and maintenance

Optical System
- Polycarbonate lens
- Utilizes advanced LED technology with CCT of 3000K and 5000K
- CRI 70+

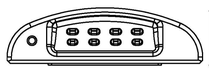
Electrical
- Input voltage of 120/277VAC
- Maintenance-free NiCad battery provides 90-minute emergency operation
- LED indicator light & test button with self-testing, self-diagnostic option
- Photocell standard with wall switch control
- Motion sensor option for additional energy saving
- Operating Temperature:
  - EM: 32°F to 122°F (0°C to +50°C)
  - Non-EM and EM Cold Weather: -13°F to +122°F (-25°C to +50°C)

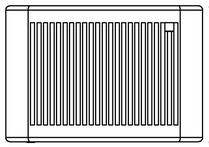
Mounting and Installation
- Fixture mounts directly to J Boxes and walls with screws
- Wiring possible through backplate or 1/2" conduit knockout
- For installations where power surge may be possible, NICOR recommends installing additional surge protection at the electrical distribution panel

Finish
- Fine-textured, UV-stabilized powder coat bronze finish

Listings
- LM-79, LM-80 testing performed in accordance with IESNA standards.
- UL & cUL 924 Listed
- Meets or exceeds requirements of NFPA 70 & NFPA 101
- Meets FCC Part 15, Subpart B, Class B standards for conducted and radiated emissions
- TM-21 Projected L70(9k) life >72,000 hours

Warranty
- 1-year limited system warranty standard
- Warranty does not cover product failure due to an overvoltage event (power surge.)





NICOR, Inc. 2200 Midtown Place NE, Albuquerque, NM 87107 P: 800.821.6283 F: 800.892.8393
www.nicorlighting.com April 2, 2021 9:17 AM

Catalog # : _____ Project : _____ Type : _____

Prepared By : _____ Date : _____

Mirada Medium (MRM)

Outdoor LED Area Light

IP66 IK08

OVERVIEW	
Lumen Package	9,000 - 55,000
Wattage Range	62 - 438
Efficacy Range (LPW)	115 - 162
Weight lbs(kg)	30 (13.6)
Control Options	IMSBT, ALB, ALS, 7-Pin, PCI

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction
- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- Designed to mount to square or round poles.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 37 lbs in carton.

Optical System
- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated sealed optical chamber in 1 component.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in IES Types 2, 3, 4, 5W, FT, FTA, AM, and LC/RC.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93-95%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377. Also Available in Phosphor Converted Amber with Peak intensity at 610nm.
- Minimum CRI of 70.
- Integral louver (IL) and integral half louver (IH) options available for enhanced backlight control.

Electrical
- High-performance programmable driver features over-voltage, under-voltage, short-circuit and over temperature protection. Custom lumen and wattage packages available.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 Vac) Input 50/60 Hz or optional High Voltage (347-480 Vac).
- L80 Calculated Life: >100k Hours (See Lumen Maintenance chart)
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F). 42L and 48L lumen packages rated to +40°C. 55L lumen package rate to +35°C.
- Power factor: >.90
- Input power stays constant over life.
- Field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Components are fully encased in potting material for moisture resistance. Driver complies with FCC standards. Driver and key electronic components can easily be accessed.

Controls
- Optional integral passive infrared Bluetooth™ motion. Fixtures operate independently and can be commissioned via iOS or Android configuration app
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7. (see controls section for more details).

Installation
- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional 3" drill pattern B3 for easy fastening of LSI products.

Warranty
- LSI LED Fixtures carry a 5-year warranty.

Listings
- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet Locations.
- IP66 rated Luminaire per IEC 60598.
- 3G rated for ANSI C136.31 high vibration applications are qualified.
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product may be DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.
- Patented Silicone Optics (US Patent NO. 10,816,165 B2)
- IK08 rated luminiare per IEC 66262 mechanical impact code

Catalog #: _____ Project: _____

Prepared By: _____ Date: _____ Type: _____

Mirada Small Wall Sconce (XWS)

Outdoor LED Wall Light

IP65 IK10

OVERVIEW	
Lumen Output Range	2,000 - 6,000
Wattage Range	15 - 52
Efficacy Range (LPW)	119 - 151
Luminaire Weight lbs (kg)	8 (3.6)

QUICK LINKS

Ordering Guide | Performance | Photometrics | Dimensions

FEATURES & SPECIFICATIONS

Construction
- Rugged die-cast aluminum housing.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Extended housing available with 1/2" threaded hubs for surface conduit and rated wire.
- Standard luminaire shipping weight: 10 lbs in carton.
- Max luminaire shipping weight (with back housing): 20 lbs in carton.

Optical System
- Choice of acrylic lens or high impact resistant polycarbonate lens
- The lens is fully gasketed with a one-piece solid silicone gasket to keep out moisture and dust, providing an IP65 rating for the luminaire
- Reflector system with recessed light engine reduces glare and brightness.
- Forward Throw Wide and Medium distributions available.
- Optional diffused lens for reduced LED pixilation over the lens and maximum visual comfort.
- Zero uplight.
- Available in 5000K, 4000K, 3500K, 3000K and 2700K color temperatures per ANSI C78.377.
- Minimum CRI of 80

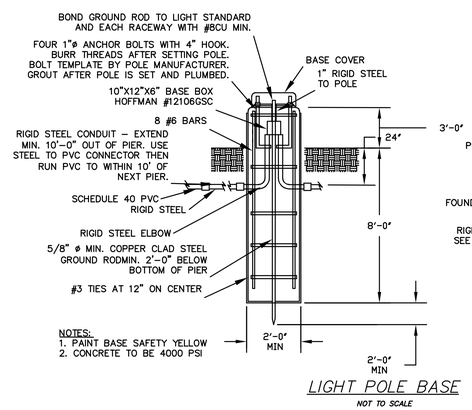
Electrical
- High-performance driver features over-voltage under-voltage, short-circuit and over temperature protection.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 VAC) Input 50/60 Hz or optional High Voltage (347-480 VAC).
- L70 Calculated Life: >60k Hours
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F).
- Power factor: >.90
- Input power stays constant over life.
- Optional 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Driver is fully encased in potting material for moisture resistance. Driver complies with FCC standards. Accessible driver and electrical components.
- Optional Dual Drivers/Circuit/Power Feeds.
- Optional battery backup provides 90-minutes of constant power to the LED system, ensuring code compliance. A test switch/indicator button is installed on the housing for ease of maintenance. Standard battery rated for 0° to 50° with cold weather battery rated for -20°C to 50°. 120-277V Only.

Controls
- Optional integral passive infrared Bluetooth™ motion and photocell sensor. Fixtures operate independently and can be commissioned via iOS or Android configuration app.
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7.

Installation
- Universal wall mounting plate mounts directly to vertical surface or 4" junction box (octagonal or square).
- Luminaire hinges to the top of the mounting plate and is secured via two flush mount screws that help to conceal the hardware and prevent over tightening during installation.

Warranty
- LSI luminaires carry a 5-year limited warranty. Refer to https://www.lsicorp.com/resources/terms-conditions-warranty/ for more information.

Listings
- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 2700K or 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet locations.
- IP65 rated luminaire per IEC 60598-1.
- IK10 rated luminaire per IEC 66262 mechanical impact code with clear polycarbonate lens (MTP).
- DesignLights Consortium® (DLC) qualified product. Not all versions of this product are DLC qualified. Please check the DLC Qualified Products List at www.designlights.org/QPL to confirm which versions are qualified.



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Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

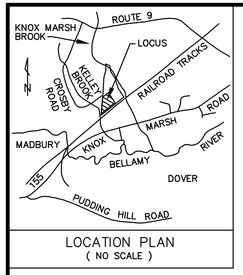
DATE: 8-6-24
SCALE: N.T.S.
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

LIGHTING DETAILS

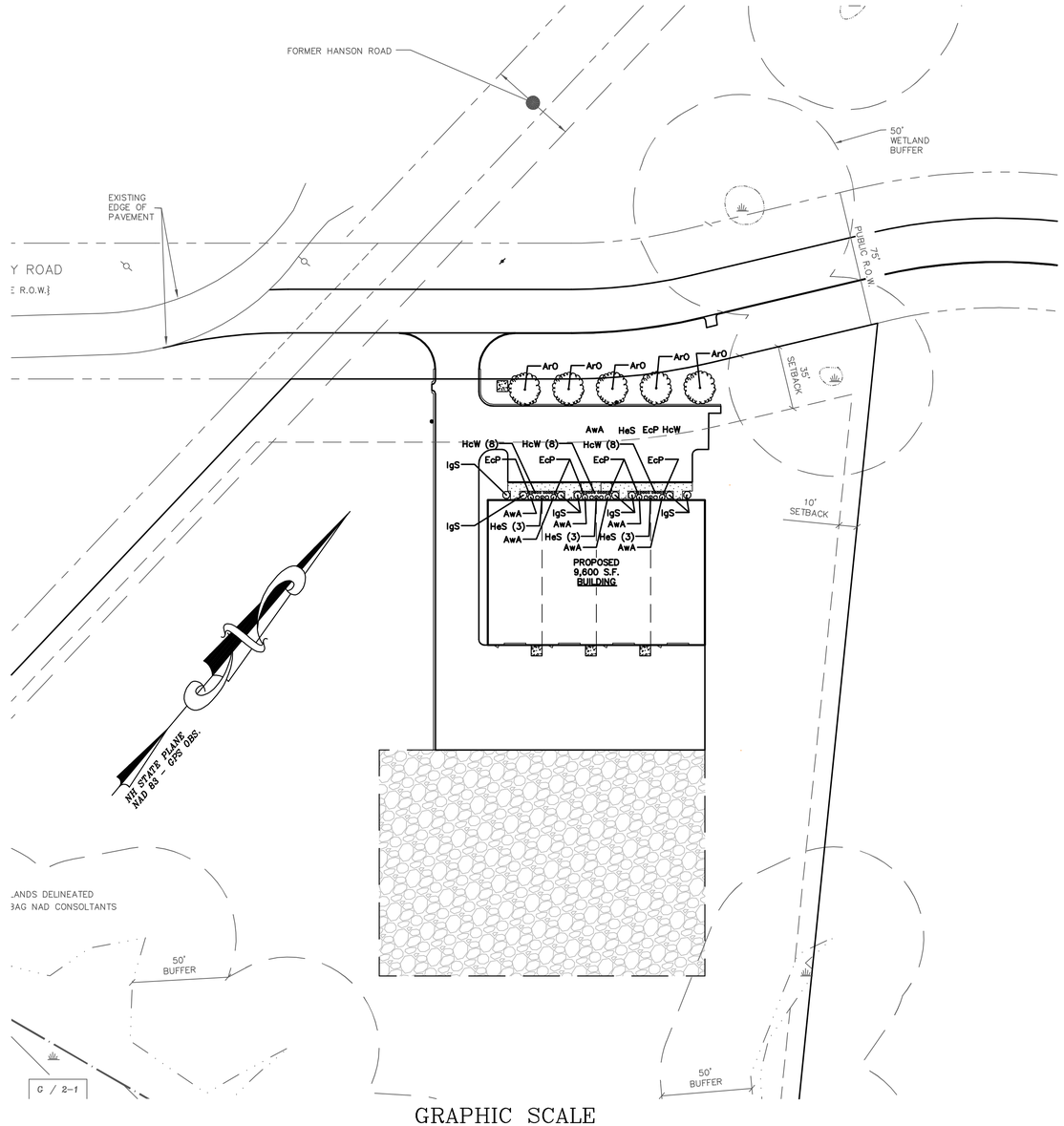
10



LOCATION PLAN
(NO SCALE)

PLANT SCHEDULE

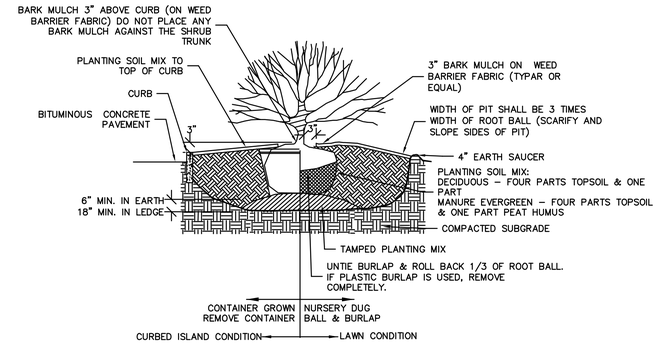
QTY	SYMBOL	BITINICAL NAME	COMMON NAME	SIZE
5	ARO	ACER RUBRUM 'OCTOBER GLORY'	OCTOBER GLORY RED MAPLE	3 -3.5" C
8	IGS	ILEX GLABRA 'SHAMROCK'	SHAMROCK HOLLY	#5
6	AMA	ARONIA MELANOCARPA 'AUTUMN MAGIC'	AUTUMN MAGIC CHOKEBERRY	#5
9	HES	HYDRANGEA 'ENDLESS SUMMER'	ENDLESS SUMMER HYDRANGEA	#3
6	ECP	ECHINACEA PURPUREZ	CONEFLOWER	#1
24	HCW	HEMEROCALLIS 'CATHERINE WOODBURY'	CAHTERINE WOODBURY DAYLILY	#1



GRAPHIC SCALE

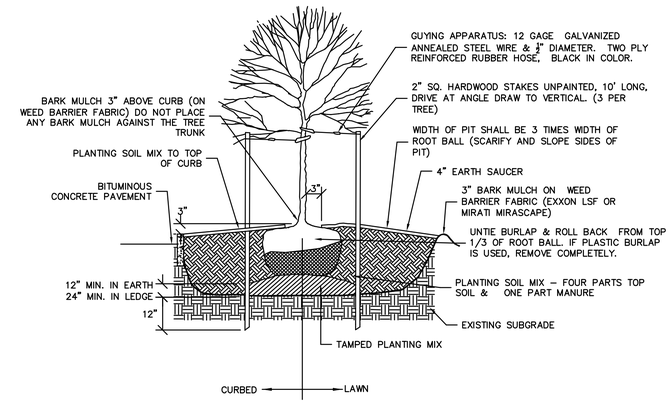
40 0 20 40 80 160

(IN FEET)



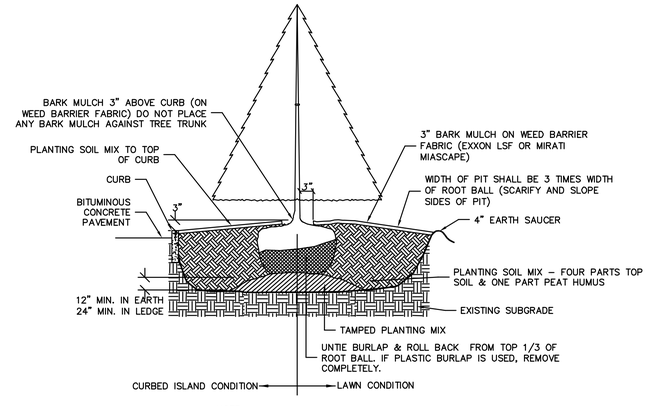
NOTE:
PLANT AT SAME DEPTH AS PREVIOUSLY PLANTED, OR WITHIN 2" ABOVE.

SHRUB PLANTING
NOT TO SCALE



NOTE:
PLANT AT SAME DEPTH AS PREVIOUSLY PLANTED, OR WITHIN 2" ABOVE.

DECIDUOUS PLANTING
NOT TO SCALE



NOTE:
PLANT AT SAME DEPTH AS PREVIOUSLY PLANTED, OR WITHIN 2" ABOVE.

EVERGREEN TREE PLANTING
NOT TO SCALE

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LANDSCAPING PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

11

DESCRIPTION

1. THE INTENT OF THIS PLAN IS TO SHOW SITE IMPROVEMENTS FOR A 9,600 S.F. COMMERICAL BUILDING WITH THE ASSOCIATED WATER, SEWAGE, AND ELECTRIC UTILITY IMPROVEMENTS.

PROJECT NAME AND LOCATION

DEL SOL DOVER, LLC
3 LOT SUBDIVISION CROSBY RD EXTENSION — *LATITUDE N43° 10' 49"*
DOVER, NEW HAMPSHIRE 03820 — *LONGITUDE W70° 54' 41"*

DISTURBED AREA

±142,500 S.F.

NOTES:

1. THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY TIME BEFORE DISTURBED AREAS ARE STABILIZED.
2. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.

SEQUENCE OF MAJOR ACTIVITIES

1. CONTRACTOR SHALL PREPARE THE SWPPP, FILE FOR AND OBTAIN THE NOI A MINIMUM OF 2 WEEKS PRIOR TO COMMENCEMENT OF SITE WORK.
2. PLACE TEMPORARY EROSION AND SEDIMENT CONTROL BMP'S PRIOR TO EARTH MOVING ACTIVITIES.
3. ALL EROSION CONTROL AND PERIMETER CONTROLS SHALL BE INSTALLED PRIOR TO COMMENCING EARTH MOVING OPERATIONS.
4. SELECTIVE DEMOLITION.
5. REGRADE SITE TO SUBGRADE.
6. TEMPORARY WATER DIVERSION (SWALES, BASINS) MUST BE USED AS NECCESSARY UNTIL AREAS ARE STABILIZED.
7. SWALES AND PONDS (AS APPLICABLE) SHALL BE CONSTRUCTED EARLY ON IN THE CONSTRUCTION SEQUENCE AND BEFORE ROUGH GRADING OF THE SITE AND ALL DITCHES AND SWALES SHALL BE STABILIZED PRIOR TO DIRECTING RUNOFF TO THEM.
8. INSTALL DRAINAGE STRUCTURES AND CONTROLS.
9. INSTALL FOUNDATION FOOTINGS AND WALLS.
10. INSTALL UTILITIES.
11. PLACE GRAVELS AND FINE GRADE.
12. STABILIZE ROADWAYS AND PARKING AREAS WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
13. ALL CUT AND FILL SLOPES SHALL BE LOAMED AND SEEDED (AS APPLICABLE) WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.
14. ALL EROSION CONTROL MEASURES SHALL BE INSPECTED AT LEAST WEEKLY AND AFTER EVERY 1/2" OF RAINFALL.
15. IN ALL CASES THE SMALLEST PRACTICAL AREA SHALL BE DISTURBED DURING CONSTRUCTION AND IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED. ALL DISTURBED AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
16. WHEN ALL SITE WORK IS COMPLETE AND ALL DISTURBED AREAS ARE STABILIZED REMOVE ALL TEMPORARY EROSION CONTROL MEASURES AND FILE THE EPA – N.O.T.

DEFINITIONS

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED.

1. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED
2. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED
3. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIP-RAP HAS BEEN INSTALLED; OR
4. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED

INSTALLATION, MAINTENANCE, AND INSPECTION PROCEDURES OF EROSION AND SEDIMENT CONTROLS

A. SILT BARRIER

1. INSTALLATION
   - a. USE SILT BARRIER AS PERIMETER CONTROLS, PARTICULARLY AT THE LOWER OR DOWN SLOPE EDGE OF A DISTURBED AREA.
   - b. LEAVE SPACE FOR MAINTENANCE BETWEEN TOE AND SLOPE OF SILT BARRIER.
   - c. TRENCH IN THE SILT BARRIER ON THE UPHILL SIDE (6 INCHES DEEP BY 6 INCHES WIDE).
   - d. INSTALL STAKES ON THE DOWNHILL SIDE OF THE SILT BARRIER.
   - e. CURVE THE END OF THE SILT BARRIER UP-GRADIENT TO HELP IT CONTAIN RUNOFF.
2. SEQUENCE OF INSTALLATION
   - a. SEDIMENT BARRIERS SHALL BE INSTALLED PRIOR TO ANY SOIL DISTURBANCE OF THE CONTRIBUTING DRAINAGE AREA ABOVE THEM.
3. MAINTENANCE
   - a. SILT BARRIERS SHOULD BE INSPECTED AND MAINTAINED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.
   - b. SILT BARRIERS HAVE A USEFUL LIFE OF ONE SEASON. ON LONGER CONSTRUCTION PROJECTS, SILT BARRIERS SHOULD BE REPLACED PERIODICALLY TO MAINTAIN EFFECTIVENESS.
   - c. REMOVE SEDIMENT WHEN IT REACHES ONE-THIRD (1/3) THE HEIGHT OF THE SILT BARRIER.
   - d. REPLACE THE SILT BARRIERS WHERE THEY ARE TORN, WORN, OR OTHERWISED DAMAGED AND MONITOR PERFORMANCE TO ENSURE EFFECTIVE PERFORMANCE.
   - e. RETRENCH OR REPLACE ANY SILT BARRIER THAT IS NOT PROPERLY ANCHORED TO THE GROUND.
   - f. IF THERE IS EVIDENCE OF END FLOW ON PROPERLY INSTALLED BARRIERS, EXTEND BARRIERS UPHILL OR CONSIDER REPLACING THEM WITH OTHER MEASURES, SUCH AS TEMPORARY DIVERSIONS AND SEDIMENT TRAPS.
   - g. SILT BARRIERS SHOULD BE REPAIRED IMMEDIATELY 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, SILT BARRIERS SHOULD BE REPLACED WITH A TEMPORARY CHECK DAM.

B. MULCHING

1. TIMING
   - a. APPLY MULCH PRIOR TO ANY STORM EVENT. IT WILL BE NECESSARY TO CLOSELY MONITOR WEATHER PREDICTIONS TO HAVE ADEQUATE WARNING OF SIGNIFICANT STORMS.
   - b. IN OTHER AREAS, THE TIME PERIOD CAN RANGE FROM 14 TO 30 DAYS OF INACTIVITY ON A AREA. THE LENGTH OF TIME VARYING WITH SITE CONDITIONS. PROFESSIONAL JUDGEMENT SHALL BE USED TO EVALUATE THE INTERACTION OF SITE CONDITIONS (SOIL ERODIBILITY, SEASON OF YEAR, EXTENT OF DISTURBANCE, PROXIMITY TO SENSITIVE RESOURCES, ETC.) AND THE POTENTIAL IMPACT OF EROSION ON ADJACENT AREAS TO CHOOSE AN APPROPRIATE TIME RESTRICTION.
   - c. WITHIN 100 FEET OF RIVERS, STREAMS, WETLANDS, AND IN LAKE AND POND WATERSHEDS, THE TIME PERIOD OF WHICH MULCHING SHOULD TAKE OCCUR SHOULD BE NO GREATER THAN SEVEN (7) DAYS. THIS SEVEN DAY LIMIT SHOULD BE REDUCED FURTHER DURING WET WEATHER PERIODS.
2. APPLICATION RATE
   - a. MULCH SHALL BE APPLIED AT A RATE OF BETWEEN 1.5 TO 2 TONS PER ACRE, OR 70 TO 90 POUNDS PER 1000 SQUARE FEET.
   - b. GUIDELINES FOR WINTER MULCH APPLICATION. WHEN MULCH IS APPLIED TO PROVIDE PROTECTION OVER WINTER (PAST THE GROWING SEASON) IT SHALL BE AT A RATE OF 150-200 POUNDS OF HAY OR STRAW PER ACRE WITH ABOUT 4 INCHES IN DEPTH. A TACKIFIER MAY BE ADDED TO THE MULCH.
3. MAINTENANCE
   - a. ALL MULCHES MUST BE INSPECTED PERIODICALLY, IN PARTICULAR AFTER RAINSTORMS. CHECK FOR SIGNS OF EROSION OR DISPLACEMENT OF THE MULCH. IF LESS THAN 90% OF THE SOIL SURFACE IS COVERED BY MULCH, ADDITIONAL MULCH SHALL BE IMMEDIATELY APPLIED.
   - b. NETS MUST BE INSPECTED AFTER RAIN EVENTS FOR DISLOCATION OR FAILURE AND SHOULD BE REPAIRED AS NECCESSARY.
   - c. INSPECTIONS SHOULD TAKE PLACE UNTIL THE SITE IS ESTABLISHED.
   - d. EROSION CONTROL MIX MULCH USED FOR TEMPORARY STABILIZATION SHOULD BE LEFT IN PLACE. VEGETATION ADDS STABILITY AND SHOULD BE PROMOTED.

C. TEMPORARY SEEDING

1. SEEDBED PREPARATION
   - a. STONES AND TRASH SHOULD BE REMOVED SO AS NOT TO INTERFERE WITH THE SEEDING AREA.
   - b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF 2 INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED.
   - c. APPLY LIMESTONE AND FERTILIZER ACCORDING TO SOIL TEST RECOMMENDATIONS.
     - i) APPLY FERTILIZER AT A RATE OF 600 POUNDS PER ACRE OR 13.8 POUNDS PER 1,000 SQUARE FEET OF LOW PHOSPHATE FERTILIZER OR EQUIVALENT.
     - ii) APPLY LIMESTONE AT A RATE OF 3 TONS PER ACRE OR 138 POUNDS PER 1,000 SQUARE FEET.
2. SEEDING
   - a. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SUMMARY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   - b. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
   - c. TEMPORARY SEEDING BETWEEN MAY 15TH AND AUGUST 15TH SHOULD BE COVERED WITH HAY OR STRAW MULCH, ACCORDING TO THE "TEMPORARY AND PERMANENT MULCHING" PRACTICE.
   - d. VEGETATED GROWTH COVERING 85% OF THE DISTURBED AREA SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH.
3. MAINTENANCE
   - a. TEMPORARY SEEDING SHALL BE INSPECTED PERIODICALLY. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER FABRICS, CHECK DAMS, ETC.).

D. PERMANENT SEEDING

1. BEDDING – STONES LARGER THAN 2 INCHES, TRASH, ROOTS, AND OTHER DEBRIS INTERFERRING WITH SEEDING AND FUTURE MAINTENANCE OF THE AREA SHOULD BE REMOVED. WHERE FEASIBLE, THE SOIL SHOULD BE TILLED TO A DEPTH OF 4" TO PREPARE A SEEDBED AND MIX FERTILIZER INTO THE SOIL.
2. FERTILIZER
   - a. LIME AND FERTILIZER SHOULD BE WORKED INTO THE SOIL TO A DEPTH OF 4 INCHES USING A DISC, SPRING TOOTH HARROW, OR OTHER SUITABLE EQUIPMENT PRIOR TO OR AT THE SAME TIME OF SEEDING.
   - b. FERTILIZER SHOULD BE RESTRICTED TO A LOW PHOSPHATE, SLOW RELEASE NITORGEN FERTILIZER WHEN APPLIED TO AREAS BETWEEN 25 FEET AND 250 FEET FROM A SURFACE WATER BODY. NO FERTILIZER EXCEPT LIMESTONE SHOULD BE APPLIED WITHIN 25 FEET OF THE SURFACE WATER.
   - c. KINDS AND AMOUNTS OF LIME AND FERTILIZER SHOULD BE BASED ON AN EVALUATION OF SOIL TESTS. WHEN A SOIL TEST IS NOT AVAILABLE, THE FOLLOWING MINIMUM AMOUNTS SHOULD BE APPLIED:
     AGRICULTURAL LIMESTONE @ 138 LBS. PER 1,000 S.F.
     LOW PHOSPHATE (N-P2O5-K20) FERTILIZER @ 13.8 LBS. PER 1,000 S.F.
3. SEED MIXTURE (RECOMMENDED)
   RATE:

TYPE	LBS. PER ACRE	LBS. PER 1,000 S.F.
TALL FESCUE	20	0.45
CREEPING RED FESCUE	20	0.45
BIRDSFOOT TREFOIL	8	0.20
TOTAL	48	1.10

4. SEEDING
   - a. SPRING SEEDING USUALLY GIVES THE BEST RESULTS FOR ALL SEED MIXES OR WITH LEGUMES. PERMANENT SEEDING SHOULD BE COMPLETED 45 DAYS PRIOR TO THE FIRST KILLING FROST.
   - b. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, DRILL, CULTIPACKER TYPE SEEDER OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER) WITH A SEEDING DEPTH FROM A QUARTER (1/4) TO A HALF (1/2) INCH.
   - c. VEGETATED GROWTH COVERING AT LEAST 85% OF THE DISTURBED SHOULD BE ACHIEVED PRIOR TO OCTOBER 15TH. IF THIS CONDITION IS NOT ACHIEVED, IMPLEMENT TEMPORARY STABILIZATION MEASURES FOR OVERWINTER PROTECTION.
5. HYDROSEEDING
   - a. LIME AND FERTILIZER MAY BE APPLIED SIMULTANEOUSLY WITH THE SEED. THE USE OF STRAW MULCH ON CRITICAL AREAS IS PREFERRED SINCE IT GRANTS BETTER SLOPE PROTECTION BY USING ADHESIVE MATERIALS.
   - b. SLOPES MUST BE NO STEEPER THAN 2 TO 1 (2 FEET HORIZONTALLY TO 1 FOOT VERTICALLY).
   - c. SEEDING RATES MUST BE INCREASED BY 10% WHEN HYDROSEEDING.
6. MAINTENANCE
   - a. PERMANENT SEEDED AREAS SHOULD BE INSPECTED AT LEAST MONTHLY DURING THE COURSE OF CONSTRUCTION. INSPECTIONS, MAINTENANCE, AND CORRECTIVE ACTIONS SHOULD CONTINUE UNTIL THE OWNER ASSUMES PERMANENT OPERATION OF THE SITE.
   - b. SEEDED AREAS SHOULD BE MOWED AS REQUIRED TO MAINTAIN A HEALTHY STAND OF VEGETATION, WITH MOWING HEIGHT AND FREQUENCY DEPENDENT ON TYPE OF GRASS COVER.
   - c. BASED ON INSPECTION, AREAS SHOULD BE RESEEDED TO ACHIEVE FULL STABALIZATION OF EXPOSED SOILS.
   - d. IF EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHOULD BE MADE AND AREAS RESEEDED. WITH OTHER TEMPORARY MEASURES USED TO PROVIDE EROSION PROTECTION DURING THE PERIOD OF VEGETATION ESTABLISHMENT.
   - e. AT A MINIMUM, 85% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION.

E. STORM DRAIN INLET PROTECTION

1. SPECIFICATIONS
   - a. THE MAXIMUM CONTRIBUTING DRAINAGE AREA TO THE BARRIER SHOULD BE LESS THAN ONE ACRE.
   - b. ANY RESULTANT PONDING OF STORMWATER MUST NOT CAUSE EXCESSIVE INCONVENIENCE OR DAMAGE TO ADJACENT AREAS OR STRUCTURES.
2. INSTALLATION
   - a. INSTALL INLET PROTECTION AS SOON AS STORM DRAIN INLETS ARE INSTALLED AND BEFORE LAND-DISTURBANCE ACTIVITIES BEGIN IN AREAS WITH EXISTING STORM DRAIN SYSTEMS.
   - b. PROTECT ALL INLETS THAT COULD RECEIVE STORMWATER FROM YOUR CONSTRUCTION PROJECT.
   - c. USE IN CONJUNCTION WITH OTHER EROSION PREVENTION AND SEDIMENT CONTROL BMPS.
   - d. DESIGN YOUR INLET PROTECTION TO HANDLE THE VOLUME OF WATER FROM THE AREA BEING DRAINED. ENSURE THAT THE DESIGN IS SIZED APPROPRIATELY.
3. MAINTENANCE
   - a. INSPECT INLETS BARRIERS FREQUENTLY, BEFORE AND AFTER EACH RAINFALL EVENT AND REPAIR WHEN NECESSARY.
   - b. SEDIMENT SHOULD BE REMOVED AND THE STORM DRAIN SEDIMENT BARRIER RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE BARRIER.
   - c. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
   - d. SWEEP STREETS, SIDEWALKS, AND OTHER PAVED AREAS REGULARLY.
   - e. ALL CATCH BASINS AND STORM DRAIN INLETS MUST BE CLEANED AT THE END OF CONSTRUCTION AND AFTER THE SITE HAS BEEN FULLY STABILIZED

TIMING OF CONTROLS/MEASURES

AS INDICATED IN THE SEQUENCE OF MAJOR ACTIVITIES THE SILT BARRIERS SHALL BE INSTALLED PRIOR TO COMMENCING ANY CLEARING OR GRADING OF THE SITE. STRUCTURAL CONTROLS SHALL BE INSTALLED CONCURRENTLY WITH THE APPLICABLE ACTIVITY. AREAS WHERE CONSTRUCTION ACTIVITY TEMPORARILY CEASES FOR MORE THAN TWENTY ONE (21) DAYS WILL BE STABILIZED WITH A TEMPORARY SEED AND MULCH WITHIN FOURTEEN (14) DAYS OF THE LAST DISTURBANCE. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN AREA, SILT FENCES AND ANY EARTH/DIKES WILL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED. ALL AREAS SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISH GRADE.

WASTE DISPOSAL

a. WASTE MATERIALS
ALL WASTE MATERIALS WILL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN A DUMPSTER. NO CONSTRUCTION WASTE MATERIALS WILL BE BURIED ON SITE. ALL PERSONEL WILL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.

b. HAZARDOUS WASTE
ALL HAZARDOUS WASTE MATERIALS WILL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER. SITE PERSONNEL WILL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.

c. SANITARY WASTE
ALL SANITARY WASTE WILL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

MAINTENACE OF STORMWATER MANAGEMENT FACILITIES

THE PROJECT PROPONENT IS RESPONSIBLE FOR THE MAINTENANCE OF ALL STORMWATER FACILITIES DURING CONSTRUCTION AND THE PROPERTY OWNER IS RESPONSIBLE AFTER CONSTRUCTION IS COMPLETE.

CATCH BASINS & STORMWATER TREATMENT STRUCTURES

1. CATCH BASINS & STORMWATER TREATMENT STRUCTURES SHOULD BE INSPECTED ON A MONTHLY BASIS AND/OR AFTER A MAJOR RAINFALL EVENT TO ASSURE THAT DEBRIS OR SEDIMENTS DO NOT REDUCE THE EFFECTIVENESS OF THE SYSTEM.

SPILL PREVENTION

A. MATERIAL MANAGEMENT PRACTICES
THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT WILL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL SANITARY EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
GOOD HOUSEKEEPING:
THE FOLLOWING GOOD HOUSEKEEPING PRACTICES THAT WILL BE FOLLOWED ON SITE DURING
1. THE CONSTRUCTION PROJECT:
   - a. AN EFFORT WILL BE MADE TO STORE ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB.
   - b. ALL MATERIALS STORED ON SITE WILL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE.
   - c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL WILL BE FOLLOWED.
   - d. THE SITE SUPERINTENDENT WILL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS.
   - e. SUBSTANCES WILL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER.
   - f. WHENEVER POSSIBLE ALL OF A PRODUCT WILL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
2. HAZARDOUS PRODUCTS:
   - a. THE FOLLOWING PRACTICES WILL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
   - b. PRODUCTS WILL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE.
   - c. ORIGINAL LABELS AND MATERIAL SAFETY DATA WILL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION.
   - d. SURPLUS PRODUCT THAT MUST BE DISPOSED OF WILL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.

B. PRODUCT SPECIFICATION PRACTICES
THE FOLLOWING PRODUCT SPECIFIC PRACTICES WILL BE FOLLOWED ON SITE:
1. PETROLEUM PRODUCTS:
   - a. ALL ON SITE VEHICLES WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTATIVE MAINTENACE TO REDUCE LEAKAGE. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE WILL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
2. FERTILIZERS:
   - a. FERTILIZERS USED WILL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS. ONCE APPLIED, FERTILIZER WILL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER. STORAGE WILL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILZER WILL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
3. PAINTS:
   - a. ALL CONTAINERS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM BUT WILL BE DISPOSED OF PROPERLY ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
4. CONCRETE TRUCKS:
   - a. CONCRETE TRUCKS WILL DISCHARGE AND WASH OUT SURPLUS CONCRETE OR DRUM WASH WATER IN A CONTAINED AREA ON SITE.

C. SPILL CONTROL PRACTICES
IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION THE FOLLOWING PRACTICES WILL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
   - a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP WILL BE CLEARLY POSTED AND SITE PERSONNEL WILL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES.
   - b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP WILL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS WILL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST, AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE.
   - c. ALL SPILLS WILL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY.
   - d. THE SPILL AREA WILL BE KEPT WELL VENTILATED AND PERSONNEL WILL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE.
   - e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL WILL BE REPORTED TO THE APPROPRIATE STATE OF LOCAL GOVERNMENT AGENCY, REGARDLESS OF THE SIZE.
   - f. THE SPILL PREVENTION PLAN WILL BE ADJUSTED TO INCLUDE MEASURES TO PREVENT THIS TYPE OF SPILL FROM RECURRING AND HOW TO CLEANUP THE SPILL IF IT OCCURS. A DESCRIPTION OF THE SPILL, ITS CAUSE, AND THE CLEANUP MEASURES WILL BE INCLUDED.
   - g. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS WILL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.

THE PROJECT PROPONENT IS REQUIRED TO MANAGE CONSTRUCTION TO MEET THE REQUIREMENTS AND INTENT OF RSA 430:53 AND AGR 3800 RELATIVE TO CONTROLLING INVASIVE SPECIES AND CONTROLLING FUGITIVE DUST IN ACCORDANCE WITH ENV-A 1002.

AGR 3800 PROHIBITED INVASIVE PLANT SPECIES RULES

THE RULE, AGR 3800, STATES: NO PERSON SHALL COLLECT, TRANSPORT, IMPORT, EXPORT, MOVE, BUY SELL, DISTRIBUTE, PROPAGATE OR TRANSPLANT ANY LIVING AND VIABLE PORTION OF ANY PLANT SPECIES, WHICH INCLUDED ALL OF THEIR CULTIVARS AND VARIETIES, LISTED IN TABLE 3800.1, NEW HAMPSHIRE PROHIBITED INVASIVE SPECIES LIST: A COMPLETE COPY OF THE RULES CAN BE ACCESSED ON THE INTERNET AT HTTP://AGRICULTURE.NH.GOV/TOPICS/PLANTS_INSECTS.HTM.

ENV-A 1002 FUGITIVE DUST: PRECAUTIONS TO PREVENT, ABATE, AND CONTROL FUGITIVE DUST.

a. ANY PERSON ENGAGED IN ANY ACTIVITY WITHIN THE STATE EMITS FUGITIVE DUST, OTHER THAT THOSE LISTED IN ENV-A 1002.02 (b), SHALL TAKE PRECAUTIONS THROUGHOUT THE DURATION OF THE ACTIVITY IN ORDER TO PREVENT, ABATE, AND CONTROL THE EMISSION OF FUGITIVE DUST.
b. PRECUATIONS REQUIRED BY (a) ABOVE, SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
   - I) THE USE OF WATER OR HYDROPHILIC MATERIAL ON OPERATIONS OR SURFACES, OR BOTH;
   - II) THE APPLICATION OF ASPHALT, WATER, OR HYDROPHILIC MATERIAL, OR TARPS OR OTHER SUCH COVERS TO MATERIAL STOCKPILES;
   - III) THE USE OF HOODS, FANS, FABRIC FILTERS, OR OTHER DEVICES TO ENCLOSE AND VENT AREAS WHERE MATERIALS PRONE TO PRODUCING FUGITIVE DUST ARE HANDLED;
   - iv) THE USE OF CONTAINMENT METHODS FOR SANDBLASTING OR SIMILAR OPERATIONS; AND
   - v) THE USE OF VACUUMS OR OTHER SUCTION DEVICES TO COLLECT AIRBORNE PARTICULATE MATTER.

WINTER CONSTRUCTION NOTES

1. ALL PROPOSED POST-DEVELOPMENT VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE PLACEMENT OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT.
2. ALL DITCHES & SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH SHALL BE STABILIZED WITH STONE OR EROSION CONTROL BLANKETS.
3. AFTER OCTOBER 15TH, INCOMPLETE ROAD AND PARKING SURFACES SHALL BE PROTECTED WITH A MINIMUM OF 3-INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT.

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: AS SHOWN
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SIT-DWG

PLANNING FILE NO.: SITE-2024-

EROSION CONTROL NOTES

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

12

CHANNEL INSTALLATION
NORTH AMERICAN GREEN – SC150BN

NORTH AMERICAN GREEN
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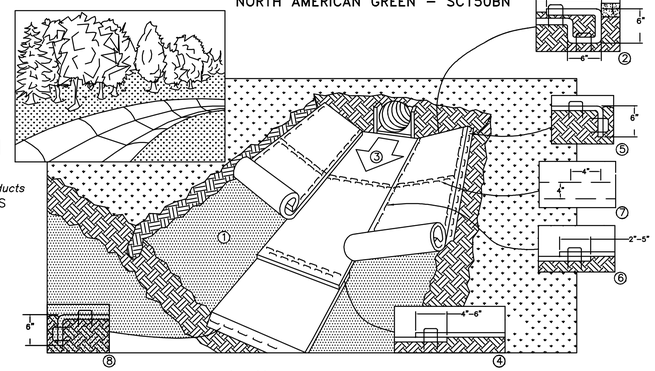
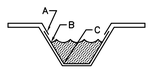


1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP's IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP's.
3. ROLL CENTER RECP's IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. PLACE CONSECUTIVE RECP's END OVER END (SHINGLE STYLE) WITH A 4" – 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
5. FULL LENGTH EDGE OF RECP's AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
6. ADJACENT RECP's MUST BE OVERLAPPED APPROXIMATELY 2" – 5" (DEPENDING ON RECP's TYPE) AND STAPLED.
7. IN HIGH FLOW CHANNEL APPLICATIONS, A STAPLE CHECK SLOT IS RECOMMENDED AT 30 TO 40 FOOT INTERVALS. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER OVER ENTIRE WIDTH OF THE CHANNEL.
8. THE TERMINAL END OF THE RECP's MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. NOTE: * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.



CRITICAL POINTS
A. OVERLAPS AND SEAMS
B. PROJECTED WATER LINE
C. CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE:
* HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE.

** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

SLOPE INSTALLATION
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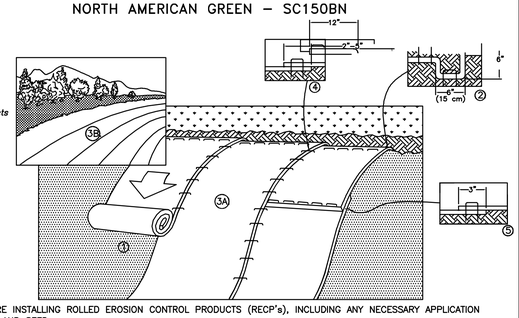
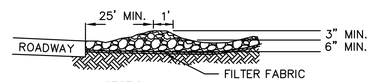


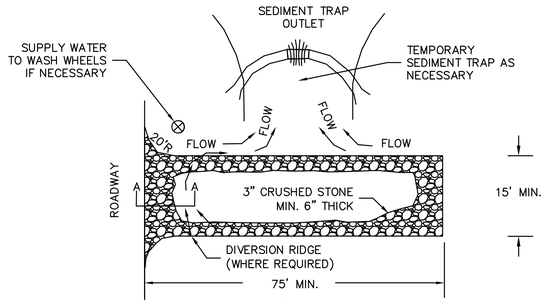
1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP's), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. NOTE: WHEN USING CELL–O–SEED DO NOT SEED PREPARED AREA. CELL–O–SEED MUST BE INSTALLED WITH PAPER SIDE DOWN.
2. BEGIN AT THE TOP OF THE SLOPE BY ANCHORING THE RECP's IN A 6" (15 CM) DEEP X 6" (15 CM) WIDE TRENCH WITH APPROXIMATELY 12" (30cm) OF RECP's EXTENDED BEYOND THE UP–SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP's WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" (30 CM) APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" (30 CM) PORTION OF RECP's BACK OVER SEED AND COMPACTED SOIL. SECURE RECP's OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" (30 CM) APART ACROSS THE WIDTH OF THE RECP's.
3. ROLL THE RECP's (A.) DOWN OR (B.) HORIZONTALLY ACROSS THE SLOPE. RECP's WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP's MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM™ STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
4. THE EDGES OF PARALLEL RECP's MUST BE STAPLED WITH APPROXIMATELY 2" – 5" (5 CM – 12.5 CM) OVERLAP DEPENDING ON RECP's TYPE.
5. CONSECUTIVE RECP's SPLICED DOWN THE SLOPE MUST BE PLACED END OVER END (SHINGLE STYLE) WITH AN APPROXIMATE 3" (7.5 CM) OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" (30 CM) APART ACROSS ENTIRE RECP's WIDTH.
   NOTE:
   *IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 CM) MAY BE NECESSARY TO PROPERLY SECURE THE RECP's.

NOTE: THE USE OF WELDED PLASTIC OR BIODEGRADABLE PLASTIC NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED. THE USE OF WILDLIFE FRIENDLY ORGANIC MATERIALS IS RECOMMENDED.

DIVERSION RIDGE REQUIRED
WHERE GRADE EXCEEDS 2%



SECTION A – A



PLAN

A. GENERAL NOTES:

1. A STABILIZED CONSTRUCTION ENTRANCE/EXIT CONSISTS OF A PAD OF STONE AGGREGATE PLACED ON A GEOTEXTILE FILTER FABRIC, LOCATED AT ANY POINT WHERE TRAFFIC WILL BE LEAVING A CONSTRUCTION SITE TO AN EXISTING ACCESS ROAD WAY OR OTHER PAVED SURFACE. ITS PURPOSE IS TO REDUCE OR ELIMINATE THE TRACKING OF SEDIMENT ONTO PUBLIC ROADS BY CONSTRUCTION VEHICLES. THIS HELPS PROTECT RECEIVING WATERS FROM SEDIMENT CARRIED BY STORM WATER RUNOFF FROM ROADS
2. ONLY CONSTRUCTION TRAFFIC LEAVING THE SITE IS REQUIRED TO USE THE TEMPORARY STABILIZED EXIT. CONSIDER PROVIDING A SEPARATE, UNPROTECTED ENTRANCE FOR TRAFFIC ENTERING THE SITE. THIS WILL INCREASE THE LONGEVITY OF THE STABILIZED EXIT BY ELIMINATING HEAVY LOADS ENTERING THE SITE AND REDUCING THE TOTAL TRAFFIC OVER THE DEVICE.
3. LOCATE THE CONSTRUCTION ENTRANCES AND EXITS, A MINIMUM OF 100 FEET FROM INTERSECTIONS, TO LIMIT SEDIMENT LEAVING THE SITE AND TO PROVIDE FOR MAXIMUM UTILITY BY ALL CONSTRUCTION VEHICLES. AVOID ENTRANCES THAT HAVE STEEP GRADES AND ENTRANCES AT CURVES IN ROADS.
4. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AND REPAIR AND/OR MAINTENANCE OF ANY MEASURES USED TO TRAP SEDIMENT.

B. SPECIFICATIONS (TEMPORARY CONSTRUCTION ENTRANCE/EXITS SHOULD MEET THE FOLLOWING REQUIREMENTS).

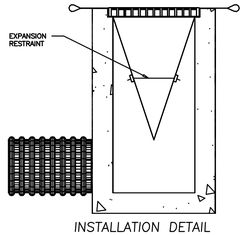
1. STONE SIZE MINIMUM: USE SHOULD BE 3" CRUSHED STONE.
2. THE MINIMUM LENGTH OF THE PAD SHOULD BE 75 FEET.
3. THE MINIMUM WIDTH OF THE PAD SHOULD BE 15 FEET OR THE WIDTH OF THE ENTRANCE, WHICHEVER IS GREATER
4. THE PAD SHOULD SLOPE AWAY FROM THE EXISTING ROADWAY.
5. THE PAD SHOULD BE AT LEAST 6" THICK.
6. A GEOTEXTILE FILTER FABRIC SHOULD BE PLACED BETWEEN THE STONE PAD AND THE EARTH SURFACE BELOW THE PAD.
7. THE PAD SHOULD BE MAINTAINED OR REPLACED WHEN MUD AND SOIL PARTICLES CLOG THE VOIDS IN THE STONE SUCH THAT MUD AND SOIL PARTICLES ARE TRACKED OFF–SITE.
8. NATURAL DRAINAGE THAT CROSSES THE LOCATION OF THE STONE PAD SHOULD BE INTERCEPTED AND PIPED BENEATH THE PAD, AS NECESSARY, WITH SUITABLE OUTLET PROTECTION.

C. MAINTENANCE REQUIREMENTS (THE ENTRANCE/EXIT SHOULD BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OF SEDIMENT ONTO PUBLIC RIGHTS–OF–WAY, THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT).

1. WHEN THE CONTROL PAD BECOMES INEFFECTIVE, THE STONE SHOULD BE REMOVED ALONG WITH THE COLLECTED SOIL MATERIAL, REGRADED ON SITE, AND STABILIZED. THE ENTRANCE SHOULD THEN BE RECONSTRUCTED.
2. THE CONTRACTOR SHOULD SWEEP THE PAVEMENT AT EXITS WHENEVER SOIL MATERIALS ARE TRACKED ONTO THE ADJACENT PAVEMENT OR TRAVELED WAY.
3. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT–OF–WAY. WHEN WHEEL WASHING IS REQUIRED, IT SHOULD BE CONDUCTED ON AN AREA STABILIZED WITH AGGREGATE, WHICH DRAINS INTO AN APPROVED SEDIMENT–TRAPPING DEVICE. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES OR WATERWAYS.

TEMPORARY CONSTRUCTION ENTRANCE/EXIT

NOT TO SCALE



INSTALLATION DETAIL

SILTSACK®
SPECIFICATIONS

NOTE: THE SILTSACK WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS. AS SUPPLIED BY AH HARRIS OF PORTSMOUTH OR APPROVED EQUAL

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	120 LBS
MULLEN BURST	ASTM D-3786	800 PSI
TRAPEZOID TEAR	ASTM D-4533	120 LBS
UV RESISTANCE	ASTM D-4355	80 %
APPARENT OPENING SIZE	ASTM D-4751	40 US SIEVE
FLOW RATE	ASTM D-4491	40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	0.55 SEC -1

HI-FLOW SILTSACK®

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS
GRAB TENSILE STRENGTH	ASTM D-4632	265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632	20 %
PUNCTURE	ASTM D-4833	135 LBS
MULLEN BURST	ASTM D-3786	420 PSI
TRAPEZOID TEAR	ASTM D-4533	45 LBS
UV RESISTANCE	ASTM D-4355	90 %
APPARENT OPENING SIZE	ASTM D-4751	20 US SIEVE
FLOW RATE	ASTM D-4491	200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491	1.5 SEC -1

OIL-ABSORBANT SILTSACK®

(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK® CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK®, WITH A WOVEN PILLOW INSERT.

DETAIL OF INLET SEDIMENT CONTROL DEVICE

SEEKING REPORTS OF RARE TURTLES

The NH Fish & Game Department is collecting observations of four turtle species:

Blanding's turtle (state endangered)
- Large, dark/black domed shell with lighter speckles
- Distinct yellow throat/chin
- Aquatic but often moves on land

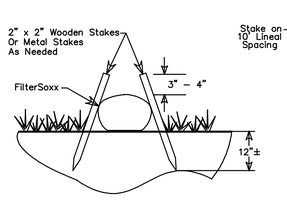
Wood turtle (special concern)
- Sculpted, pyramidal brownish shell
- Orange around neck and limbs
- River/stream turtle spending many months on land

Eastern box turtle (state endangered)
- Small terrestrial turtle with highly domed shell
- Irregular yellow or orange markings over brown/black base

Spotted turtle (state threatened)
- Small, mostly aquatic with black or dark brown with yellow spots.
- Fairly flat shell compared to Blanding's turtle

Report sightings to RAARP@wildlife.nh.gov or 603-271-2461 *Please report promptly, noting specific location and date – Photographs strongly encouraged*

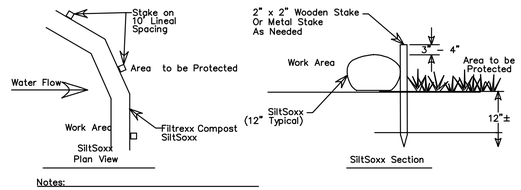
NOTES:
1. ALL OUTSIDE CONSTRUCTION PERSONNEL SHALL RECEIVE TRAINING IN THE IDENTIFICATION OF RARE TURTLE SPECIES AND MADE AWARE OF THEIR PROTECTED STATUS.
2. THE USE OF WELDED PLASTIC OR 'BIODEGRADABLE PLASTIC' NETTING OR THREAD IN EROSION CONTROL MATTING IS PROHIBITED
3. THE USE OF EROSION CONTROL BERM, WHITE FILTREXX DEGRADABLE WOVEN SILT SOCK, OR 'WILDLIFE FRIENDLY' WOVEN ORGANIC MATERIAL (E.G. COCO OR JUTE MATTING SUCH AS NORTH AMERICAN GREEN SC150BN OR EQUIVALENT) ARE ACCEPTABLE FOR USE
4. IF WOOD, SPOTTED, OR BLANDING'S TURTLES ARE FOUND LAYING EGGS IN THE WORK AREA, PLEASE CONTACT MELISSA DOPERALSKI AT 271–1738 or JOSH MEGYESY AT 271–1125 FOR FURTHER INSTRUCTIONS.



FilterSoxx Section
At Ends of Run Cross Stakes

Notes:
1. All material to meet Filtrexx specifications
2. FilterSoxx compost/soil/rock/seed fill to meet application requirements.
3. Compost material to be dispersed on site, as determined by Engineer.

FilterSoxx Staking Details



Notes:
1. All material to meet Filtrexx specifications
2. SiltSoxx compost/soil/rock/seed fill to meet application requirements.
3. SiltSoxx depicted is for minimum slopes. Greater slopes may require larger socks per the Engineer.
4. Compost material to be dispersed on site, as determined by Engineer.

SILTSOXX DETAILS

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: N.T.S.
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO:24085
FILE: SITE.DWG

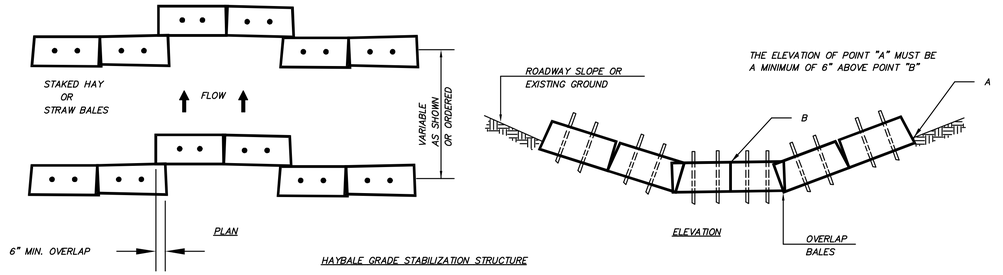
PLANNING FILE NO.: SITE–2024–

EROSION CONTROL DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

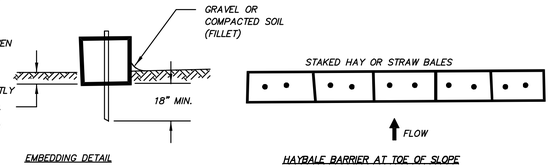
13



HAYBALE GRADE STABILIZATION STRUCTURE

CONSTRUCTION SPECIFICATIONS

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY 2" x 2" STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.
5. BALES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
6. REMOVE AND PROPERLY DISPOSE OF ALL SEDIMENT PRIOR TO REMOVING HAYBALES.

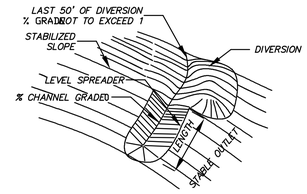


EMBEDDING DETAIL

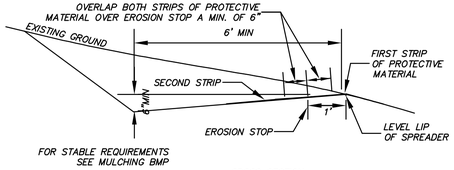
HAYBALE BARRIER AT TOE OF SLOPE

HAYBALE NOTES AND DETAILS

NOT TO SCALE



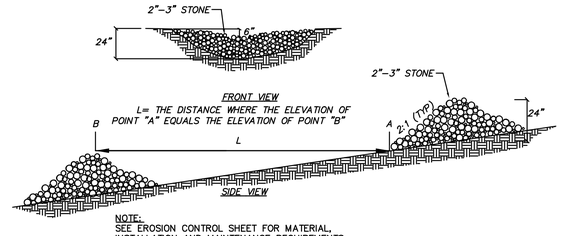
ISOMETRIC VIEW



CROSS SECTION

LEVEL SPREADER DETAIL

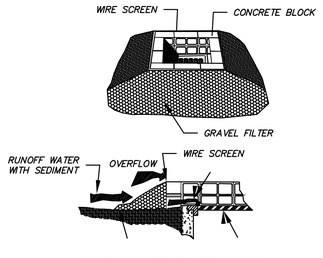
NOT TO SCALE



NOTE:
SEE EROSION CONTROL SHEET FOR MATERIAL, INSTALLATION AND MAINTENANCE REQUIREMENTS.

STONE CHECK DAM

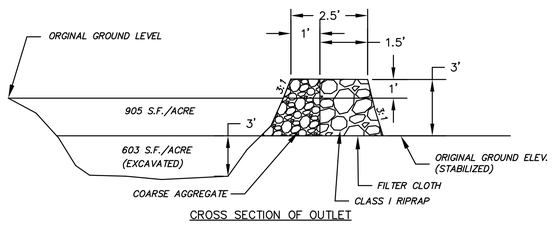
NOT TO SCALE



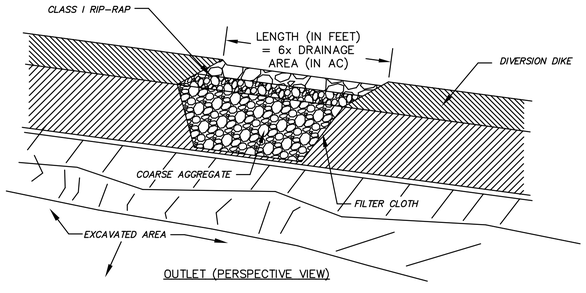
NORMAL USE AROUND CATCH BASINS

TEMPORARY EROSION CONTROL

NOT TO SCALE



CROSS SECTION OF OUTLET

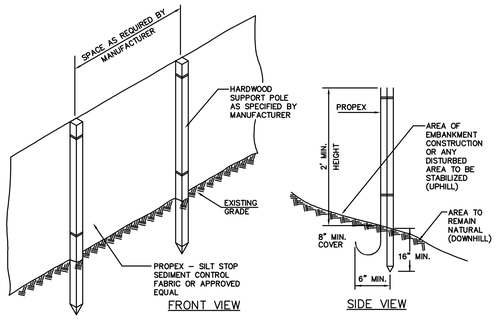


OUTLET (PERSPECTIVE VIEW)

NOTES:
1. COARSE AGGREGATE SHALL MEET NHDOT 304.5 SPECIFICATIONS AND SHALL NOT CONTAIN MORE THAN 5% FINES PASSING THE #200 SIEVE.
2. FILTER CLOTH SHALL BE MIRAFI 700X OR APPROVED EQUAL.
3. CLASS I RIPRAP SHALL MEET NHDOT 583 SS SPECIFICATIONS.
4. THE MAXIMUM CONTRIBUTING AREA TO THE TRAP SHALL BE LESS THAN 5 AC.
5. THE TRAP SHALL BE CLEANED WHEN 50% OF THE ORIGINAL VOLUME IS FILLED.
6. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

TEMPORARY SEDIMENT TRAP

NOT TO SCALE



SILT FENCE DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

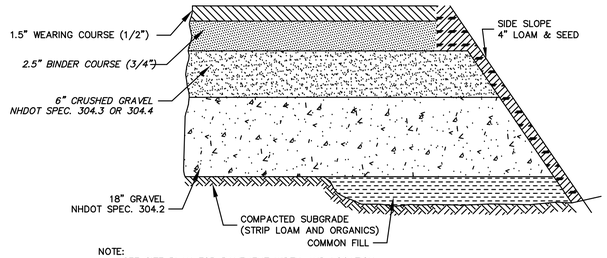
DATE: 8-6-24
SCALE: N.T.S.
DRAWN BY: SRD
DESIGN BY: JPG
APPROVED BY:SJH
PROJECT NO:24085
FILE: SITE.DWG

PLANNING FILE NO.: SITE-2024-

EROSION CONTROL DETAILS

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

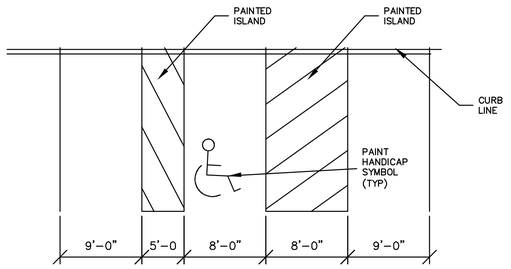
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820



NOTE:
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
3. GEOTEXTILE FABRIC MAYBE REQUIRED UNDER THE ROADWAY AND /OR THE PARKING AREAS AS REQUIRED BY THE ENGINEER BASED UPON SITE CONDITIONS.

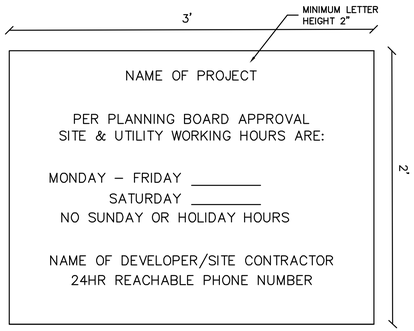
HEAVY DUTY TYPICAL PAVEMENT SECTION

NOT TO SCALE



ACCESSIBLE PARKING LAYOUT

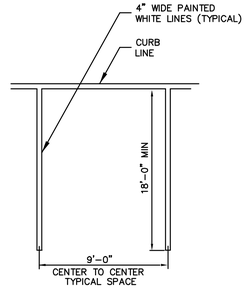
NOT TO SCALE



NOTES:
1. SIGN SHALL HAVE BLACK LETTERS ON A WHITE BACKGROUND
2. SIGN SHALL BE WEATHER RESISTANT AND SECURED TO THE GROUND
3. HOURS ON THE SIGN SHALL COMPLY WITH ALL PLANNING BOARD CONDITIONS OF APPROVAL.

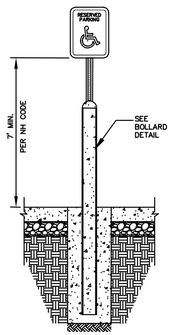
CITY OF DOVER D-2 CONSTRUCTION SIGN

NOT TO SCALE



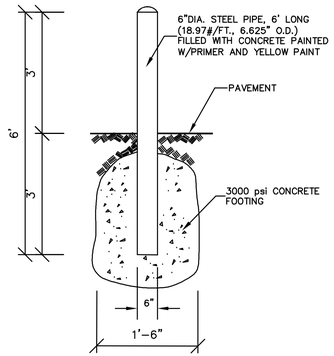
STANDARD PARKING STALL

NOT TO SCALE



SIGN IN BOLLARD

NOT TO SCALE



BOLLARD DETAIL

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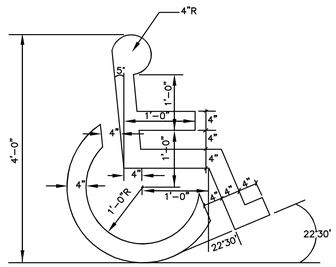
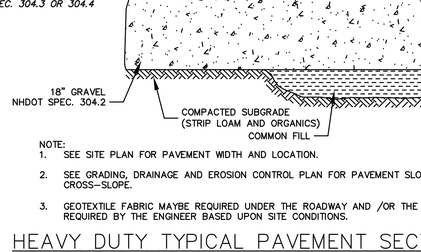


PAINTED ACCESSIBLE PARKING SYMBOL

NOT TO SCALE



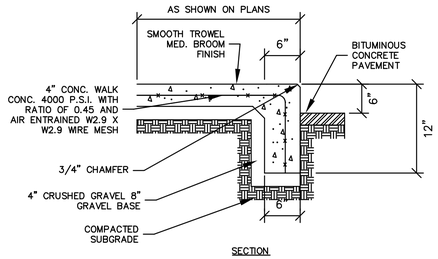
SLOPED GRANITE CURB

RADIUS	MAX LENGTH
< 21'	USE CURVED CURB
12'	3'
22' – 28'	4'
29' – 35'	5'
36' – 42'	6'
43' – 49'	7'
50' – 56'	8'
57' – 60'	9'
OVER 60'	10'

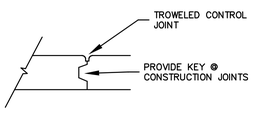
NOTES:
1. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
2. CONCRETE CURB SUPPORT SHOULD BE SET 1/2" BELOW THE TOP OF THE PAVEMENT BASE COURSE.

CITY OF DOVER D-8 GRANITE CURB DETAIL

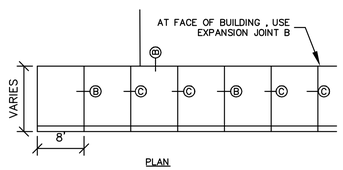
NOT TO SCALE



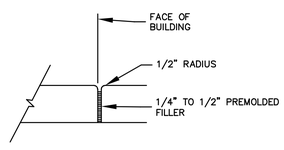
SECTION



CONSTRUCTION CONTROL JOINT C



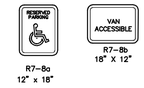
PLAN



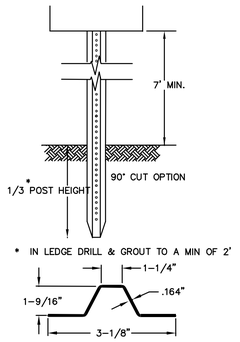
EXPANSION JOINT B

CONCRETE WALKWAY WITH MONLITHIC CONCRETE CURB

NOT TO SCALE



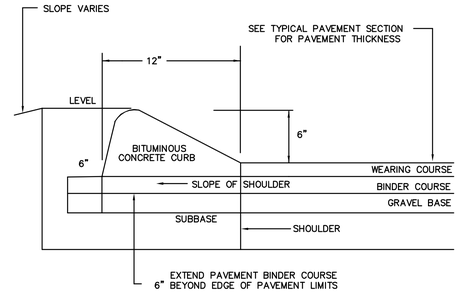
NOTE:
1. ALL SIGNS TO BE INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.



LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 – 1080)
FINISH: SHALL BE PAINTED WITH TWO COATS OF AN APPROVED MEDIUM GREEN
BAKED ON OR AIR DRIED, PAINT OF WEATHER RESISTANT QUALITY.
ALL FABRICATION SHALL BE COMPLETE BEFORE PAINTING.

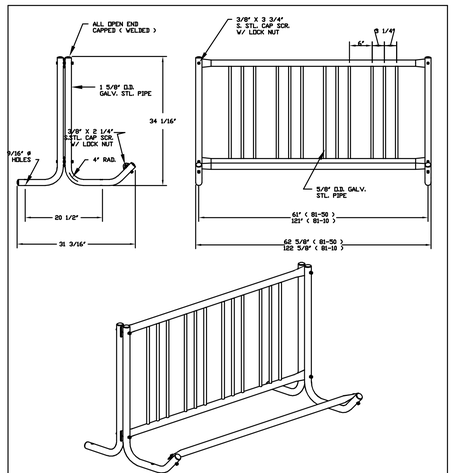
SIGN LEGEND & SIGN POST

NOT TO SCALE



BITUMINOUS CONCRETE CURB

NOT TO SCALE



NOTES:
1) ALL STL. MEMBERS GALVANIZED. WELDS COATED WITH ZINC-RICH FINISH.
2) 1/2" X 5 1/2" EXPANSION ANCHOR BOLTS PROVIDED.

LENGTH OPTIONS
☐ 5' RACK
☐ 10' RACK

DuMor, inc.
P.O. Box 142 Mifflintown, PA 17059-0142

SCALE:	NONE
DATE DRAWN:	3/22/94
DRAWN BY:	CDC
DATE REV.:	7/9/02
REV. BY:	CDC
TITLE:	SINGLE-SIDE ENTRY BIKE RACK
REV.	C
DRAWING NUMBER	81 SERIES
SHEET	1 OF 2

BIKE RACK DETAIL

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

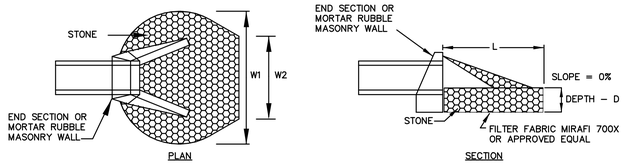
DATE: 8-6-24
SCALE: N.T.S.
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

PLANNING FILE NO.: SITE-2024-

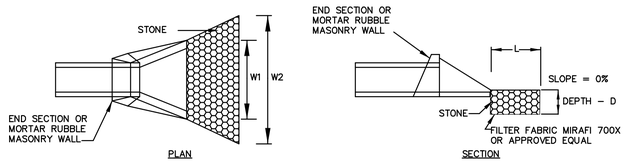
DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH



STONE APRON OUTLET PROTECTION DETAIL
OUTLET TO DEFINED CHANNEL



STONE APRON OUTLET PROTECTION DETAIL
OUTLET TO FLAT AREA, NON DEFINED CHANNEL

MAINTENANCE

THE OUTLET PROTECTION SHOULD BE CHECKED AT LEAST ANNUALLY AND AFTER EVERY MAJOR STORM. IF THE RIPRAP HAS BEEN DISPLACED, UNDERMINED OR DAMAGED, IT SHOULD BE REPAIRED IMMEDIATELY. THE CHANNEL IMMEDIATELY BELOW THE OUTLET SHOULD BE CHECKED TO SEE THAT EROSION IS NOT OCCURRING. THE DOWNSTREAM CHANNEL SHOULD BE KEPT CLEAR OF OBSTRUCTIONS SUCH AS FALLEN TREES, DEBRIS, AND SEDIMENT THAT COULD CHANGE FLOW PATTERNS AND/OR TAILWATER DEPTHS ON THE PIPES. REPAIRS MUST BE CARRIED OUT IMMEDIATELY TO AVOID ADDITIONAL DAMAGE TO THE OUTLET PROTECTION APRON.

STONE GRADATION

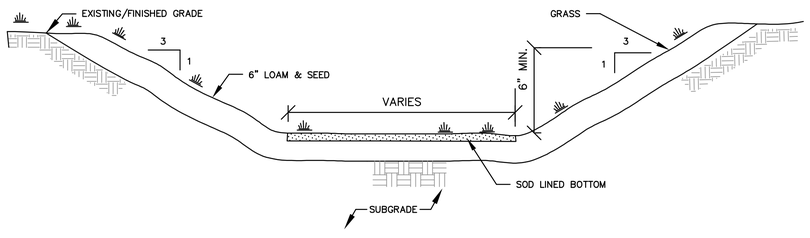
% OF WEIGHT SMALLER THAN THE GIVEN SIZE	SIZE OF STONE
100	1.5 TO 2.0 D50
85	1.3 TO 1.8 D50
50	1.0 TO 1.5 D50
15	0.3 TO 0.5 D50

CONSTRUCTION SPECIFICATIONS

1. THE SUBGRADE FOR THE FILTER MATERIAL, GEOTEXTILE FABRIC, AND RIPRAP SHALL BE PREPARED TO THE LINES AND GRADES SHOWN ON THE PLANS.
2. THE ROCK OR GRAVEL USED FOR FILTER OR RIPRAP SHALL CONFORM TO THE SPECIFIED GRADATION.
3. GEOTEXTILE FABRICS SHALL BE PROTECTED FROM PUNCTURE OR TEARING DURING THE PLACEMENT OF THE ROCK RIPRAP. DAMAGED AREAS IN THE FABRIC SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC OVER THE DAMAGED AREA OR BY COMPLETE REPLACEMENT OF THE FABRIC. ALL OVERLAPS REQUIRED FOR JOINING TWO PIECES OF FABRIC SHALL BE A MINIMUM OF 12 INCHES.
4. STONE FOR THE RIP RAP MAY BE PLACED BY EQUIPMENT AND SHALL BE CONSTRUCTED TO THE FULL LAYER THICKNESS IN ONE OPERATION AND IN SUCH A MANNER AS TO PREVENT SEGREGATION OF THE STONE SIZES.

OUTLET FROM	W1(ft)	W2(ft)	L(ft)	D (ft)	D50(IN)	CHANNEL TYPE
BIO-1	8	2	20	1	6	DEFINED
BIO-2	3	13	10	1	6	UNDEFINED
BIO-3	3	11	8	1	6	UNDEFINED

RIP RAP OUTLET PROTECTION
NOT TO SCALE



MAINTENANCE
TIMELY MAINTENANCE IS IMPORTANT TO KEEP THE VEGETATION IN THE SWALE IN GOOD CONDITION. MOWING SHOULD BE DONE FREQUENTLY ENOUGH TO KEEP THE VEGETATION IN VIGOROUS CONDITION AND TO CONTROL ENCROACHMENT OF WEEDS AND WOODY VEGETATION, HOWEVER IT SHOULD NOT BE MOWED TOO CLOSELY, MAINTAIN A MINIMUM 4" STAND OF VEGETATION. FERTILIZE ON AN "AS NEEDED" BASIS TO KEEP THE GRASS HEALTHY. OVER FERTILIZATION CAN RESULT IN THE SWALE BECOMING A SOURCE OF POLLUTION.

THE SWALE SHOULD BE INSPECTED PERIODICALLY AND AFTER EVERY MAJOR STORM TO DETERMINE THE CONDITION OF THE SWALE. RILLS AND DAMAGED AREAS SHOULD BE PROMPTLY REPAIRED AND REVEGETATED AS NECESSARY TO PREVENT FURTHER DETERIORATION.

GRASS LINED CONVEYANCE SWALE DETAIL
NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

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CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
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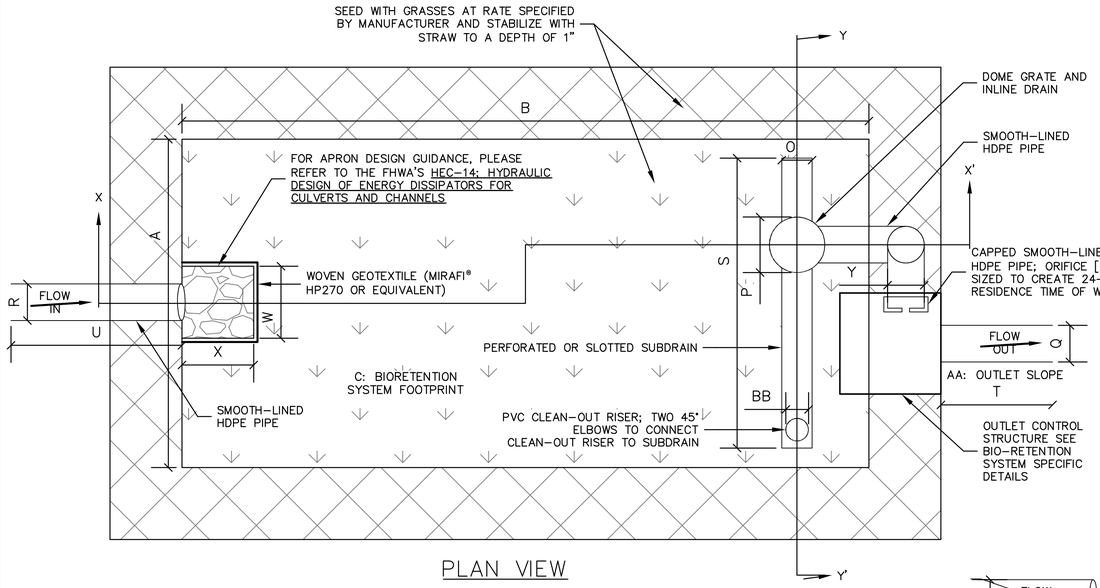
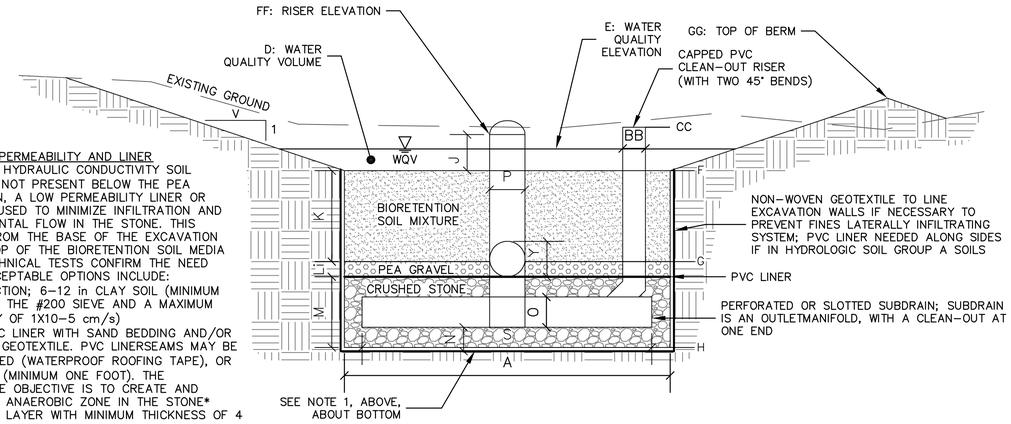


PLAN VIEW



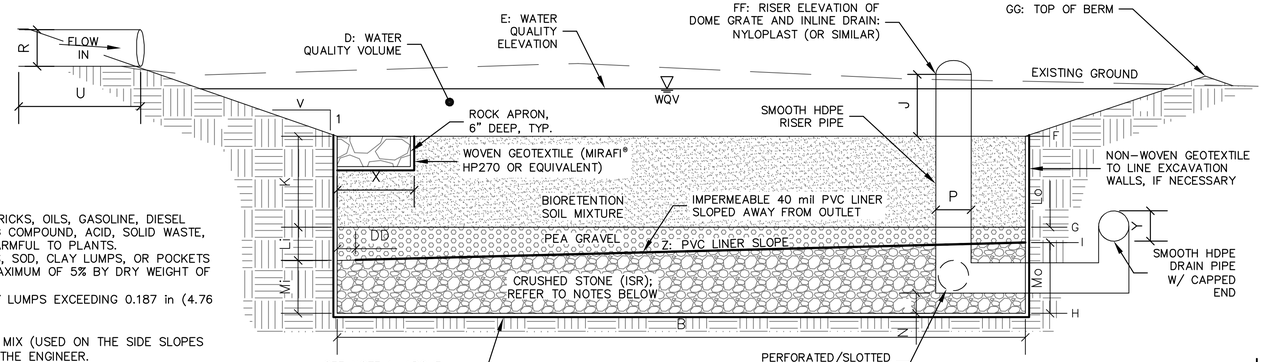
SECTION Y-Y'

NOTE 1: BOTTOM PERMEABILITY AND LINER
IF A NATIVE, LOW HYDRAULIC CONDUCTIVITY SOIL ($k \leq 0.03$ft/day) IS NOT PRESENT BELOW THE PEA GRAVEL ELEVATION, A LOW PERMEABILITY LINER OR SOIL SHOULD BE USED TO MINIMIZE INFILTRATION AND PRESERVE HORIZONTAL FLOW IN THE STONE. THIS LINER EXTENDS FROM THE BASE OF THE EXCAVATION TO ABOVE THE TOP OF THE BIORETENTION SOIL MEDIA LAYER. IF GEOTECHNICAL TESTS CONFIRM THE NEED FOR A LINER, ACCEPTABLE OPTIONS INCLUDE:

a. SOIL COMPACTION; 6-12 in CLAY SOIL (MINIMUM 15% PASSING THE #200 SIEVE AND A MAXIMUM PERMEABILITY OF 1X10-5 cm/s)
b. A 40 mil PVC LINER WITH SAND BEDDING AND/OR NON-WOVEN GEOTEXTILE. PVC LINERSEAMS MAY BE WELDED, TAPED (WATERPROOF ROOFING TAPE), OR OVERLAPPED (MINIMUM ONE FOOT). THE PERFORMANCE OBJECTIVE IS TO CREATE AND MAINTAIN AN ANAEROBIC ZONE IN THE STONE*
c. A BENTONITE LAYER WITH MINIMUM THICKNESS OF 4 in
d. USE OF CHEMICAL ADDITIVES (SEE NRCS AGRICULTURAL HANDBOOK #386, DATED 1961)
e. OR AN OTHERWISE PREPARED DESIGN BY A PROFESSIONAL ENGINEER

*IF ENGINEER BELIEVES THE PVC LINER IS AT RISK OF PUNCTURE, THE LINER MAY BE SANDWICHED BETWEEN NON-WOVEN GEOTEXTILE OR SAND (3 in THICKNESS)

NOTE: ADDITIONAL OUTLET STRUCTURES ABOVE THE ELEVATION OF THE WQV OR DESIGN VOLUME MAY BE NECESSARY TO CONVEY LARGE FLOWS.



SECTION X-X'

NOTES:

1. FOR FULL BIORETENTION STORMWATER SYSTEM SPECIFICATIONS, PLEASE REFER TO THE UNH STORMWATER CENTER'S BIORETENTION SPECIFICATIONS PUBLICATION, DATED FEBRUARY 2017, FOUND AT: https://www.unh.edu/unhsc/sites/default/files/media/unhsc_bsm_spec_2-28-17_0.pdf
2. SYSTEM FOOTPRINT NEED NOT BE RECTANGULAR, ANY SHAPE IS POSSIBLE. THESE DETAILS USE THE RECTANGULAR SHAPE AS AN EXAMPLE.
3. THESE DETAILS ARE NOT TO SCALE; FOR DIMENSIONS AND SPECIFICATIONS, REFERENCE EACH LETTER TO THE TABLE OF METRICS.
4. BIORETENTION SOIL MIX SHALL NOT BE PLACED UNTIL AFTER ENGINEERING APPROVAL AND INSPECTION OF SUBGRADE.
5. BIORETENTION SYSTEM IS RECOMMENDED TO HAVE PRETREATMENT (FOREBAY, SWALE, OR OTHER APPROVED STRUCTURE). PRETREATMENT IS REQUIRED FOR PROJECTS REQUIRING ALTERATION OF TERRAIN (AOT) PERMITTING.
6. PLANT THE SYSTEM AS SPECIFIED; AT A MINIMUM, SEED THE SYSTEM FLOOR AND SIDE SLOPES WITH RYE GRASS MIXTURE CONTAINING PERENNIAL AND WINTER RYES, AT A RATE SPECIFIED BY THE MANUFACTURER. STABILIZE THE SLOPES WITH STRAW TO A DEPTH OF 1".
7. GENERAL CONSTRUCTION GUIDELINES:
   - 7.1. VERIFY THAT NO FOREIGN OR DELETERIOUS MATERIAL OR LIQUID SUCH AS PAINT, PAINT WASHOUT, CONCRETE SLURRY, ASPHALT/CONCRETE LAYERS OR CHUNKS. CEMENT, PLASTER, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, SOLID WASTE, OR ACID HAS BEEN DEPOSITED IN PLANTING SOIL (BIORETENTION MEDIA OR LOAM ON SIDE SLOPES).
   - 7.2. PROCEED WITH PLACEMENT OF ANY SUBSURFACE MATERIALS ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
   - 7.3. COMPACT EACH BLENDED LIFT OF BIORETENTION SOIL MEDIA TO 75% OF MAXIMUM STANDARD PROCTOR DENSITY ACCORDING TO ASTM D698.
   - 7.4. GRADE SOIL MEDIA TO A SMOOTH, UNIFORM SURFACE PLANE WITH LOOSE, UNIFORMLY FINE TEXTURE. ROLL AND RAKE, REMOVE RIDGES, AND FILL DEPRESSIONS TO MEET FINISH GRADES.
   - 7.5. LIGHTLY COMPACT FINISHED FLOOR ELEVATION AND FINISHED SLOPES USING THE BUCKET OF AN EXCAVATOR, NON-MOTORIZED ROLLER, HAND TAMP, OR OTHER MEANS, THEN ROUGHEN SURFACE WITH A RAKE TO LOOSEN SOILS BEFORE SEEDING.
   - 7.6. DO NOT COMPACT THE SUBGRADE AT THE BOTTOM OF EXCAVATION UNLESS PERMEABILITY EXCEEDS $1x10^{-5}$ cm/s
8. BIORETENTION SOIL MEDIA (BSM) MIXTURE SPECIFICATIONS:
   - 8.1. STICKS AND ROOTS SHOULD BE MINIMIZED IN THE BSM MIXTURE, AND PREFERABLY LIMITED TO NOTHING LARGER THAN 4.76 mm (0.187 in).
   - 8.2. DEBRIS AND OTHER FOREIGN MATERIALS SHOULD BE MINIMIZED.
   - 8.3. ORGANIC MATTER SHOULD MAKE UP A MINIMUM OF 3% BY VOLUME AND A MAXIMUM 8% BY VOLUME OF THE BSM.
   - 8.4. BSM MIXTURE SHOULD HAVE A SOIL REACTION pH OF 6 TO 7.
   - 8.5. CATION EXCHANGE CAPACITY (CEC) OF BSM SHOULD BE A MINIMUM OF 10 meq PFR 100 ml AT A pH OF 7.0.
9. IF BSM IS PURCHASED FROM A MANUFACTURER, BSM MIXTURE SHALL NOT CONTAIN THE FOLLOWING:
   - 9.1. UNACCEPTABLE MATERIALS: CONCRETE SLURRY, CONCRETE LAYERS OR CHUNKS, CEMENT, PLASTER, BUILDING DEBRIS, ASPHALT, BRICKS, OILS, GASOLINE, DIESEL FUEL, PAINT THINNER, TURPENTINE, TAR, ROOFING COMPOUND, ACID, SOLID WASTE, OR OTHER EXTRANEOUS MATERIALS THAT ARE HARMFUL TO PLANTS.
   - 9.2. UNSUITABLE MATERIALS: STONES, ROOTS, PLANTS, SOD, CLAY LUMPS, OR POCKETS OF COARSE SAND THAT EXCEEDS A COMBINED MAXIMUM OF 5% BY DRY WEIGHT OF THE MANUFACTURED SOIL.
   - 9.3. LARGE MATERIALS: STONES, CLODS, ROOTS, CLAY LUMPS EXCEEDING 0.187 in (4.76 mm) IN ANY DIMENSION.
10. ORGANIC SOIL AMENDMENTS:
    - 10.1. NO COMPOST SHOULD BE USED IN THE PLANTING MIX (USED ON THE SIDE SLOPES AND SURROUNDING AREA) UNLESS SPECIFIED BY THE ENGINEER.
    - 10.1. SPHAGNUM PEAT: PARTIALLY DECOMPOSED SPHAGNUM PEAT MOSS, FINELY DIVIDED OR OF GRANULAR TEXTURE WITH 100% PASSING THROUGH A 1/2-in (13 mm) SIEVE, WITH A pH OF 3.4 TO 4.8.
    - 10.2. WOOD DERIVATIVES: SHREDDED WOOD, WOOD CHIPS, GROUND BARK, OR WOOD WASTE; OF UNIFORM TEXTURE AND FREE OF STONES, STICKS, SOIL, OR TOXIC MATERIAL.
11. THE CRUSHED STONE LAYER SHOULD CONSIST OF AASHTO #5 STONE (3/4-in).
12. THE VOLUME OF WATER CONTAINED ABOVE THE BSM ELEVATION AND BELOW THE HIGH FLOW SPILLWAY IS STATISTICALLY DESIGNED TO HOLD A SPECIFIC RUNOFF VOLUME.
13. THE DESIGN VOLUME ABOVE THE BSM IS PREFERABLY THE WQV. THIS VOLUME MAY NOT BE ACHIEVABLE FOR RETROFIT INSTALLATIONS

BIORETENTION SYSTEM DESIGN METRICS

ID	DESIGN PARAMETER	MIN	BIO 1	BIO 2	BIO 3	UNITS
A	SYSTEM FLOOR WIDTH		14	19	10	FT
B	SYSTEM FLOOR LENGTH		49	60	28	FT
C	BIORETENTION FOOTPRINT AREA		686	1,140	280	SF
D	WATER QUALITY VOLUME		1,274	2,203	435	CF
E	WQV ELEVATION		95.42	95.09	95.16	FT
F	SYSTEM FLOOR ELEVATION		94.85	94.60	94.60	FT
G	BOTTOM BSM ELEVATION		93.35	93.10	93.10	FT
H	BOTTOM STONE ELEVATION		91.85	91.60	91.60	FT
I	TOP STONE/OUTLET INVERT ELEVATION		93.10	92.85	92.85	FT
J	PONDING DEPTH BELOW LOWEST INV.		0.65	0.50	0.60	FT
K	BSM MEDIA DEPTH	18	18	18	18	IN
Li	INLET END PEA GRAVEL DEPTH		6	7	5	IN
Lo	OUTLET END PEA GRAVEL DEPTH	3	3	3	3	IN
Mi	INLET END CRUSHED STONE DEPTH		12	11	13	IN
Mo	OUTLET END CRUSHED STONE DEPTH	14	15	15	15	IN
N	SUBDRAIN DEPTH ABOVE BOTTOM	4	4	4	4	IN
O	PERFORATED SUBDRAIN DIAMETER	6	6	6	6	IN

BIORETENTION SYSTEM DESIGN METRICS

ID	DESIGN PARAMETER	MIN	BIO 1	BIO 2	BIO 3	UNITS
P	RISER PIPE DIAMETER	6	12	12	12	IN
Q	OUTLET PIPE DIAMETER	6	12	12	12	IN
R	INFLOW PIPE DIAMETER		N/A	N/A	N/A	IN
S	PERFORATED SUBDRAIN LENGTH		12	16	7	FT
T	OUTLET PIPE LENGTH		10	10	10	FT
U	INFLOW PIPE LENGTH		N/A	N/A	N/A	FT
V	SLOPE GRADE (RUN PER 1ft RISE)		3	3	3	FT
W	ROCK APRON WIDTH		N/A	N/A	N/A	FT
X	ROCK APRON LENGTH		N/A	N/A	N/A	FT
Y	SMOOTH LINED HDPE PIPE DIAMETER		6	6	6	IN
Z	PVC LINER SLOPE		0.51	0.56	0.60	%
AA	OUTLET PIPE SLOPE		1.0	1.0	1.0	%
BB	CLEAN-OUT RISER DIAMETER		6	6	6	IN
CC	CLEAN-OUT RISER ELEVATION		95.75	95.75	95.75	FT
DD	PVC LINER GAP	0.1*B	5	6	3	FT
EE	OUTLET PIPE ORIFICE DIAMETER		7/8	1-1/8	1/2	IN
FF	RISER ELEVATION		95.50	95.10	95.20	FT
GG	TOP OF BERM		96.25	96.25	96.25	FT

ACCEPTABLE PARTICLE SIZE DISTRIBUTION OF FINAL BIORETENTION SOIL MIX

MEDIA TYPE	SIEVE #	SIZE (in)	SIZE (mm)	% PASSING
COARSE SAND	4	0.187	4.76	100
MEDIUM SAND	10	0.079	2.00	95
FINE SAND	40	0.017	0.42	40-15
SILTS	200	0.003	0.075	10-20
CLAYS	<200	PAN	PAN	0-5

BIORETENTION SOIL MEDIA COMPONENTS: *

- AMOUNTS MIXED BY TOTAL VOLUME
- 60-85% - SAND (0.5 TO 2.0 mm) (SEE SPECS ABOVE)
- 15-25% - LOAM OR TOPSOIL
- 3-8% - ORGANIC MATTER
- 0-5% - WATER TREATMENT RESIDUALS OR IRON FILINGS**

*ALTERNATELY, USE MEDIA SPECIFIED IN THE ALTERATION OF TERRAIN RULES, Env-Wq 1508.07(k)
**THIS IS AN AMENDMENT USED FOR ENHANCED PHOSPHORUS ADSORPTION

INTERNAL STORAGE RESERVOIR (ISR) NOTES:

- THE HYBRID BIORETENTION SYSTEM HARBORS AN ANAEROBIC INTERNAL STORAGE RESERVOIR FOR NITROGEN REMOVAL.
- THE ISR IS SEPARATED BY AN IMPERMEABLE PVC LINER BETWEEN THE PEA GRAVEL AND CRUSHED STONE LAYERS.
- THE PVC LINER SLOPES FROM THE OUTLET TOWARDS THE INLET TO MAXIMIZE STORAGE RETENTION AND PROVIDE EXTRA TREATMENT/FILTER TIME VIA PLUG FLOW THROUGH CRUSHED STONE.
- DESIGN GUIDELINES FOR THE SUBSURFACE GRAVEL WETLAND SPECIFICATIONS (UNHSC, 2016) IDENTIFIED THAT THE WATER VOLUME IN THE ISR BE AT LEAST 0.26*WQV [WATER QUALITY VOLUME], OR 26% OF THE WQV.
- PVC LINER THICKNESS OF 40 TO 60 MIL, PREFERABLY SEAMLESS. IF SEAMS ARE UNAVOIDABLE, THE SEAMS SHOULD BE SEALED.

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LOT 2 DEVELOPMENT
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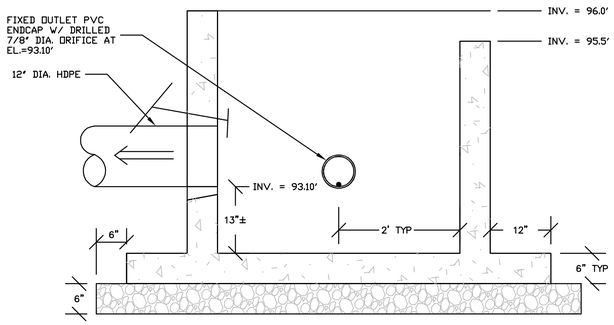
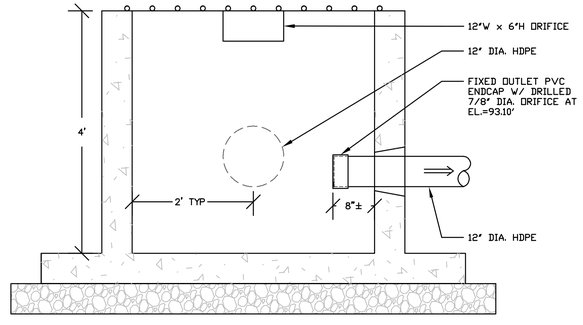
17



SIDE VIEW

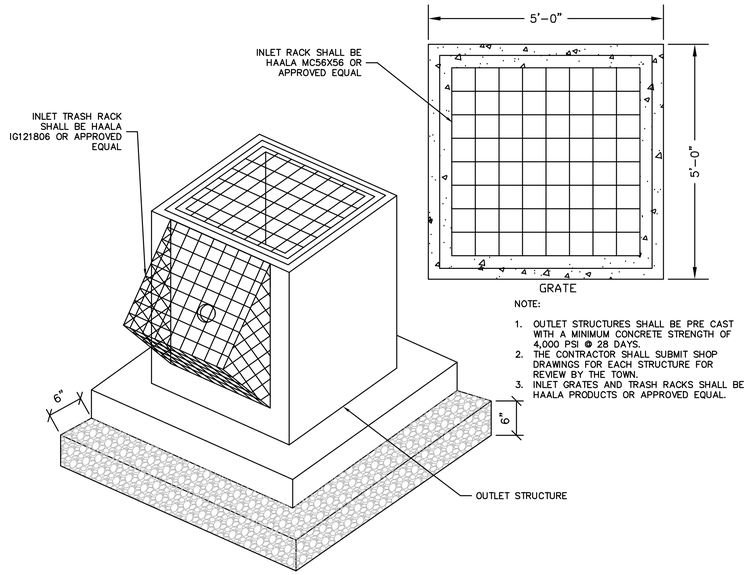


FRONT VIEW

NOTE:
1) ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3) SUMPS SHALL NOT BE GREATER THAN 8 INCHES.

BIORETENTION POND 1 (BIO1) OUTLET STRUCTURE DETAIL

NOT TO SCALE

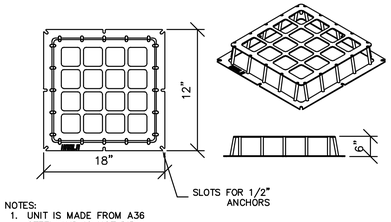


NOTE:

1. OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3. INLET GRATES AND TRASH RACKS SHALL BE HAALA PRODUCTS OR APPROVED EQUAL.

TYPICAL INLET TRASH RACKS

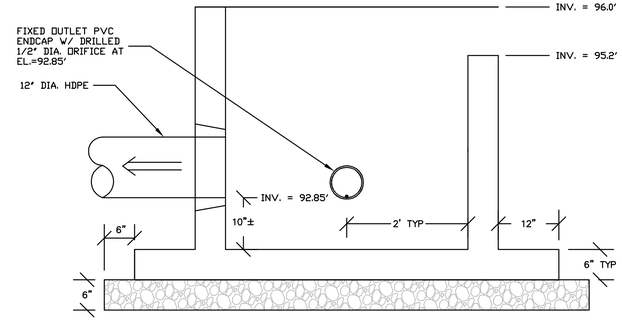
NOT TO SCALE



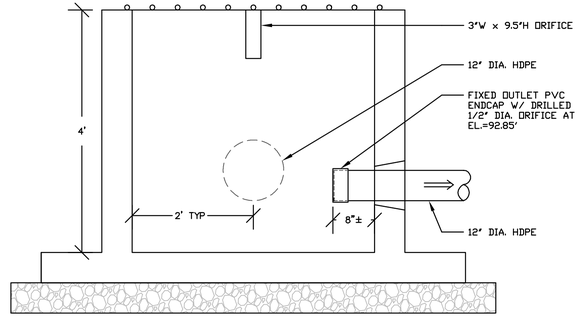
NOTES:
1. UNIT IS MADE FROM A36 STEEL AND IS HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123.

HAALA IG121806

NOT TO SCALE



SIDE VIEW



FRONT VIEW

NOTE:
1) ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3) SUMPS SHALL NOT BE GREATER THAN 8 INCHES.

BIORETENTION POND 2 (BIO2) OUTLET STRUCTURE DETAIL

NOT TO SCALE

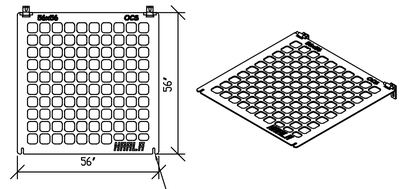
SIDE VIEW

FRONT VIEW

NOTE:
1) ALL OUTLET STRUCTURES SHALL BE PRE CAST WITH A MINIMUM CONCRETE STRENGTH OF 4,000 PSI @ 28 DAYS.
2) THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EACH STRUCTURE FOR REVIEW BY THE TOWN.
3) SUMPS SHALL NOT BE GREATER THAN 8 INCHES.

BIORETENTION POND 3 (BIO3) OUTLET STRUCTURE DETAIL

NOT TO SCALE



NOTES:
1. UNIT IS MADE FROM A36 STEEL AND IS HOT DIP GALVANIZED AFTER FABRICATION PER ASTM A123.

HAALA MC56X56

NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

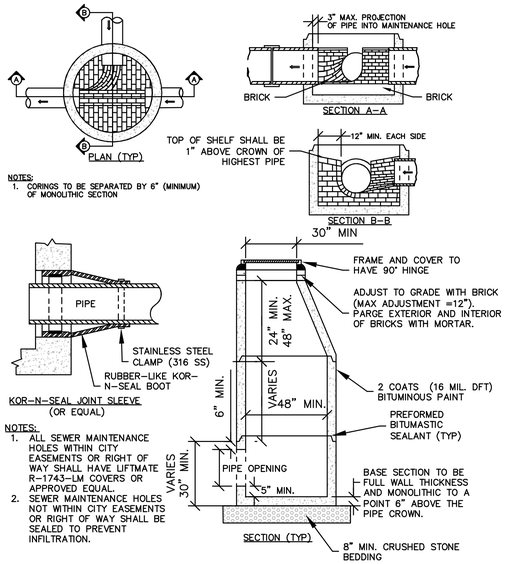
DATE: 8-6-24
SCALE: N.T.S
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

PLANNING FILE NO.: SITE-2024-

DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

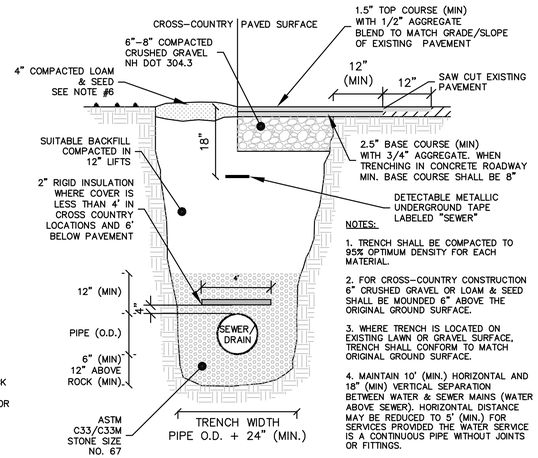
LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH



NOTES:
1. CORINGS TO BE SEPARATED BY 6" (MINIMUM) OF MONOLITHIC SECTION

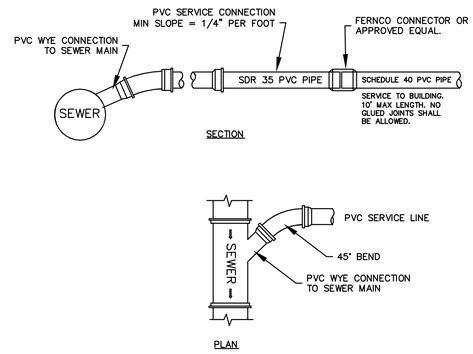
NOTES:
1. ALL SEWER MAINTENANCE HOLES WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL HAVE LIFTMATE R-1743-LM COVERS OR APPROVED EQUAL.
2. SEWER MAINTENANCE HOLES NOT WITHIN CITY EASEMENTS OR RIGHT OF WAY SHALL BE SEALED TO PREVENT INFILTRATION.

CITY OF DOVER D-16
SEWER MANHOLE DETAIL
NOT TO SCALE



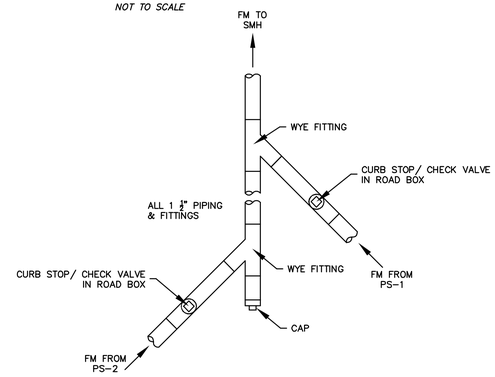
NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT AND ROCKS OVER 6" IN LARGEST DIMENSION
6. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.

CITY OF DOVER D-3
SEWER TRENCH DETAIL
NOT TO SCALE

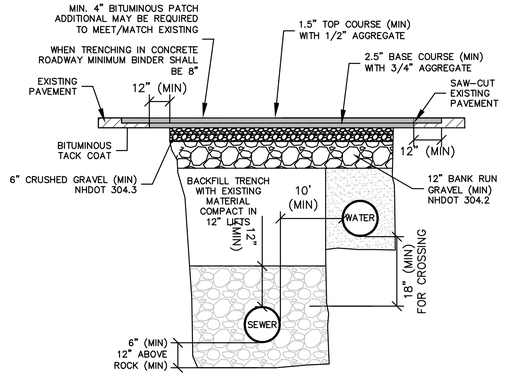


NOTES:
1. TRENCHING AND BEDDING REQUIREMENTS PER CITY SEWER TRENCH DETAIL (D-3).
2. SERVICE LATERAL DIAMETER VARIES PER APPLICATION. REVIEW SIZE WITH CITY ENGINEER PRIOR TO INSTALLATION.
3. SDR 35 SHALL NOT EXTEND INTO THE BUILDING

CITY OF DOVER D-17
SEWER SERVICE DETAIL
NOT TO SCALE



FORCE MAIN CONNECTION DETAIL
NOT TO SCALE



NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY.
2. ALL WORK SHALL COMPLY WITH THE CITY OF DOVER CONSTRUCTION GUIDELINES AND PROCEDURES
3. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.

CITY OF DOVER
TYPICAL TRENCH DETAIL
NOT TO SCALE

TRELLEBORG PIPE SEALS

TRELLEBORG

Kor-N-Seal® I Stainless Steel Wedge Connector (WS Series)

Installation Instructions

CONNECTOR INSTALLATION

1. Check to be sure the Stainless Steel Waveband® is properly located in Connector groove.
2. Inspect the inside surface of the cored/formed hole. If there is porosity or wire-to-concrete separation, use patching or hydraulic cement to smooth the surface.
3. Insert Connector Assembly into hole with Wedge Expander at top of hole.
4. Position Connector so it is square to manhole both vertically and horizontally.
5. Tighten Wedge Expander using 1/2" socket wrench to 12 foot pounds.
6. Retorquing prior to shipment is recommended but not required.

Note if Vacuum Testing

Testing should be done prior to backfilling so that leaks can be easily located and repaired.

All lift holes need to be plugged with a nonshrinking mortar.

Plug all pipes entering the manhole, taking care to securely brace the pipes and plugs.

Patented Waveband technology "captures" the rubber between itself and the concrete, creating a more effective seal.

*Covered under US Patent No.: 5,738,359

PIPE INSTALLATION

1. Be sure sealing area of pipe is smooth and free of defects. Repair if needed.
2. Center pipe in Connector opening. (Pipe must not rest on Connector Korband)
3. Position the Pipe Clamp in the Connector's Pipe Clamp groove with the screw at the top.
4. Tighten the Pipe Clamp screw to 60 inch pounds with a T-handle Torque Wrench, P/N 80090

Note:

On minimum pipe O.D. installations, tension the rubber under the pipe clamp by lifting the rubber toward pipe clamp screw housing by hand. This will help prevent the rubber from wrinkling or folding over during tightening of hose clamp. Application of a very small amount pipe lube on the pipe clamp track will allow the pipe clamp to slide on the rubber and improve the performance of the hose clamp. Make sure to torque all screw locations on the pipe clamps.

Caution:

Do not use an impact wrench for installation.

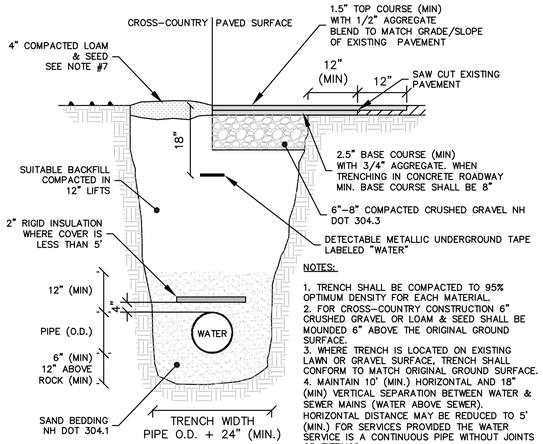
All pipe stubs must be restrained.

Adapters are required when using Corrugated Pipe. Refer to the Corrugated Pipe Adapter Data Sheet for more information.

Check calibration of torque limiters monthly

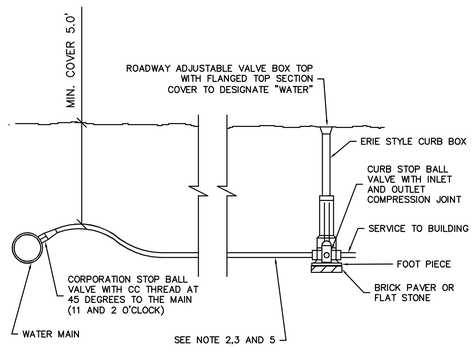
Torque limiters are available for connectors that can be used with cordless drills and hand or air ratchets.

Call 800-626-2180 for information.



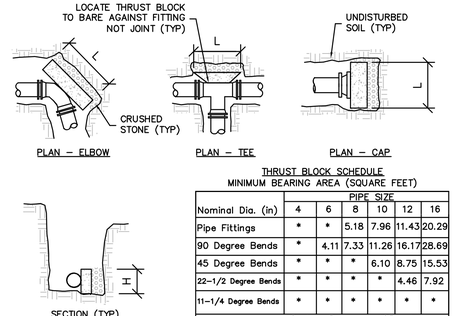
NOTES:
1. TRENCH SHALL BE COMPACTED TO 95% OPTIMUM DENSITY FOR EACH MATERIAL.
2. FOR CROSS-COUNTRY CONSTRUCTION 6" CRUSHED GRAVEL OR LOAM & SEED SHALL BE MOUNDED 6" ABOVE THE ORIGINAL GROUND SURFACE.
3. WHERE TRENCH IS LOCATED ON EXISTING LAWN OR GRAVEL SURFACE, TRENCH SHALL CONFORM TO MATCH ORIGINAL GROUND SURFACE.
4. MAINTAIN 10' (MIN.) HORIZONTAL AND 18" (MIN) VERTICAL SEPARATION BETWEEN WATER & SEWER MAINS (WATER ABOVE SEWER). HORIZONTAL DISTANCE MAY BE REDUCED TO 5' (MIN.) FOR SERVICES PROVIDED THE WATER SERVICE IS A CONTINUOUS PIPE WITHOUT JOINTS OR FITTINGS.
5. BACKFILL MATERIAL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING THE COURSE OF CONSTRUCTION, BUT SHALL EXCLUDE; DEBRIS, PAVEMENT, ORGANIC MATTER, TOP SOIL, MUCK, PEAT, AND ROCKS OVER 6" IN LARGEST DIMENSION
6. PROVIDE MINIMUM 5' OF COVER. ENGINEERING APPROVAL REQUIRED FOR LESS THAN 5' OF COVER.
7. LOAM AND SEED SHOULD BE IN COMPLIANCE WITH NH DOT 641, 642, 643, 644 AND 645.
8. CLASS 52 DUCTILE IRON PIPE

CITY OF DOVER D-4
WATER TRENCH DETAIL
NOT TO SCALE



NOTES:
1. ALL WATER LINES 4" OR GREATER SHALL BE DUCTILE IRON WITH AN 8 MIL POLYETHYLENE WRAP, INCLUDING TEE AND OTHER CONNECTIONS.
2. WATER SERVICE LINES SHALL BE COPPER TUBING (TYPE K) BETWEEN MAIN AND CURB STOP.
3. SERVICE BETWEEN CURB STOP AND BUILDING MAY BE (BLUE OR BLACK) CTS SDR 9 PLASTIC POLYETHYLENE RATED FOR 250 psi.
4. CAM-LOCK REQUIRED FOR CTS OR IPS, MJ ADAPTER REQUIRED FOR HDPE
5. 3/4"- COPPER, CTS
   1"- COPPER, CTS
   2"- CTS, HDPE, IPS

CITY OF DOVER D-13
WATER SERVICE CONNECTION DETAIL
NOT TO SCALE



THRUST BLOCK SCHEDULE
MINIMUM BEARING AREA (SQUARE FEET)

	PIPE SIZE					
Nominal Dia. (in)	4	6	8	10	12	16
Pipe Fittings	*	*	5.18	7.96	11.43	20.29
90 Degree Bends	*	4.11	7.33	11.26	16.17	28.69
45 Degree Bends	*	*	*	6.10	8.75	15.53
22-1/2 Degree Bends	*	*	*	*	4.46	7.92
11-1/4 Degree Bends	*	*	*	*	*	*
*SEE NOTE 2	System Pressure: 125 psi Safety Factor: 1.5 Soil Bearing Capacity: 2,000 psf					

NOTES:
1. ALL THRUST BLOCKS SHALL BE PRE-CAST CONCRETE UNLESS APPROVED BY THE CITY ENGINEER.
2. 2'X2'X2' MINIMUM THRUST BLOCK REQUIRED, ANY BEARING AREA OVER 4SF REQUIRES THRUST BLOCKS, RESTRAINED JOINTS AND CALCULATIONS ASSOCIATED WITH THE JOINT.
3. THE MINIMUM BEARING AREAS SHOWN IN THE THRUST BLOCK SCHEDULE ARE BASED ON A SYSTEM PRESSURE OF 125 PSI. IF THE SYSTEM PRESSURE IS ABOVE 125 PSI, INCREASE THE NOTED AREAS PROPORTIONALLY TO THE ACTUAL SYSTEM PRESSURE.
4. FOR MINIMUM BEARING AREAS OVER 4 SF, THE LENGTH (L) OF THE BLOCK IS APPROXIMATELY TWICE AS LONG AS THE HEIGHT (H).
5. PLACE CRUSHED STONE BEHIND THRUST BLOCK AGAINST UNDISTURBED SOIL.
6. PLACE THRUST BLOCK ALONG MAXIMUM LENGTH OF THE FITTING TO MAXIMIZE BEARING AREA.
7. CONCRETE COMPRESSIVE STRENGTH: 2,000 PSI MINIMUM.
8. USE OF THRUST BLOCKS DOES NOT ELIMINATE THE REQUIREMENT OF OTHER RESTRAINTS OR VICE VERSA.

CITY OF DOVER D-15
THRUST BLOCK DETAIL
NOT TO SCALE

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

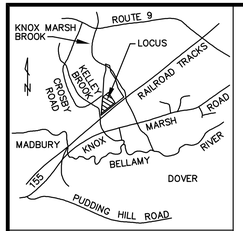
DATE: 8-6-24
SCALE: N.T.S.
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

PLANNING FILE NO.: SITE-2024-

DETAILS

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH



LOCATION PLAN
(NO SCALE)

FORMER HANSON ROAD

50' WETLAND BUFFER

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

PUBLIC R.O.W. 75'

312'R

288'R

SGC

STOP

20'R

12'R

8'R

BCC

3'R

ICC

35' SETBACK

10' SETBACK

PROPOSED 9,600 S.F. BUILDING

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

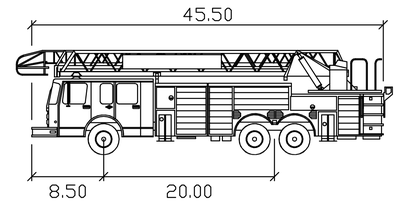
WETLANDS DELINEATED BY BAG NAD CONSOLTANTS

50' BUFFER

G / 2-1

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

NHF&G DEED RESTRICTED WILDLIFE AREA



Dover ladder

	feet
Width	: 8.50
Track	: 8.50
Lock to Lock Time	: 6.0
Steering Angle	: 44.0

NH STATE PLANE NAD 83 GPS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CNE CIVILWORKS NEW ENGLAND
CIVIL & WATERFRONT ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

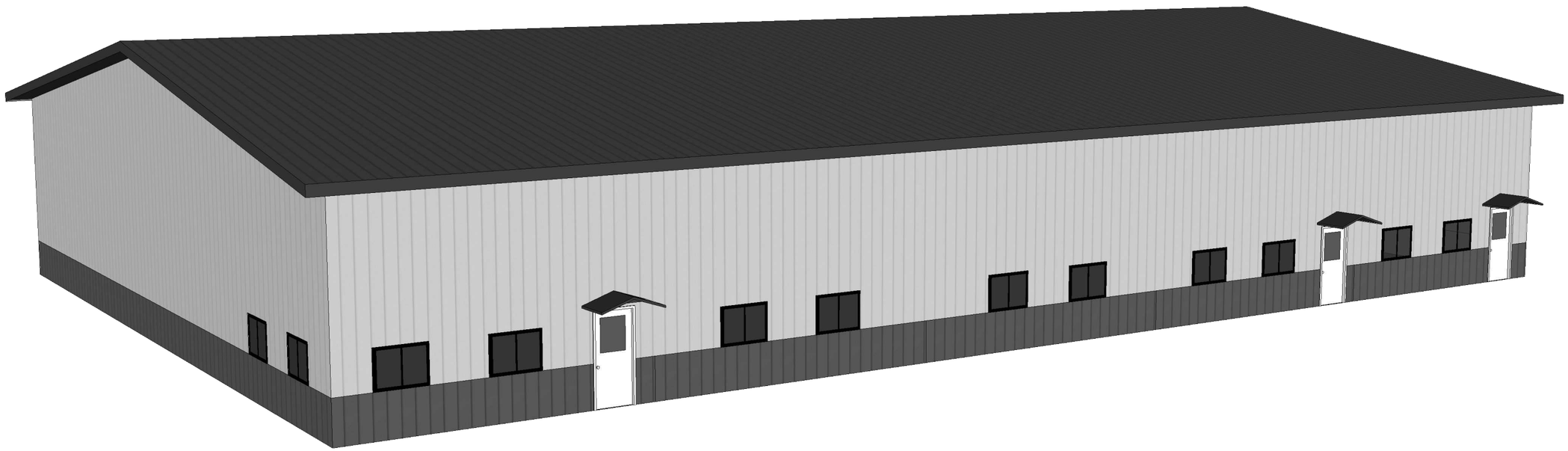
DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

TRUCK MOVEMENT PLAN

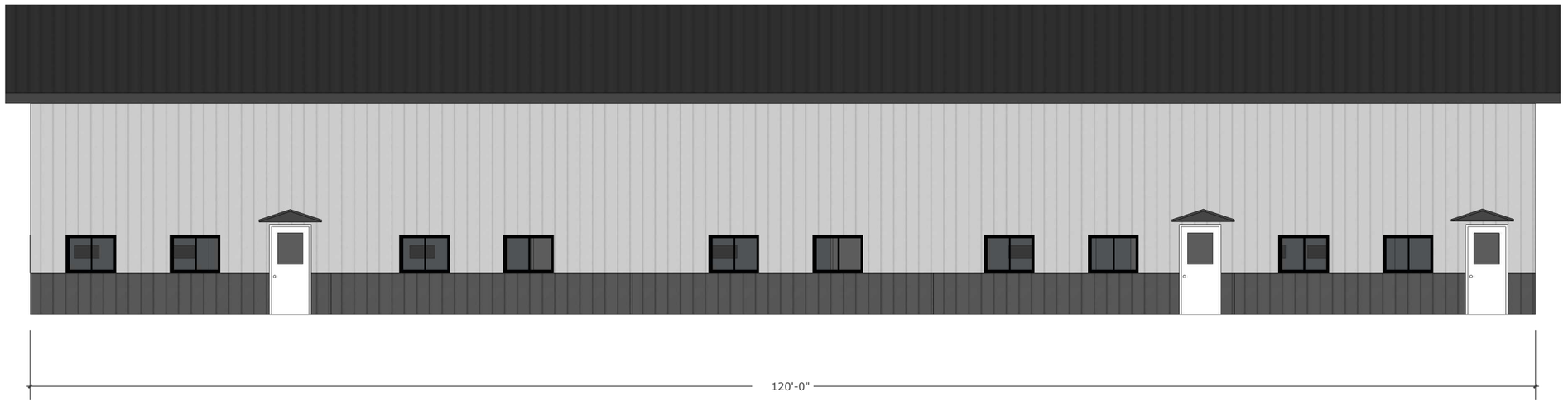
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

20



Seacoast Crane & Building Co., Inc.



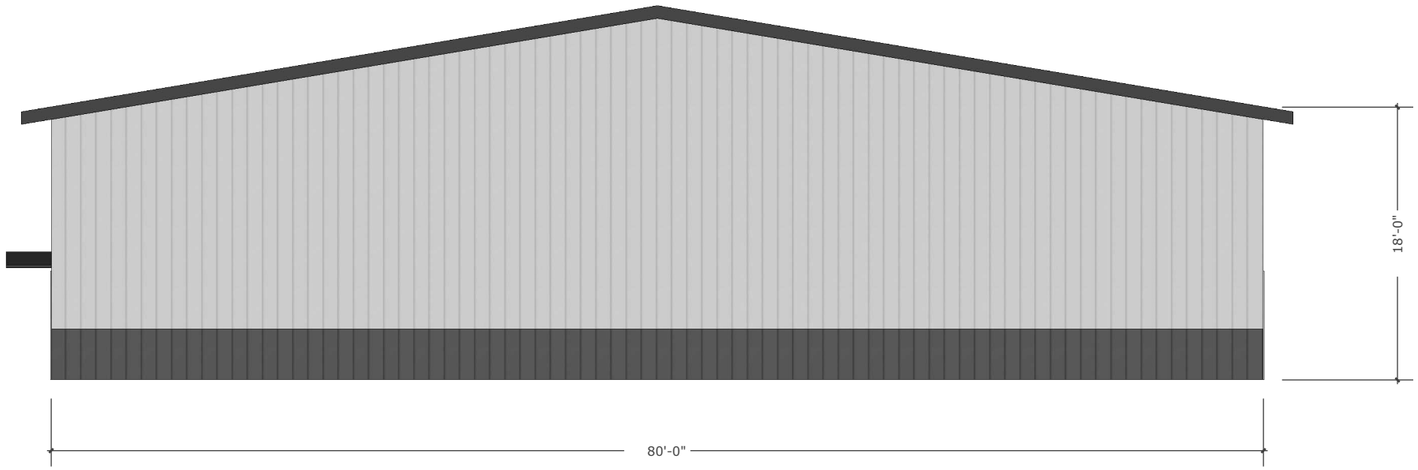
Front Side Wall Elevation

A
01

Back Sidewall Elevations

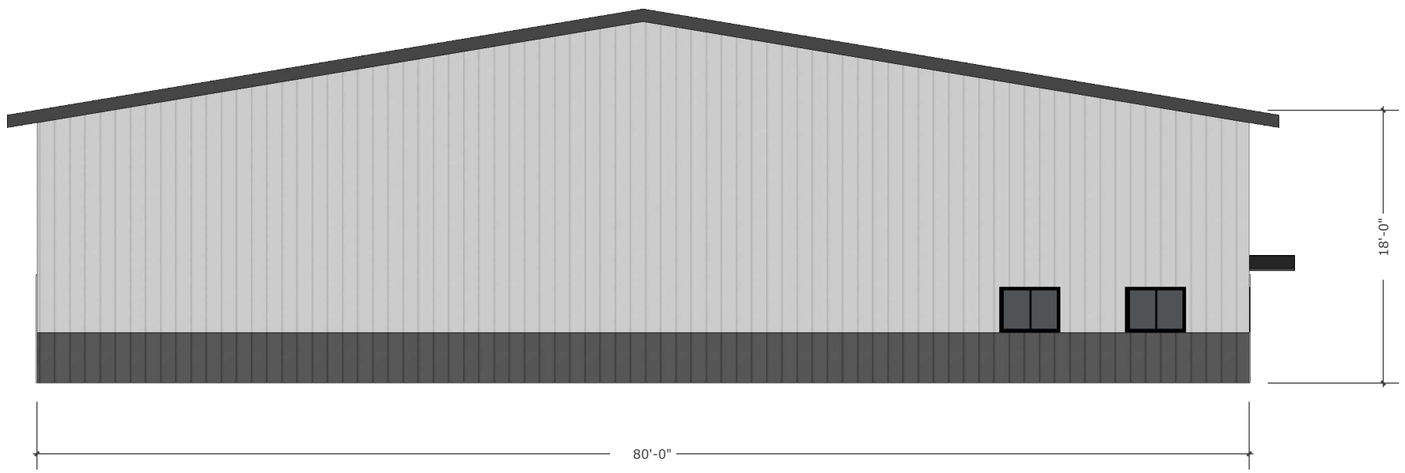
A
02

Seacoast Crane & Building Co., Inc.



Left Endwall Elevation

A
01



Right Endwall Elevation

A
02

Stormwater Management System Inspection & Maintenance Plan

Prepared for:

LOT 2 SITE DEVELOPMENT
Map G, Lot 2-1

Crosby Road
Dover, New Hampshire
Strafford County

AUGUST 2024

Owner of Record:

DEL SOL DOVER, LLC
340 Central Avenue
Suite 202
Dover, New Hampshire 03820

Prepared By:

CIVILWORKS NEW ENGLAND
P.O. Box 1166
181 Watson Road
Dover, New Hampshire 03821

Introduction

Civilworks NE, has prepared the following Stormwater Management System Inspection & Maintenance Plan for **Del Sol Dover, LLC.** The intent of this plan is to provide a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this site.

The inspection and maintenance requirements outlined in this document are required to be performed in perpetuity. In the event the property is sold, future owners will be responsible for implementing the responsibilities outlined in this document.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will also help to minimize potential environmental impacts to the areas surrounding the developed site. By following the enclosed procedures, the property owners, and maintenance personnel will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

This plan also requires the Owner/Operator to prepare and implement a salt minimization plan to reduce salt usage on-site and ultimately within the watershed. This plan will allow the owner/operator to monitor and modify how much salt is needed, when it should be applied, where it needs to be applied, with the ultimate goal of reducing salt-use without compromising safety. It is expected that salt-use reduction will lead to long-term cost-savings as a result of purchasing less salt and reduced impacts on vegetation (e.g., landscaping) and corrosion of infrastructure.

The salt minimization plan should include the retention of a contractor who has completed the Green SnowPro Training course and obtained NHDES Salt Application Certification.

It is anticipated that this be a living document that will be updated at regular intervals (recommend updating annually in advance of the winter season in order to facilitate adjustments).

Owner:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

In the event of a change in ownership, this Inspection and Maintenance Plan shall be transferred to the new party; transfer shall be documented to NH DES in writing.

Contact / Responsible Party:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Chad Kageleiry
Phone: (603) 749 2800
Email: chad@summitlanddev.com

The contact information for the Contact / Responsible Party shall be kept current; transfer shall be documented to NHDES in writing.

Management Company:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

The contact information for the Management Party shall be kept current.

Inspection Schedule / Record Retention

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NHDES. See the Inspection and Maintenance Plan for frequency requirements. Inspections shall include a photograph of each practice that is subject to the I&M requirements each time it is inspected. A copy of the completed Stormwater Management System's Inspection & Maintenance Log, inspection photographs, and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law. All Inspection and Maintenance records must be provided to NHDES upon request and to the City of Dover Community Services Department annually before Dec 15th.

Stormwater Management System Components

The Stormwater Management System associated with the project is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)
- Bioretention Basin w/ Internal Storage Reservoir (ISR)
- Grassed Lined Conveyance Swale
- Stone Lined Conveyance Swale
- Pre-Treatment Structures
  - Sediment Forebay
- Pavement
- Litter / Trash Removal

Design elements are identified in the design plans, a copy of which shall be maintained with this Inspection and Maintenance Plan.

Control of Invasive Species

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. Invasive plants shall be controlled to prevent them from reproducing, spreading, or re-growing. See the University of New Hampshire – Cooperative Extension's "Method for Disposing Non-Native Invasive Plants", included at the end of this manual, for guidance on the removal and disposal of invasive species.

Inspection and Maintenance Plan

By implementing the following procedures, the owners will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

PIPES/CULVERTS:

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

OUTLET STRUCTURE(S):

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

ENERGY DISSIPATION STRUCTURES (RIP RAP):

- Inspect at least once a year.
- Inspect for sediment accumulation.
- Remove all debris immediately.
- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- If stones become displaced from the riprap areas, they should be replaced immediately and chinked in to assure stability. Add additional riprap as needed. Vegetation growing through the riprap should be eliminated at least yearly.

BIORETENTION BASIN W/ ISR:

- Inspection, by a **qualified professional**, of the Bioretention Basin at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection. If the Bioretention Basin systems do not drain within 72-hours following a rainfall event, a **qualified professional** should assess the condition and determine measures required to restore filtration practice (as applicable).
- Inlet and outlet pipes, inlet and outlet structures, containment structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Vegetation should be inspected at least annually and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed at least once annually. The vegetation should be maintained in a healthy condition, as appropriate to the function of the facility and type of vegetation, to prevent the establishment of woody vegetation.

- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

GRASS LINED CONVEYANCE SWALE:

- Inspect once per year.
- Inspect for erosion, sediment accumulation, vegetation loss, and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and dead vegetation.
- Perform periodic mowing of swale (at least twice annually), maintain a 4" stand of vegetative growth.

STONE LINED CONVEYANCE SWALE

- Inspect once per year.
- Inspect for erosion, sediment accumulation, woody vegetation and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and woody vegetation.
- Reset any dislodged stones.

PRE-TREATMENT STRUCTURES:

SEDIMENT FOREBAY:

- Vegetated areas shall be mowed to maintain a 4" start of vegetative growth.
- Inspect at least once per year.
- Inspect for sediment accumulation.
- Remove all debris immediately.

PAVEMENT:

- Minimize sanding.
- Minimize application of salt for ice control.
- Clean periodically (1-2 times per year) using a sweeper or vacuum sweeper. Vacuum sweeping is the preferred method.

LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

DE-ICING AGENTS:

- To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends that the Owner/Operator develop a Road Salt and Deicing Minimization Plan for the parking lots and roadways. The plan should develop the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. The plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. (See Deicing Salt Quantity Use Log).
- Use sand as primary agent for driveway and access way safety during ice and snow conditions.
- Minimize the use of salt during the winter.

- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Recommend using a certified Winter Operator (Green SnowPro Trained) for applying de-icing agents.
- Monitor weather and apply de-icing agents based on weather conditions and temperatures.

ANTI-ICING AND SALT MINIMIZATION:

- Owner to develop a Road Salt and Deicing Minimization Plan.
- Provide a written policy that the “Development” will keep in place to minimize salt and other deicer use after the project has been completed.
- Use the attached form to track the use of salt and other deicers for each storm event and compiling salt use data annually.

Inspection & Maintenance Table

System Component / BMP	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Pipes/Culverts	Annually	• Check for clogging • Check for sediment accumulation	Remove when noticed Clean when necessary
Outlet Structure(s)	Annually	• Inspect once per year. • Inspect for clogging and sediment accumulation. • Remove all debris immediately and sediment accumulations ≥ 2 inches.	≥ 2 in. sediment Remove immediately
Energy Dissipation (ED) Structures (Rip Rap)	Annually	• Check for erosion • Check for displaced stones • Check for woody vegetation • Check for sediment accumulation	≥ 3 in. sediment Remove annually Replace/ reset Dislodged stones immediately
Bioretention Basin w/ ISR • Inlet/Outlet Piping • Pond • Sediment • Drawdown • Trash/Debris • Vegetation (Veg.) • Embankments	Bi-Annually “ “ Annually Periodically “ “ “ “	• Check for erosion, settlement, seepage, etc. • Check for sediment accum. in pond • Check drainage time • Check for and remove trash/debris • Maintain >75% veg. (pond & slopes) Maintain healthy stand of veg.	Repair immediately ≥ 2 in sediment >72 hours Remove all trash/debris Restore veg. in-kind Mow when ≥ 6 in
Grass Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Ensure swale is stabilized • Maintain healthy stand of veg., min 4” • Inspect for invasive species	≥ 1 in. sediment Repair immediately Restore vegetation in-kind Mow twice per year Remove/Dispose of accordingly
Stone Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Inspect for woody/ invasive vegetation • Check for dislodged stones	≥ 1 in. sediment Repair immediately Remove/Dispose of accordingly
Pre-Treatment Structures: Sediment Forebay	Annually	• Check for sediment accumulation • Check for woody vegetation growth • Check for debris • Vegetated areas shall be mowed to maintain a 4” start of vegetation growth.	Remove/ Dispose of accordingly Mow twice per year
Pavement: • Sanding • Salt Applications • Sweep/Vacuum • Trash/Debris	Limit use As required 1 - 2 x’s Year Periodically	• Minimize use to prevent tracking issues • RECORD APPLICATION RATES • Sweep or vacuum to prevent tracking issues • Check for trash/debris	Sweep to prevent issues Minimize (as required) Sweep/Vac as needed Remove when noticed
Litter / Trash Removal	Periodically	• Check for litter and trash	Remove when noticed

Inspection & Maintenance Checklist/Log

The following pages contain a blank copy of the Stormwater Management System's Inspection & Maintenance Log and a Deicing Salt Quantity Use Log. These forms are provided to assist the owners with the inspection and maintenance of the aforementioned Stormwater Management System.

Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance_____ Inspector:_____

System Component / BMP	Cleaning / Repair Needed (List Items / Comments)	Date of Cleaning/Repair	Performed By

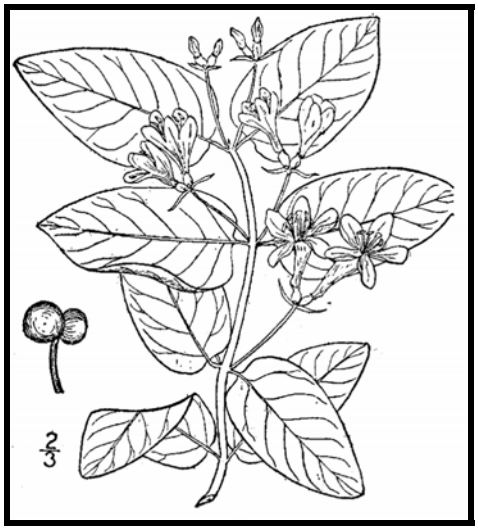
Deicing Salt Quantity Use Log

Date	Amount of Material Applied	Comments

University of New Hampshire Cooperative Extension

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

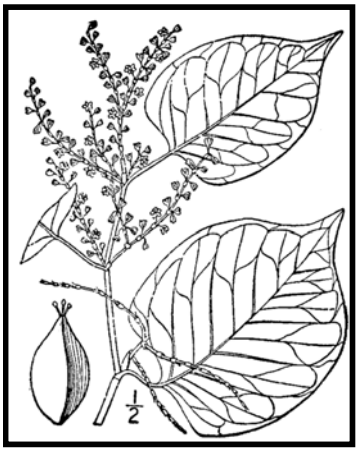
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds** 	**Prior to flowering** Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	**Small infestation** ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. **Large infestation** ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

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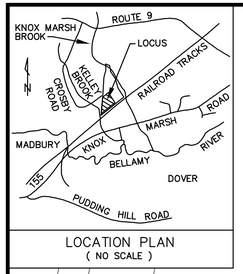

LOCATION PLAN
(NO SCALE)

LEGEND:

= SEDIMENT FOREBAY

= ENERGY DISSIPATION STRUCTURES (RIP RAP)

= BIO-RETENTION BASIN W/ ISR

= STONE LINED CONVEYANCE SWALE

= GRASSED LINED CONVEYANCE SWALE

FORMER HANSON ROAD

50' WETLAND BUFFER

WATER - DOVER PARA01-020-WI

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

GAS 4"ø PP

WATER

DOVER PARA01-025-WI

HYDRANT #319

BIORETENTION POND 1 W/ ISR (BIO1 W/ ISR)

EDGE OF PAVEMENT

PROPOSED 9,600 S.F. BUILDING

EDGE OF PAVEMENT

PROPOSED GRAVEL 125'x180' LAYDOWN AREA

EDGE OF GRAVEL

BIORETENTION POND 2 W/ ISR (BIO2 W/ ISR)

BIORETENTION POND 3 W/ ISR (BIO3 W/ ISR)

EXISTING GRASSED LINED CONVEYANCE SWALE

C / 2-1

NEW PARCEL AREA
273,596 S.F.
6.28 Ac.

NH STATE PLANE NAD 83 - GAS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: MJM
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

BMP LOCATION PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

BMP

DRAINAGE ANALYSIS

Del Sol Dover, LLC
CROSBY ROAD EXTENSION &
LOT 2 DEVELOPMENT
TAX MAP G, LOT 2-1
DOVER, NH

August 2024

Prepared For:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Prepared By:

Civilworks NE
PO Box 1166
181 Watson Road
Dover, NH 03820

CONTENTS

1.0 INTRODUCTION

2.0 DRAINAGE ANALYSIS

2.1 DRAINAGE DESIGN PARAMETERS
- 2.1.1 Watersheds
- 2.1.2 Soils
- 2.1.3 Rainfall Data
- 2.1.4 Runoff Curve Numbers

2.2 EXISTING CONDITIONS
- 2.2.1 Table A – Existing Conditions Hydrology

2.3 DEVELOPED CONDITIONS
- 2.3.1 Table B – Developed Conditions Hydrology

2.4 HYDROLOGIC COMPARISON
- 2.4.1 Table C – Existing vs. Developed Conditions Hydrology

2.5 STORMWATER DESIGN
- 2.5.1 Stormwater Best Management Practices
- 2.5.2 Pollutant Removal
- 2.5.3 Groundwater Recharge
- 2.5.4 Outlet Protection

3.0 APPENDIX A – HYDROLOGIC CALCULATIONS
- A Extreme Precipitation Table
- A-1 Existing Watersheds
  - Drainage Diagram, Area, and Soil Listings
  - Node Listing – 2-yr
  - Node Listing – 10-yr
  - 10-yr Storm Summary Hydrographs
  - Node Listing – 25-yr
  - Node Listing – 50-yr
- A-2 Developed Watersheds
  - Drainage Diagram, Area, and Soil Listings
  - Node Listing – 2-yr
  - Node Listing – 10-yr
  - 10-yr Storm Summary Hydrographs
  - Node Listing – 25-yr
  - Node Listing – 50-yr

4.0 APPENDIX B – DESIGN
- B-1 Stormwater Best Management Practices
- B-2 Pollutant Removal
- B-3 Outlet Protection

5.0 APPENDIX C – INSPECTION AND MAINTENANCE
- C-1 Stormwater Management System Inspection & Maintenance Plan

6.0 APPENDIX D – WATERSHED PLANS
- D-1 Pre-Development Conditions
- D-2 Post-Development Conditions

1.0 INTRODUCTION

This is a hydrologic analysis of a portion of the subject parcel located on Crosby Road in Dover, NH. The 20.80± acre lot is identified as Tax Map G, Lot 2-1. The parcel is being subdivided into three (3) lots (Lot 2-1, 2-1A, & 2-1B) ranging in size from approximately 5.0 to 8.3 acres. This hydrologic analysis analyzes the land development associated with construction of the proposed road and the development of the newly formed (6.15+/- acre) Lot 2-1. The area of analysis is currently undeveloped and primarily consists of mowed fields with a small, graveled area for site access. The project parcel, Lot 2-1, is relatively flat and slopes to the railroad tracks located along the south easterly property line. The parcel is bound by commercial lots to the North, East, and West, and the railroad tracks to the South and Southeast.

This analysis includes the construction of an 807 foot, 24-foot-wide paved road (Crosby Road extension) and the full build out of one (Tax Map G Lot 2-1) of the three (3) commercial lots. The commercial development consists of the construction of a 9,600-sf building, site access from the newly constructed Crosby Road extension, associated parking, gravel lay down area, underground utilities, and grading and drainage improvements. The proposed drainage system incorporates grassed and stone lined swales for stormwater conveyance, sediment forebays for pre-treatment, and three (3) bioretention basins with internal storage reservoirs (ISR's) for stormwater treatment. A large portion of stormwater runoff from the proposed roadway is designed to drain into the stormwater drainage structures located on Lot 2-1 while the last 50+/- ft will be treated be treated within the proposed right-of-way and proposed Lot 2-1A. The proposed stormwater system captures, stores, and treats the stormwater runoff from the site and roadway, then redirects it to the existing discharge points. The proposed stormwater drainage structures will be maintained by the project proponent as outlined within the Stormwater Management System Inspection & Maintenance Manual (Stormwater I&M Manual) in Appendix C.

To effectively analyze the pre-development subject parcel and proposed roadway, a 12.19 ac area was analyzed and divided into three (3) watersheds, A, B, & C. The remaining 8.61 acres of the original larger lot is not being developed as part of this project. Watershed A drains to the south to an existing drainage ditch along the railroad tracks; Watershed B drains to the country drainage associated with the former Hanson Road, prior to discharge from a cross culvert under the driveway of an abutting lot; and Watershed C drains to Knox Marsh Brook. The site is located within a Great Bay Community; therefore, this analysis includes a 15% increase to the extreme precipitation data obtained from the Northeast Regional Climate Center.

The post development condition maintains the same three (3) watersheds as the pre-development condition. Watersheds A & B are further divided into subcatchments, three (3) and two (2) respectively, to account for the proposed stormwater management system. The post-development watersheds utilize the same points of discharge as the existing conditions, and they provide a direct comparison to the pre-development model. Bioretention Basins with ISR's were utilized for stormwater treatment as the site is located

within a “Class A – All Features” watershed as identified on the NHDES OneStop Data Mapper. This analysis indicates that the proposed stormwater measures, and stormwater management plan will treat and mitigate stormwarer runoff in general accordance with ENV-Wq 1500 of the New Hampshire Code of Administrative Rules and the City of Dover’s Subdivision and Site Review Regulations. The proposed development of the site, in conjunction with the implementation of the Stormwater I&M Manual, will have minimal impact on the watersheds.

2.0 DRAINAGE ANALYSIS

A comprehensive hydrologic study of this site has been performed utilizing nationally recognized runoff estimating techniques developed by the USDA, Soil Conservation Services (SCS). The technique and runoff models are described in various SCS publications and references as follows:

“Stormwater Management and Erosion Sediment Control Handbook for Urban and Developing Areas in New Hampshire”

“New Hampshire Stormwater Manual Volume 2 - Post-Construction Best Management Practices Selection & Design”

“Civil Engineering Reference Manual, Fifth Edition”

“Open-Channel Hydraulics” Chow.

“Stormwater Modeling System” HydroCAD Ver. 10.10

2.1 DRAINAGE DESIGN PARAMETERS

A brief review of the procedures and parameters used in the drainage study follows:

2.1.1 Watersheds

The watershed was delineated using on site topographic and as built survey data field located by McEneaney Survey Associates of New England.

2.1.2 Soils

Soil types were determined utilizing a site specific soils map prepared by BAG Land Consultants, Bruce A. Gilday, CSS#012. The hydrologic soil drainage classifications used for this analysis are Class B and D.

Hydrologic Drainage Class B:

Map Unit Symbol	Soil Taxonomic Name	Drainage Class
313B	Deerfield	Moderately-Well Drained
915B	Deerfield Variant	Somewhat Poorly Drained

Hydrologic Drainage Class D:

Map Unit Symbol	Soil Taxonomic Name	Drainage Class
233B/P	Scantic	Poorly Drained (P)

2.1.3 Rainfall Data

Extreme precipitation estimate values from the Northeast Regional Climate Center were utilized in this analysis. The analysis has been performed for the 2-year, 10-year, 25-year, and 50-year storm events with 3.60", 5.44", 6.88", and 8.23" rainfall depths respectively. The rainfall data has been peaked by 15% in accordance with NHDES Alteration of Terrain requirements as the site is located within the Coastal Region.

2.1.4 Runoff Curve Numbers

The SCS runoff curve numbers were used and are summarized within each sub-catchment drainage summary in Appendix A.

2.2 EXISTING CONDITIONS

For the purposes of this analysis, the subject parcel was analyzed as three (3) watersheds.

2.2.1 Table A – Existing Conditions (2, 10, 25, and 50-year storm events)

Watershed	**Pre-Development Volume (af)**	**Pre Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.625	2.8	6.6	9.8	12.7
B	0.080	0.4	1.2	1.8	2.5
C	0.223	1.4	3.0	4.2	5.3

2.3 DEVELOPED CONDITIONS

The post development model was analyzed utilizing the same summing points as the pre-development analysis.

2.3.1 Table B – Developed Conditions (2, 10, 25, and 50-year storm events)

Watershed	**Post-Development Volume (af)**	**Post Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.915	2.5	6.3	9.7	12.7
B	0.055	0.3	0.8	1.3	1.7
C	0.261	1.4	3.0	4.2	5.3

2.4 HYDROLOGIC COMPARISON

The analysis indicates that the proposed project will have negligible impact on the developed watersheds.

2.4.1 Table C – Pre/Post Development Comparison (2, 10, 25, and 50-year storm events)

Watershed	Pre/**Post-Development Volume (af)**	Pre/**Post Development Peak Flows (cfs)**			
Discharge Point	**2-yr**	**2-yr**	**10-yr**	**25-yr**	**50-yr**
A	0.625/**0.915**	2.8/**2.5**	6.6/**6.3**	9.8/**9.7**	12.7/**12.7**
B	0.080/**0.055**	0.4/**0.3**	1.2/**0.8**	1.8/**1.3**	2.5/**1.7**
C	0.223/**0.261**	1.4/**1.4**	3.0/**3.0**	4.2/**4.2**	5.3/**5.3**

2.5 STORMWATER DESIGN

The project incorporates best management practices to mitigate runoff as well as treat and convey stormwater.

2.5.1 Stormwater Best Management Practices (BMP's)

This project incorporates three (3) bioretention basins with ISR's to mitigate flow and water quality from the proposed development. Pre-treatment for the proposed

stormwater BMP's will utilize sediment forebays. See Appendix B-1 for the BMP design calculations and supporting documentation.

2.5.2 Pollutant Removal

This project treats 1.65+/- acres of proposed impervious area. The project incorporates the following practice and associated pollutant removal efficacy as identified in the New Hampshire Stormwater Management Manual Volume 2, Appendix B:

	TSS	TN	TP
Bioretention Basin with ISR:	90%	65%	65%

The pollutant removal meets or exceeds The City of Dover's Site Review Regulations. See Appendix B-2 for the removal efficiency data as provided in Volume 1.

2.5.3 Groundwater Recharge

The site was evaluated for infiltration practices in support of groundwater recharge. The site's characteristics were not conducive for infiltration. The site limitations prevent infiltration and therefore will influence the project's ability to meet City and State requirements to attenuate volume and meet channel protection requirements respectively.

Site characteristics including soil type, topography, and depth to SHWT prevent the infiltration of stormwater. However, the project's stormwater infrastructure is designed to attenuate flow from the development of the parcel in support of meeting the spirit of the channel protection criteria to the greatest extent practicable. The discharge from the site is directed to large wetland complexes associated with Kelley and Knox Marsh Brooks and the proposed project will not contribute to flooding or functional impairments to streets, adjacent properties, or downstream properties.

2.5.4 Outlet Protection

BMP's, conveyance structures, and outlet protection have been sized to convey the 50-year, 24 hour storm event. All proposed rip-rap applications shall consist of min. d50 = 6" stone with a stone layer thickness of 12" (min) on a filter fabric layer over a 6" thick (min) gravel base. See Appendix B-3 for design calculations and supporting data, the plan set for rip-rap locations and the drainage details for additional information.

APPENDIX A

HYDROLOGIC CALCULATIONS

Extreme Precipitation in New York & New England

An Interactive Web Tool for Extreme Precipitation Analysis

About this Project | Data & Products | Daily Monitoring | Documentation

Select Product

- Extreme Precipitation Tables - HTML
- Extreme Precipitation Tables - Text/CSV
- Partial Duration Series - by Point
- Partial Duration Series - by Station
- Distribution Curves - Graphical
- Distribution Curves - Text/TBL
- Intensity Frequency Duration Graphs
- Precipitation Frequency Duration Graphs
- GIS Data Files
- Regional/State Maps

Select Location *Double-click map to place a marker, or enter address or latitude/longitude.*

Hybrid | Map | Satellite | Terrain

Locate by Address → | Locate by Lat/Lon 43.17° N -70.91° W → | Locate by State/County

Select Options

Smoothing: Yes

Delivery: Popup

Submit

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This project is a joint collaboration between:

Northeast Regional Climate Center (NRCC) | Natural Resources Conservation Service (NRCS)

Contact: precip@cornell.edu

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Metadata for Point	
Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.180 degrees North
Longitude	70.911 degrees West
Elevation	20 feet
Date/Time	Mon Jun 24 2024 14:58:45 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day		+15%
1yr	0.26	0.40	0.50	0.65	0.81	1.03	**1yr**	0.70	0.98	1.20	1.54	1.99	~~2.60~~	2.85	**1yr**	2.30	2.74	3.14	3.87	4.44	**1yr**	2.99
2yr	0.32	0.49	0.61	0.81	1.01	1.28	**2yr**	0.87	1.17	1.50	1.91	2.44	~~3.13~~	3.48	**2yr**	2.77	3.35	3.84	4.57	5.21	**2yr**	3.60
5yr	0.37	0.57	0.72	0.96	1.23	1.58	**5yr**	1.06	1.44	1.85	2.38	3.06	3.96	4.46	**5yr**	3.50	4.29	4.90	5.78	6.54	**5yr**	
10yr	0.40	0.63	0.80	1.09	1.41	1.84	**10yr**	1.22	1.69	2.17	2.82	3.65	~~4.73~~	5.38	**10yr**	4.19	5.17	5.90	6.90	7.77	**10yr**	5.44
25yr	0.46	0.74	0.94	1.29	1.72	2.26	**25yr**	1.48	2.09	2.69	3.51	4.59	~~5.98~~	6.90	**25yr**	5.30	6.64	7.54	8.73	9.76	**25yr**	6.88
50yr	0.51	0.82	1.06	1.48	1.99	2.66	**50yr**	1.72	2.45	3.17	4.17	5.47	~~7.16~~	8.33	**50yr**	6.33	8.01	9.08	10.43	11.61	**50yr**	8.23
100yr	0.58	0.93	1.20	1.70	2.31	3.11	**100yr**	1.99	2.88	3.73	4.94	6.51	~~8.56~~	10.07	**100yr**	7.57	9.68	10.94	12.47	13.81	**100yr**	9.84
200yr	0.64	1.04	1.35	1.94	2.69	3.65	**200yr**	2.32	3.39	4.41	5.87	7.77	10.24	12.17	**200yr**	9.06	11.70	13.18	14.91	16.44	**200yr**	
500yr	0.75	1.24	1.61	2.34	3.28	4.51	**500yr**	2.83	4.20	5.47	7.34	9.79	12.98	15.64	**500yr**	11.49	15.04	16.87	18.91	20.72	**500yr**	

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.24	0.37	0.45	0.60	0.74	0.90	**1yr**	0.64	0.88	0.91	1.25	1.55	2.04	2.48	**1yr**	1.81	2.38	2.92	3.35	4.05	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.18	**2yr**	0.86	1.16	1.36	1.83	2.36	3.04	3.38	**2yr**	2.69	3.25	3.73	4.45	5.06	**2yr**
5yr	0.35	0.54	0.67	0.91	1.16	1.40	**5yr**	1.00	1.37	1.61	2.15	2.78	3.70	4.11	**5yr**	3.27	3.96	4.58	5.40	6.10	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.57	1.82	2.45	3.14	4.26	4.78	**10yr**	3.77	4.59	5.31	6.24	7.01	**10yr**
25yr	0.44	0.67	0.83	1.18	1.55	1.91	**25yr**	1.34	1.87	2.11	2.85	3.67	5.04	5.79	**25yr**	4.46	5.57	6.48	7.56	8.43	**25yr**
50yr	0.48	0.73	0.91	1.31	1.77	2.19	**50yr**	1.53	2.14	2.36	3.21	4.12	5.78	6.69	**50yr**	5.11	6.44	7.53	8.74	9.68	**50yr**
100yr	0.54	0.81	1.02	1.47	2.02	2.51	**100yr**	1.74	2.46	2.64	3.59	4.61	6.61	7.73	**100yr**	5.85	7.43	8.76	10.09	11.08	**100yr**
200yr	0.60	0.90	1.14	1.65	2.30	2.88	**200yr**	1.99	2.81	2.93	4.02	5.16	7.57	8.93	**200yr**	6.70	8.58	10.19	11.67	12.72	**200yr**
500yr	0.70	1.04	1.34	1.94	2.77	3.47	**500yr**	2.39	3.39	3.40	4.67	6.01	9.01	10.78	**500yr**	7.97	10.37	12.44	14.15	15.20	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.43	0.53	0.71	0.87	1.08	**1yr**	0.75	1.05	1.23	1.74	2.21	2.83	3.05	**1yr**	2.50	2.93	3.37	4.17	4.76	**1yr**
2yr	0.33	0.51	0.62	0.84	1.04	1.24	**2yr**	0.90	1.22	1.48	1.95	2.50	3.25	3.59	**2yr**	2.87	3.45	3.96	4.72	5.39	**2yr**
5yr	0.39	0.60	0.75	1.03	1.31	1.58	**5yr**	1.13	1.54	1.85	2.49	3.19	4.22	4.80	**5yr**	3.73	4.61	5.23	6.17	6.94	**5yr**
10yr	0.46	0.70	0.87	1.21	1.57	1.92	**10yr**	1.35	1.87	2.23	3.04	3.84	5.19	5.98	**10yr**	4.59	5.75	6.55	7.58	8.46	**10yr**
25yr	0.55	0.84	1.05	1.49	1.96	2.47	**25yr**	1.69	2.41	2.87	3.95	4.92	6.93	8.02	**25yr**	6.13	7.71	8.73	9.96	11.02	**25yr**
50yr	0.64	0.97	1.21	1.74	2.34	2.98	**50yr**	2.02	2.91	3.48	4.80	5.97	8.55	10.03	**50yr**	7.57	9.64	10.87	12.25	13.47	**50yr**
100yr	0.74	1.12	1.40	2.03	2.78	3.59	**100yr**	2.40	3.51	4.21	5.87	7.24	10.55	12.55	**100yr**	9.34	12.07	13.52	15.08	16.47	**100yr**
200yr	0.86	1.29	1.63	2.37	3.30	4.35	**200yr**	2.85	4.26	5.12	7.18	8.78	13.06	15.72	**200yr**	11.56	15.11	16.83	18.54	20.18	**200yr**
500yr	1.05	1.56	2.00	2.91	4.13	5.59	**500yr**	3.57	5.46	6.61	9.39	11.34	17.35	21.17	**500yr**	15.36	20.36	22.49	24.42	26.41	**500yr**

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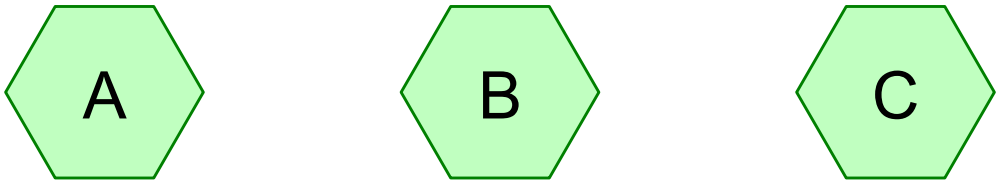
Northeast Regional Climate Center

A – 1

EXISTING WATERSHEDS



A

B

C

Subcat Reach Pond Link

Routing Diagram for 24085 - Pre
Prepared by Civilworks New England
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.549	61	>75% Grass cover, Good, HSG B (A, B, C)
3.457	80	>75% Grass cover, Good, HSG D (A, C)
0.186	96	Gravel surface, HSG B (A)
12.192	**67**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.735	HSG B	A, B, C
0.000	HSG C	
3.457	HSG D	A, C
0.000	Other	
12.192		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	8.549	0.000	3.457	0.000	12.005	>75% Grass cover, Good	A, B, C
0.000	0.186	0.000	0.000	0.000	0.186	Gravel surface	A
0.000	**8.735**	**0.000**	**3.457**	**0.000**	**12.192**	**TOTAL AREA**	

A – 1

NODE LISTING – 2-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=0.91"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=2.8 cfs 0.625 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.4 cfs 0.080 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=1.13"
Flow Length=402' Tc=20.7 min CN=71 Runoff=1.4 cfs 0.223 af

Total Runoff Area = 12.192 ac Runoff Volume = 0.928 af Average Runoff Depth = 0.91"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

NODE LISTING – 10-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=2.12"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=6.6 cfs 1.458 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=1.64"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.2 cfs 0.211 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=2.45"
Flow Length=402' Tc=20.7 min CN=71 Runoff=3.0 cfs 0.486 af

Total Runoff Area = 12.192 ac Runoff Volume = 2.155 af Average Runoff Depth = 2.12"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

10-YR STORM SUMMARY

Summary for Subcatchment A: A

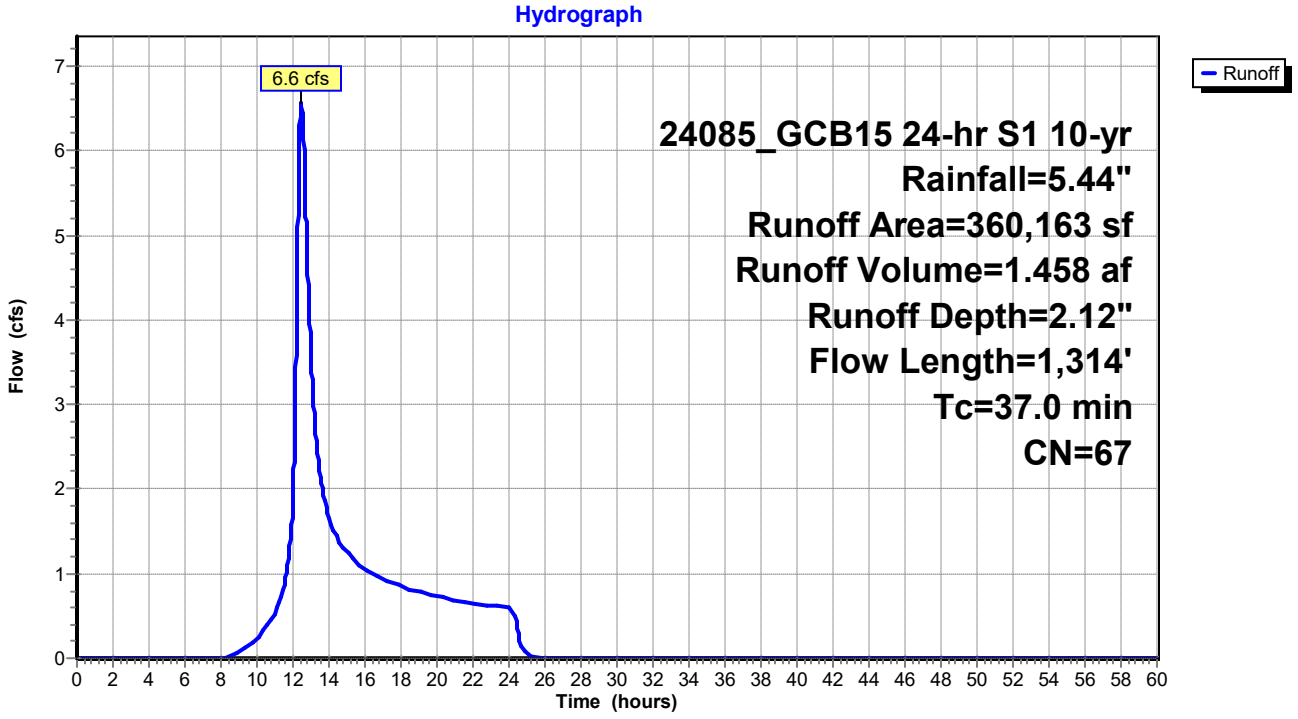
Runoff = 6.6 cfs @ 12.46 hrs, Volume= 1.458 af, Depth= 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
253,585	61	>75% Grass cover, Good, HSG B
8,114	96	Gravel surface, HSG B
98,464	80	>75% Grass cover, Good, HSG D
360,163	67	Weighted Average
360,163		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
16.1	479	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.1	735	0.0050	4.00	35.96	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.50' Z= 2.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
37.0	1,314	Total			

Subcatchment A: A



Summary for Subcatchment B: B

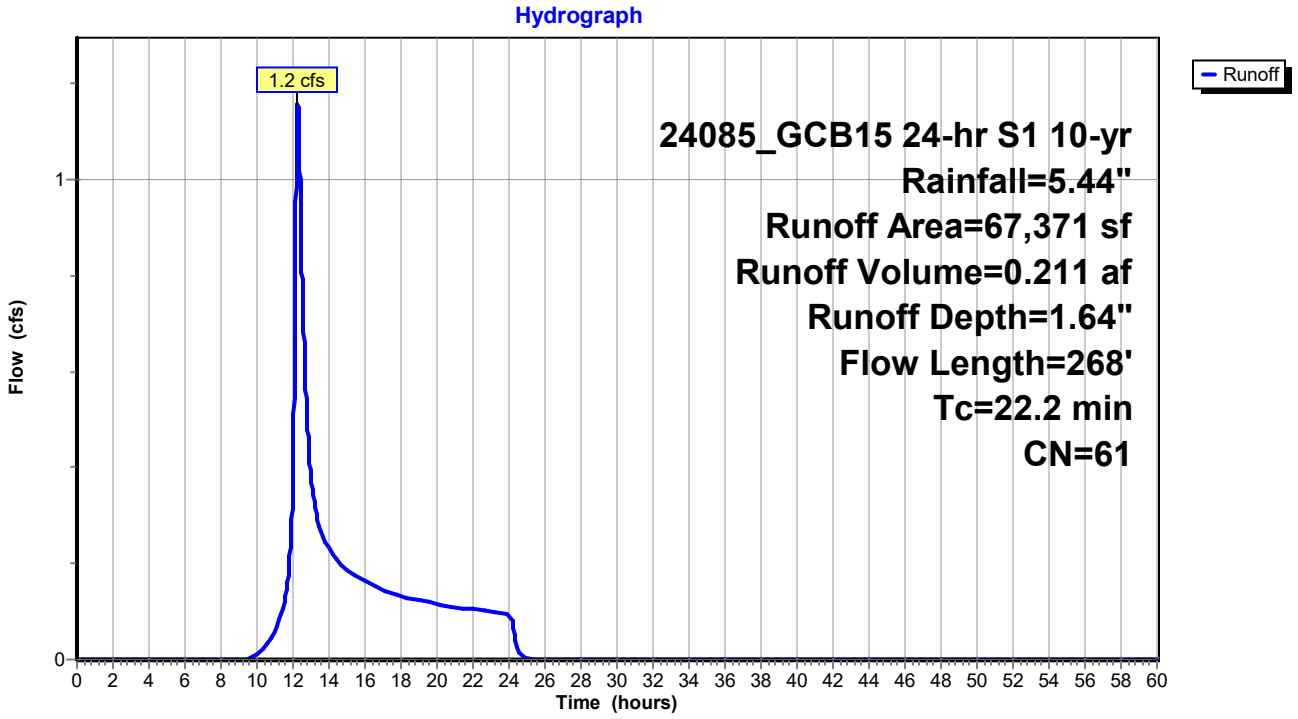
Runoff = 1.2 cfs @ 12.26 hrs, Volume= 0.211 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
67,371	61	>75% Grass cover, Good, HSG B
67,371		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0120	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
5.7	168	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.2	268	Total			

Subcatchment B: B



Summary for Subcatchment C: C

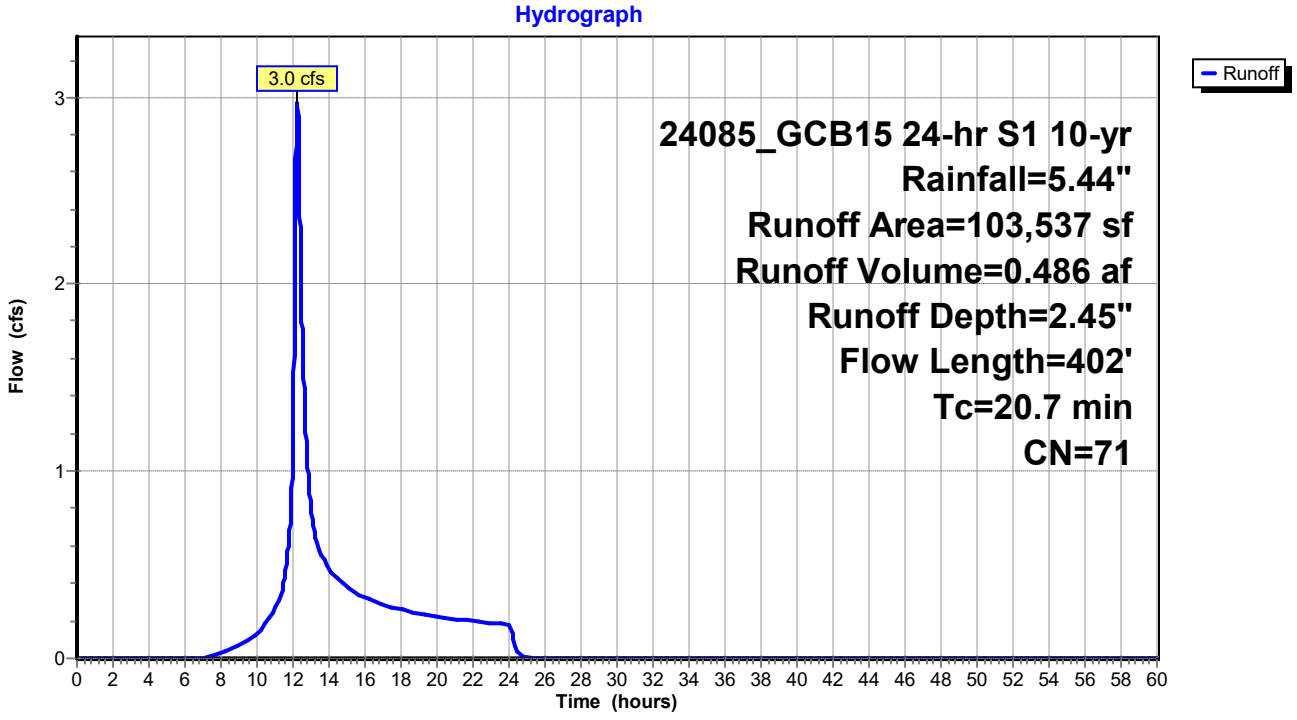
Runoff = 3.0 cfs @ 12.24 hrs, Volume= 0.486 af, Depth= 2.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
51,429	61	>75% Grass cover, Good, HSG B
52,108	80	>75% Grass cover, Good, HSG D
103,537	71	Weighted Average
103,537		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
7.2	302	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	402	Total			

Subcatchment C: C



A – 1

NODE LISTING – 25-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=3.21"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=9.8 cfs 2.213 af

Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.8 cfs 0.337 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=402' Tc=20.7 min CN=71 Runoff=4.2 cfs 0.718 af

Total Runoff Area = 12.192 ac Runoff Volume = 3.268 af Average Runoff Depth = 3.22"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 1

NODE LISTING – 50-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment A: A Runoff Area=360,163 sf 0.00% Impervious Runoff Depth=4.31"
Flow Length=1,314' Tc=37.0 min CN=67 Runoff=12.7 cfs 2.972 af

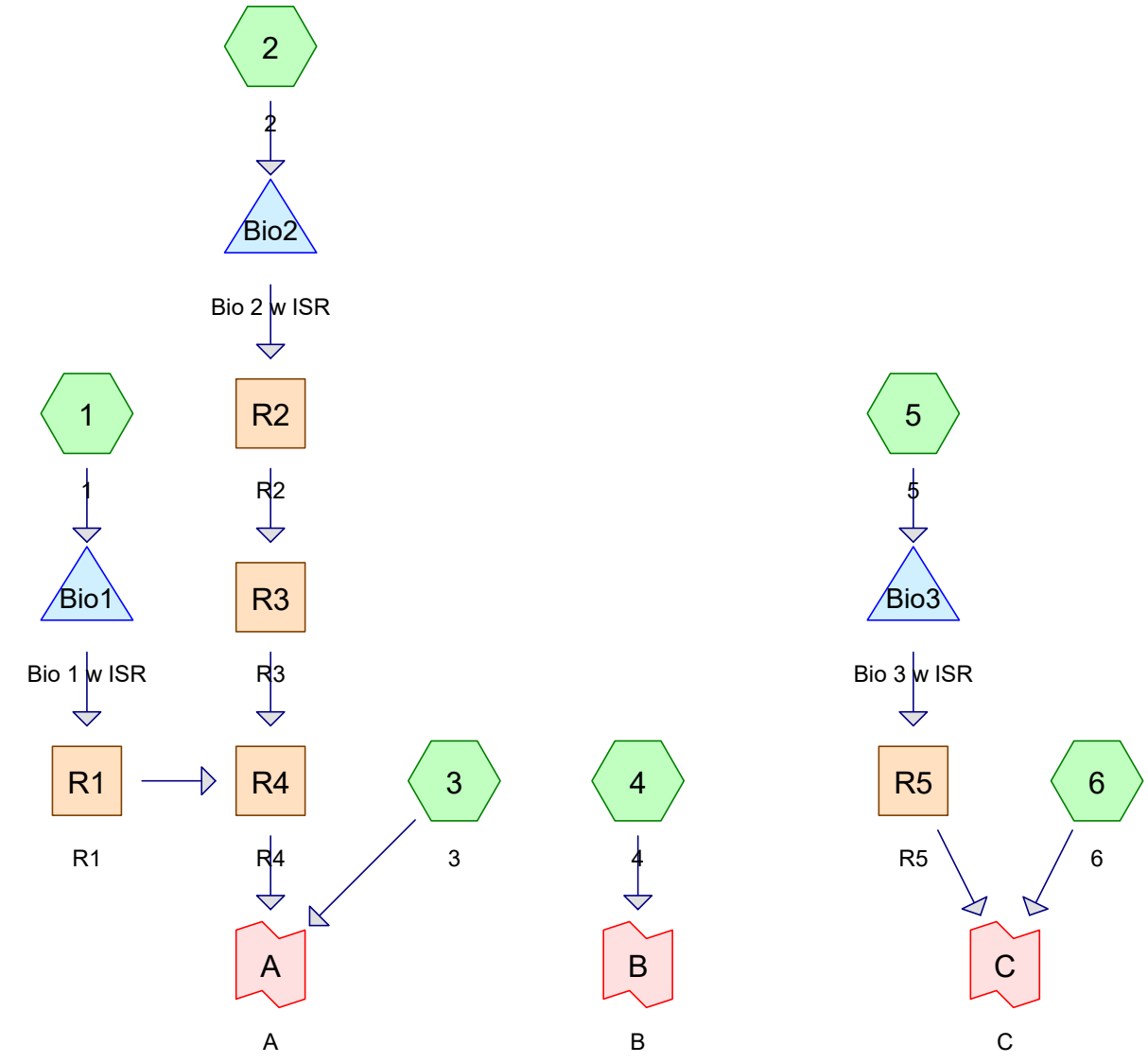
Subcatchment B: B Runoff Area=67,371 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=2.5 cfs 0.467 af

Subcatchment C: C Runoff Area=103,537 sf 0.00% Impervious Runoff Depth=4.78"
Flow Length=402' Tc=20.7 min CN=71 Runoff=5.3 cfs 0.947 af

Total Runoff Area = 12.192 ac Runoff Volume = 4.385 af Average Runoff Depth = 4.32"
100.00% Pervious = 12.192 ac 0.00% Impervious = 0.000 ac

A – 2

DEVELOPED WATERSHEDS



Subcat Reach Pond Link

Routing Diagram for 24085 - Post
Prepared by Civilworks New England
HydroCAD® 10.10-5a s/n 03240 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.025	61	>75% Grass cover, Good, HSG B (1, 2, 3, 4, 5, 6)
3.517	80	>75% Grass cover, Good, HSG D (1, 2, 3, 5, 6)
0.576	96	Gravel surface, HSG B (2, 5)
0.017	96	Gravel surface, HSG D (5)
0.524	98	Paved parking, HSG B (2, 5)
0.008	98	Paved parking, HSG D (5)
0.305	98	Paved roads w/curbs & sewers, HSG B (1)
0.220	98	Roofs, HSG B (1, 2)
12.192	**71**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
8.650	HSG B	1, 2, 3, 4, 5, 6
0.000	HSG C	
3.541	HSG D	1, 2, 3, 5, 6
0.000	Other	
12.192		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	7.025	0.000	3.517	0.000	10.542	>75% Grass cover, Good	1, 2, 3, 4, 5, 6
0.000	0.576	0.000	0.017	0.000	0.593	Gravel surface	2, 5
0.000	0.524	0.000	0.008	0.000	0.531	Paved parking	2, 5
0.000	0.305	0.000	0.000	0.000	0.305	Paved roads w/curbs & sewers	1
0.000	0.220	0.000	0.000	0.000	0.220	Roofs	1, 2
0.000	**8.650**	**0.000**	**3.541**	**0.000**	**12.192**	**TOTAL AREA**	

A – 2

NODE LISTING – 2-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=2.27"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=1.2 cfs 0.102 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=2.02"
Flow Length=468' Tc=14.5 min CN=84 Runoff=2.4 cfs 0.293 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=0.96"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=2.3 cfs 0.520 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=0.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.3 cfs 0.055 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=2.54"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=0.8 cfs 0.054 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=1.19"
Flow Length=402' Tc=20.7 min CN=72 Runoff=1.3 cfs 0.207 af

Reach R1: R1 Avg. Flow Depth=0.04' Max Vel=0.44 fps Inflow=0.0 cfs 0.102 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.0 cfs 0.102 af

Reach R2: R2 Avg. Flow Depth=0.10' Max Vel=1.28 fps Inflow=0.3 cfs 0.293 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=0.3 cfs 0.293 af

Reach R3: R3 Avg. Flow Depth=0.12' Max Vel=0.72 fps Inflow=0.3 cfs 0.293 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=0.3 cfs 0.293 af

Reach R4: R4 Avg. Flow Depth=0.16' Max Vel=0.61 fps Inflow=0.3 cfs 0.395 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=0.3 cfs 0.395 af

Reach R5: R5 Avg. Flow Depth=0.08' Max Vel=0.44 fps Inflow=0.1 cfs 0.054 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.1 cfs 0.054 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.52' Storage=2,961 cf Inflow=1.2 cfs 0.102 af
Outflow=0.0 cfs 0.102 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.30' Storage=6,200 cf Inflow=2.4 cfs 0.293 af
Outflow=0.3 cfs 0.293 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.41' Storage=1,126 cf Inflow=0.8 cfs 0.054 af
Outflow=0.1 cfs 0.054 af

Link A: A Inflow=2.5 cfs 0.915 af
Primary=2.5 cfs 0.915 af

Link B: B Inflow=0.3 cfs 0.055 af
Primary=0.3 cfs 0.055 af

Link C: C

Inflow=1.4 cfs 0.261 af
Primary=1.4 cfs 0.261 af

Total Runoff Area = 12.192 ac Runoff Volume = 1.231 af Average Runoff Depth = 1.21"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

NODE LISTING – 10-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=3.98"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=1.8 cfs 0.179 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=3.68"
Flow Length=468' Tc=14.5 min CN=84 Runoff=3.8 cfs 0.532 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=2.20"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=5.4 cfs 1.192 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=1.64"
Flow Length=268' Tc=22.2 min CN=61 Runoff=0.8 cfs 0.145 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=4.30"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.1 cfs 0.092 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=2.54"
Flow Length=402' Tc=20.7 min CN=72 Runoff=2.7 cfs 0.443 af

Reach R1: R1 Avg. Flow Depth=0.13' Max Vel=0.85 fps Inflow=0.3 cfs 0.179 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.3 cfs 0.179 af

Reach R2: R2 Avg. Flow Depth=0.18' Max Vel=1.85 fps Inflow=0.9 cfs 0.532 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=0.9 cfs 0.532 af

Reach R3: R3 Avg. Flow Depth=0.23' Max Vel=1.07 fps Inflow=0.9 cfs 0.532 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=0.9 cfs 0.532 af

Reach R4: R4 Avg. Flow Depth=0.33' Max Vel=0.94 fps Inflow=1.1 cfs 0.711 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=1.1 cfs 0.711 af

Reach R5: R5 Avg. Flow Depth=0.14' Max Vel=0.64 fps Inflow=0.3 cfs 0.092 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.3 cfs 0.092 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.68' Storage=3,572 cf Inflow=1.8 cfs 0.179 af
Outflow=0.3 cfs 0.179 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.55' Storage=9,733 cf Inflow=3.8 cfs 0.532 af
Outflow=0.9 cfs 0.532 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.72' Storage=1,548 cf Inflow=1.1 cfs 0.092 af
Outflow=0.3 cfs 0.092 af

Link A: A Inflow=6.3 cfs 1.903 af
Primary=6.3 cfs 1.903 af

Link B: B Inflow=0.8 cfs 0.145 af
Primary=0.8 cfs 0.145 af

Link C: C

Inflow=3.0 cfs 0.535 af
Primary=3.0 cfs 0.535 af

Total Runoff Area = 12.192 ac Runoff Volume = 2.583 af Average Runoff Depth = 2.54"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

10-YR STORM SUMMARY

Summary for Subcatchment 1: 1

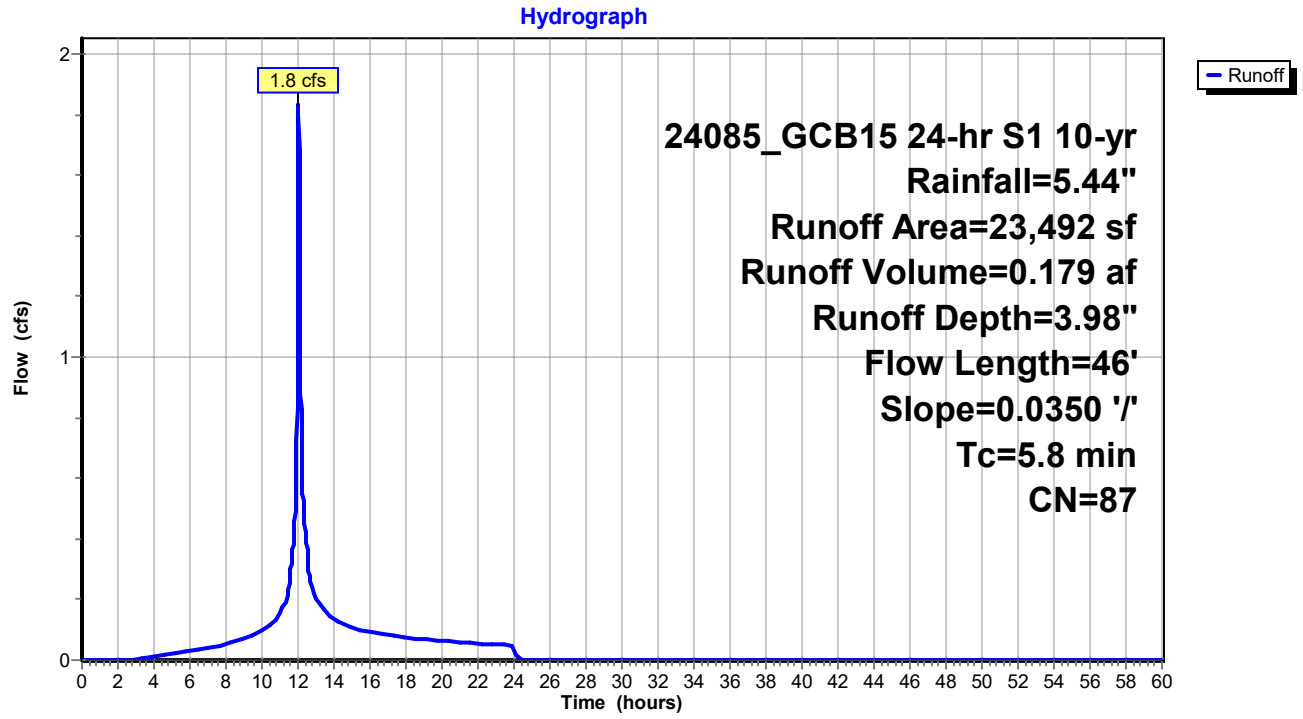
Runoff = 1.8 cfs @ 12.03 hrs, Volume= 0.179 af, Depth= 3.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
6,277	61	>75% Grass cover, Good, HSG B
13,295	98	Paved roads w/curbs & sewers, HSG B
2,400	98	Roofs, HSG B
1,520	80	>75% Grass cover, Good, HSG D
23,492	87	Weighted Average
7,797		33.19% Pervious Area
15,695		66.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	46	0.0350	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"

Subcatchment 1: 1



Summary for Subcatchment 2: 2

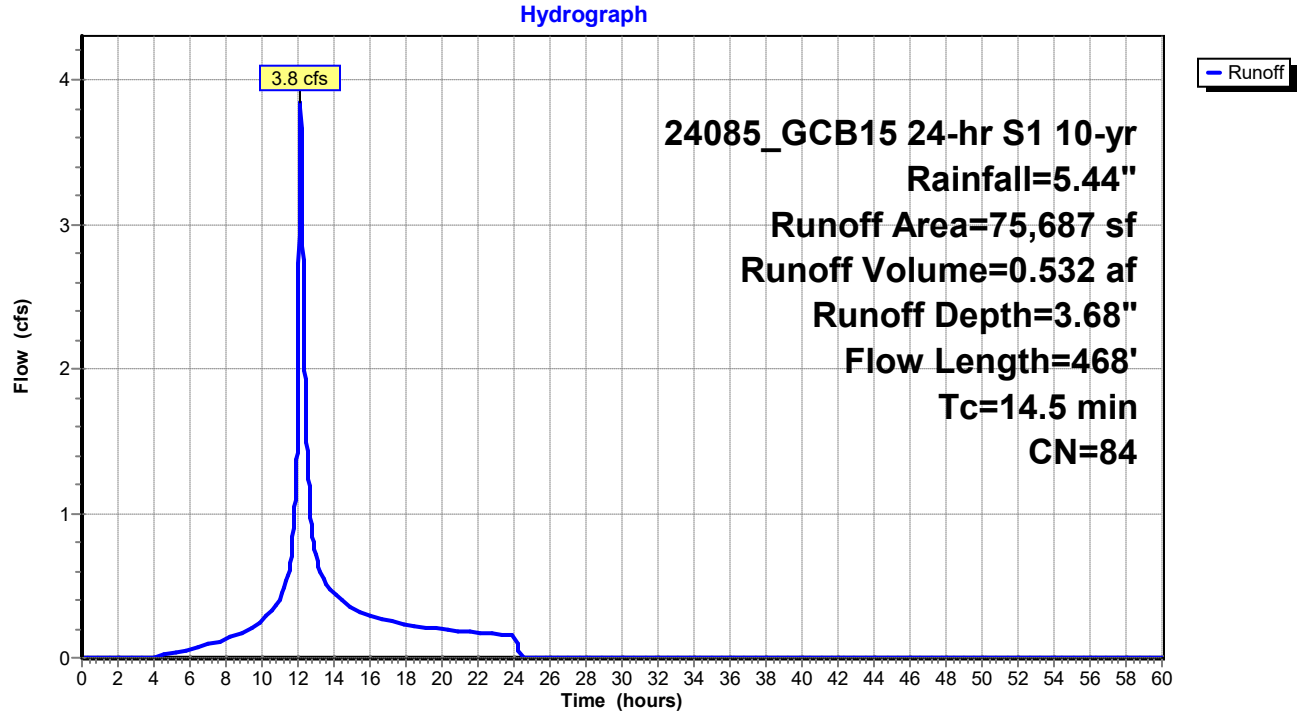
Runoff = 3.8 cfs @ 12.15 hrs, Volume= 0.532 af, Depth= 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
26,404	61	>75% Grass cover, Good, HSG B
22,500	96	Gravel surface, HSG B
17,963	98	Paved parking, HSG B
7,200	98	Roofs, HSG B
1,620	80	>75% Grass cover, Good, HSG D
75,687	84	Weighted Average
50,524		66.75% Pervious Area
25,163		33.25% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.1	65	0.0110	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
2.4	403	0.0040	2.80	16.81	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.00' Z= 3.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
14.5	468	Total			

Subcatchment 2: 2



Summary for Subcatchment 3: 3

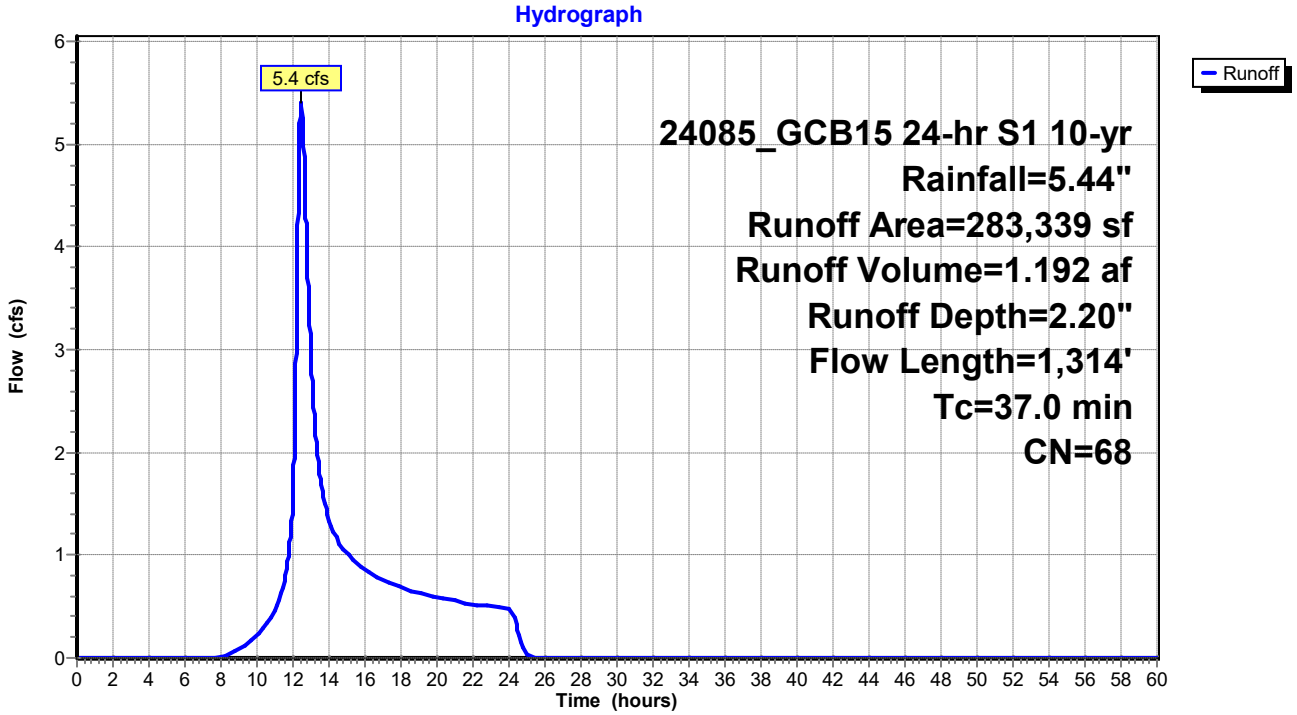
Runoff = 5.4 cfs @ 12.46 hrs, Volume= 1.192 af, Depth= 2.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
184,875	61	>75% Grass cover, Good, HSG B
98,464	80	>75% Grass cover, Good, HSG D
283,339	68	Weighted Average
283,339		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	100	0.0100	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
16.1	479	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
3.1	735	0.0050	4.00	35.96	**Trap/Vee/Rect Channel Flow,** Bot.W=3.00' D=1.50' Z= 2.0 '/' Top.W=9.00' n= 0.025 Earth, clean & straight
37.0	1,314	Total			

Subcatchment 3: 3



Summary for Subcatchment 4: 4

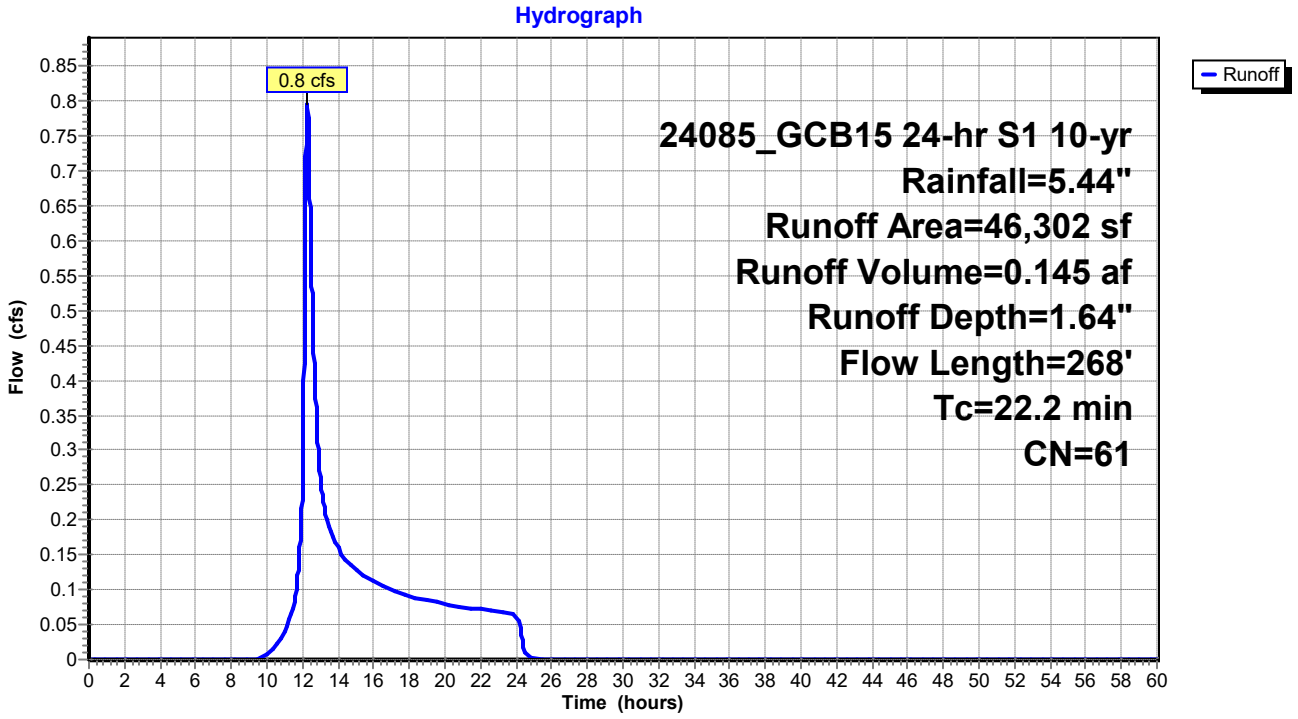
Runoff = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af, Depth= 1.64"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
46,302	61	>75% Grass cover, Good, HSG B
46,302		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
16.5	100	0.0120	0.10		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
5.7	168	0.0050	0.49		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
22.2	268	Total			

Subcatchment 4: 4



Summary for Subcatchment 5: 5

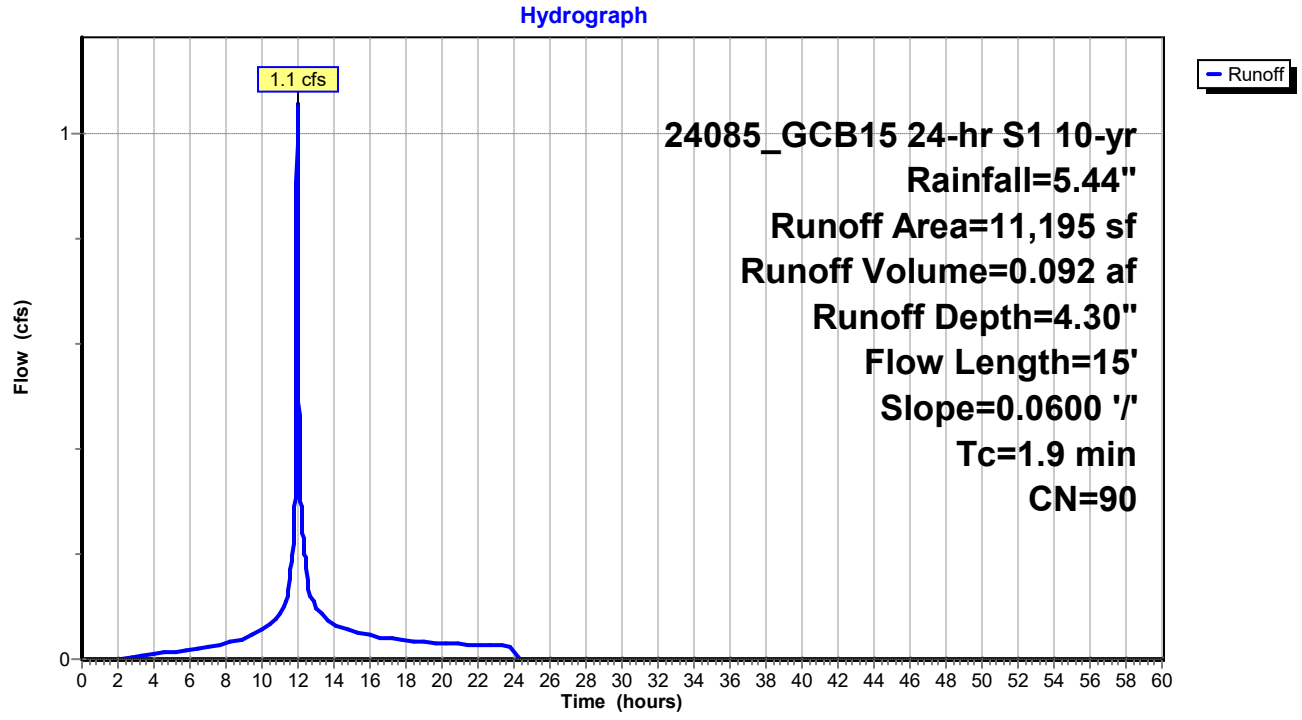
Runoff = 1.1 cfs @ 12.00 hrs, Volume= 0.092 af, Depth= 4.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
1,995	61	>75% Grass cover, Good, HSG B
2,606	96	Gravel surface, HSG B
4,843	98	Paved parking, HSG B
678	80	>75% Grass cover, Good, HSG D
743	96	Gravel surface, HSG D
330	98	Paved parking, HSG D
11,195	90	Weighted Average
6,022		53.79% Pervious Area
5,173		46.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	15	0.0600	0.13		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"

Subcatchment 5: 5



Summary for Subcatchment 6: 6

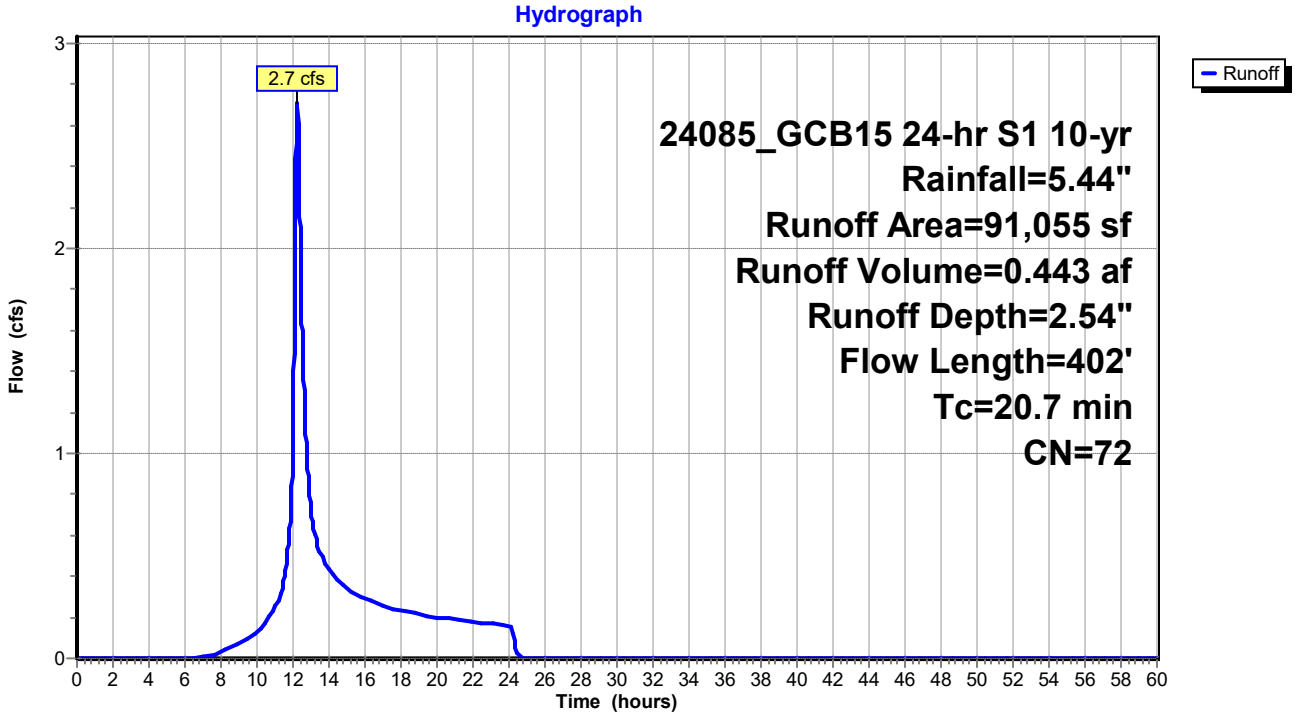
Runoff = 2.7 cfs @ 12.24 hrs, Volume= 0.443 af, Depth= 2.54"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
24085_GCB15 24-hr S1 10-yr Rainfall=5.44"

Area (sf)	CN	Description
40,145	61	>75% Grass cover, Good, HSG B
50,910	80	>75% Grass cover, Good, HSG D
91,055	72	Weighted Average
91,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
13.5	100	0.0200	0.12		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.60"
7.2	302	0.0100	0.70		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
20.7	402	Total			

Subcatchment 6: 6



Summary for Reach R1: R1

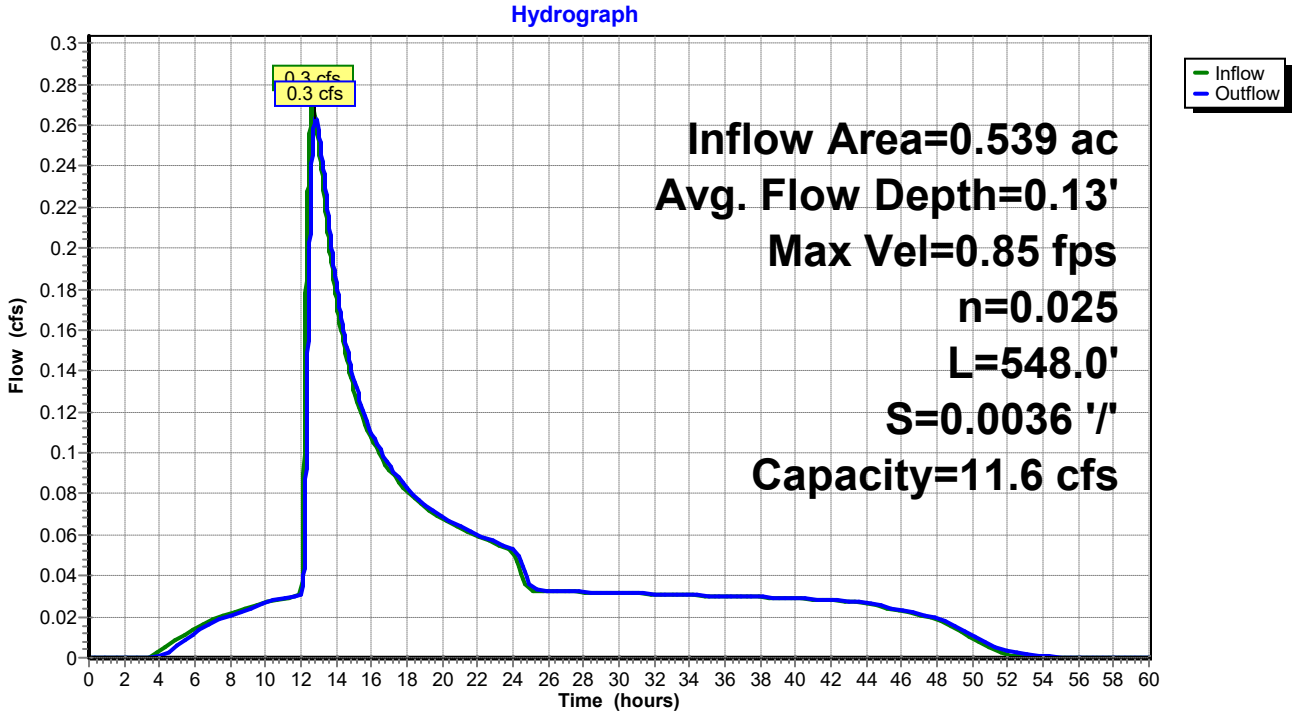
Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth > 3.98" for 10-yr event
Inflow = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af
Outflow = 0.3 cfs @ 12.84 hrs, Volume= 0.179 af, Atten= 3%, Lag= 11.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.85 fps, Min. Travel Time= 10.8 min
Avg. Velocity = 0.38 fps, Avg. Travel Time= 24.2 min

Peak Storage= 171 cf @ 12.84 hrs
Average Depth at Peak Storage= 0.13' , Surface Width= 2.67'
Bank-Full Depth= 1.00' Flow Area= 4.5 sf, Capacity= 11.6 cfs

2.00' x 1.00' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 2.0 '/' Top Width= 7.00'
Length= 548.0' Slope= 0.0036 '/'
Inlet Invert= 93.00', Outlet Invert= 91.00'

Reach R1: R1



Summary for Reach R2: R2

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth > 3.67" for 10-yr event
Inflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af, Atten= 0%, Lag= 0.4 min

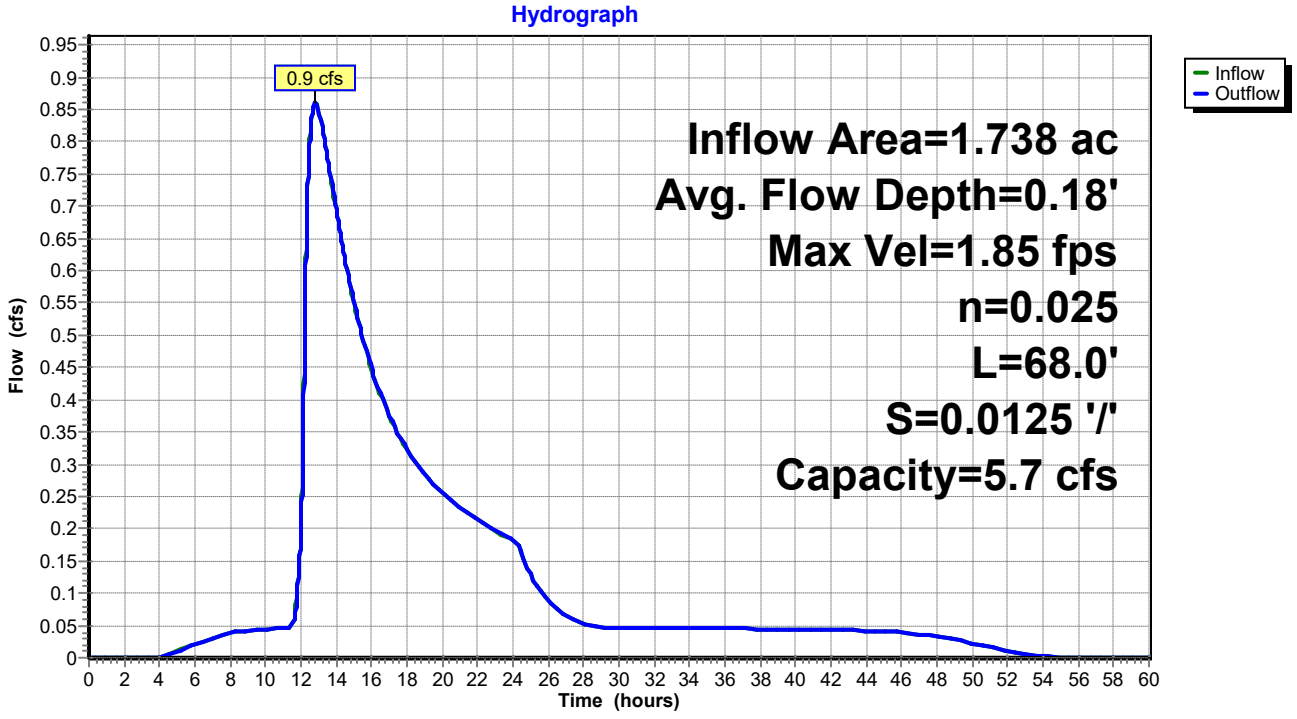
Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 0.74 fps, Avg. Travel Time= 1.5 min

Peak Storage= 32 cf @ 12.80 hrs
Average Depth at Peak Storage= 0.18' , Surface Width= 3.09'
Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 5.7 cfs

2.00' x 0.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 5.00'
Length= 68.0' Slope= 0.0125 '/'
Inlet Invert= 92.75', Outlet Invert= 91.90'

‡

Reach R2: R2



Summary for Reach R3: R3

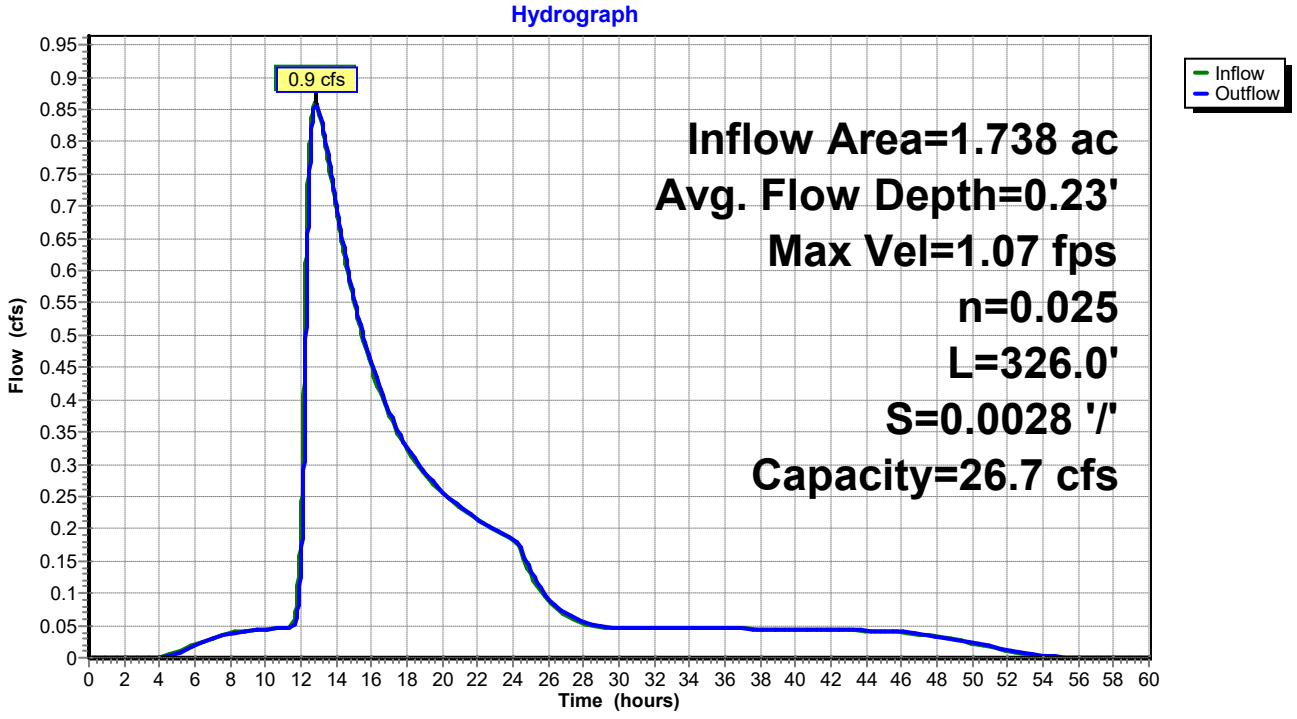
Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth > 3.67" for 10-yr event
Inflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.87 hrs, Volume= 0.532 af, Atten= 0%, Lag= 4.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.07 fps, Min. Travel Time= 5.1 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 12.8 min

Peak Storage= 263 cf @ 12.87 hrs
Average Depth at Peak Storage= 0.23' , Surface Width= 3.93'
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 26.7 cfs

3.00' x 1.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 326.0' Slope= 0.0028 '/'
Inlet Invert= 91.90', Outlet Invert= 91.00'

Reach R3: R3



Summary for Reach R4: R4

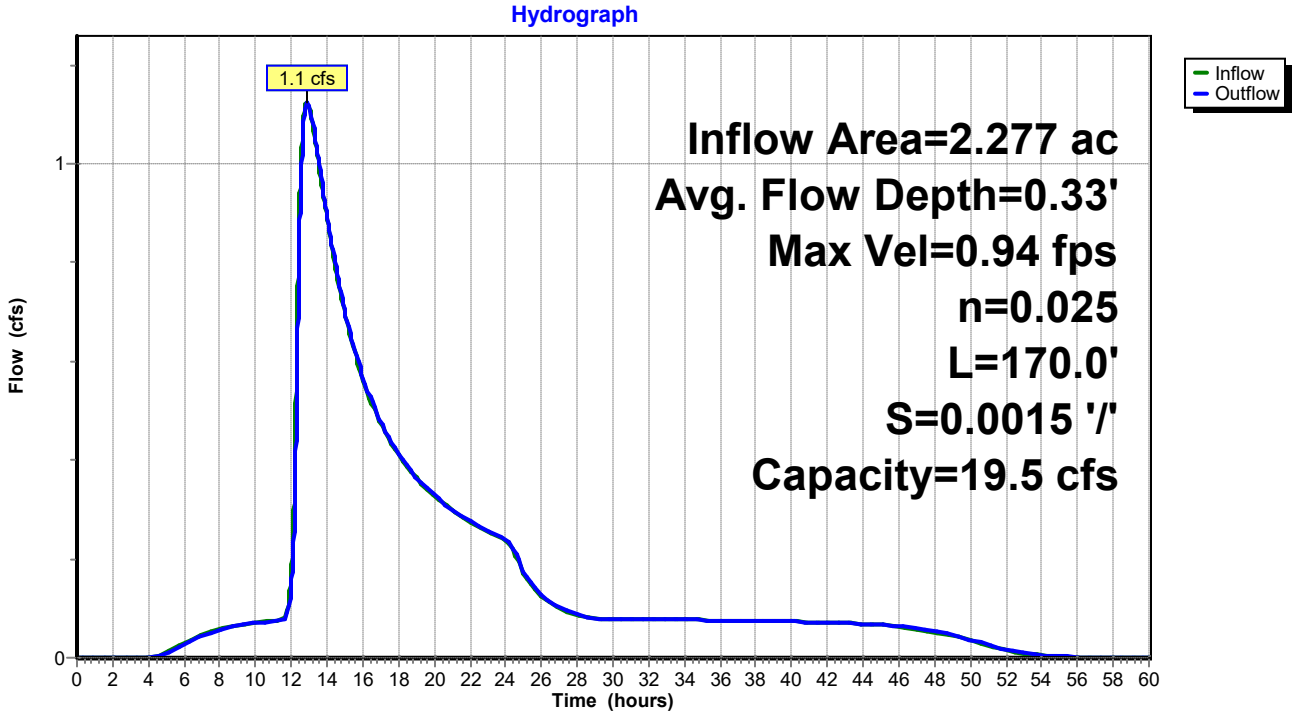
Inflow Area = 2.277 ac, 41.20% Impervious, Inflow Depth > 3.75" for 10-yr event
Inflow = 1.1 cfs @ 12.86 hrs, Volume= 0.711 af
Outflow = 1.1 cfs @ 12.90 hrs, Volume= 0.711 af, Atten= 0%, Lag= 2.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.94 fps, Min. Travel Time= 3.0 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 7.3 min

Peak Storage= 202 cf @ 12.90 hrs
Average Depth at Peak Storage= 0.33' , Surface Width= 4.30'
Bank-Full Depth= 1.50' Flow Area= 9.0 sf, Capacity= 19.5 cfs

3.00' x 1.50' deep channel, n= 0.025 Earth, clean & straight
Side Slope Z-value= 2.0 '/' Top Width= 9.00'
Length= 170.0' Slope= 0.0015 '/'
Inlet Invert= 91.00', Outlet Invert= 90.75'

Reach R4: R4



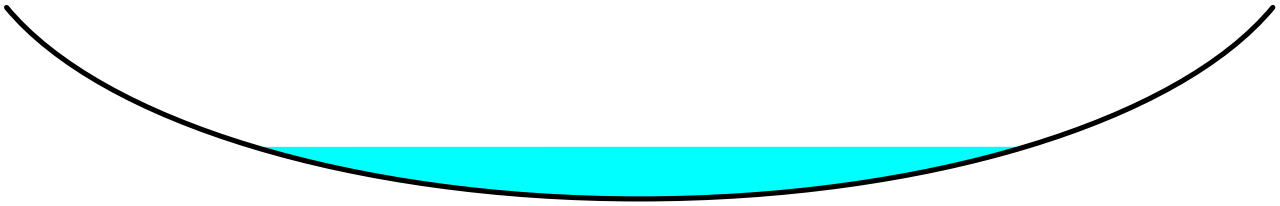
Summary for Reach R5: R5

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 4.30" for 10-yr event
Inflow = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af
Outflow = 0.3 cfs @ 12.23 hrs, Volume= 0.092 af, Atten= 1%, Lag= 5.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Max. Velocity= 0.64 fps, Min. Travel Time= 3.9 min
Avg. Velocity = 0.22 fps, Avg. Travel Time= 11.3 min

Peak Storage= 72 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.14' , Surface Width= 5.22'
Bank-Full Depth= 0.50' Flow Area= 3.3 sf, Capacity= 5.1 cfs

10.00' x 0.50' deep Parabolic Channel, n= 0.035 Earth, dense weeds
Length= 151.0' Slope= 0.0056 '/'
Inlet Invert= 92.75', Outlet Invert= 91.90'



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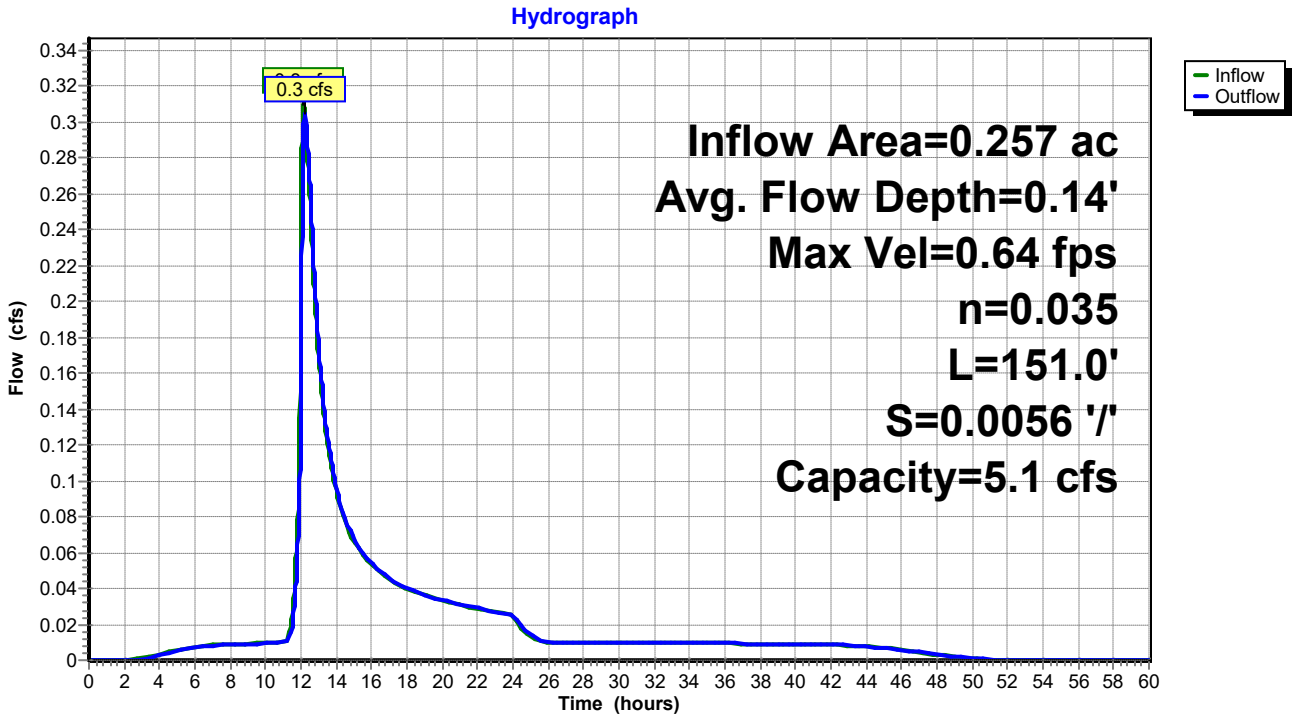
Reach R5: R5



Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 3.98" for 10-yr event
Inflow = 1.8 cfs @ 12.03 hrs, Volume= 0.179 af
Outflow = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af, Atten= 85%, Lag= 37.3 min
Primary = 0.3 cfs @ 12.66 hrs, Volume= 0.179 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.68' @ 12.66 hrs Surf.Area= 3,982 sf Storage= 3,572 cf (3,229 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 601.0 min calculated for 0.171 af (96% of inflow)
Center-of-Mass det. time= 533.0 min (1,354.8 - 821.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

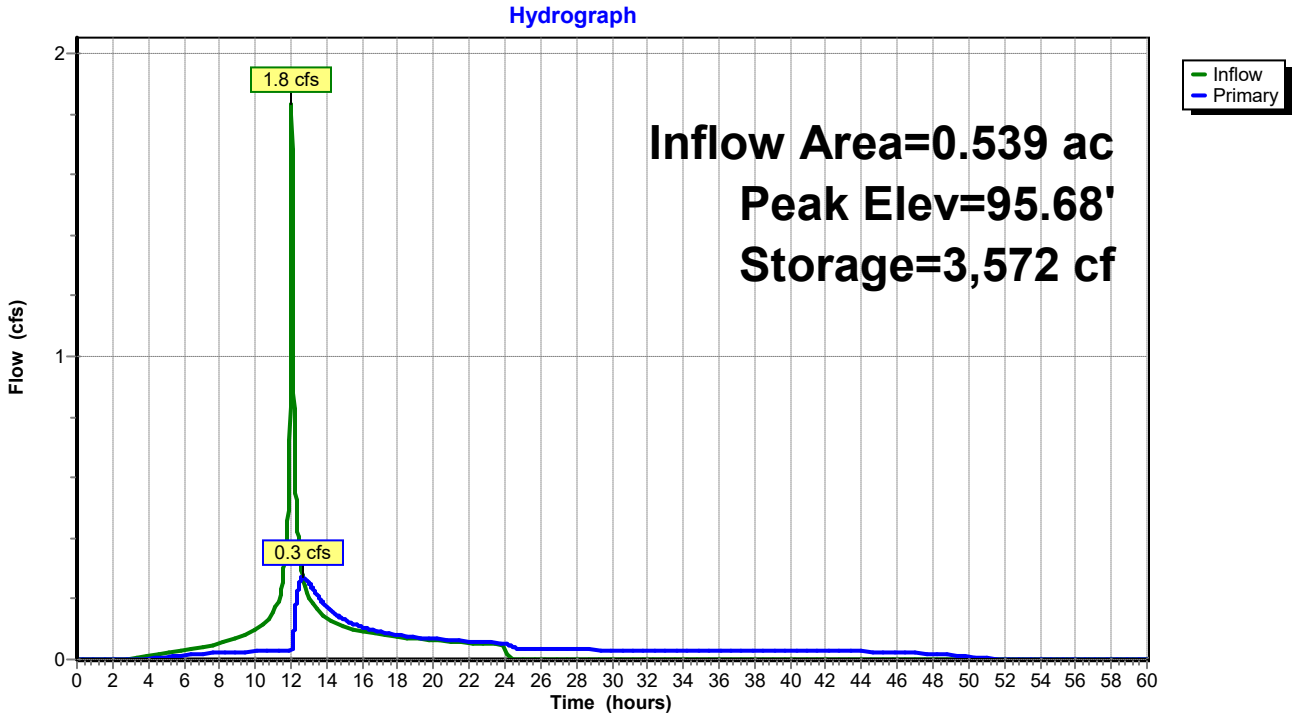
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.3 cfs @ 12.66 hrs HW=95.68' TW=93.13' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.3 cfs of 5.4 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.67 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 0.8 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.2 cfs @ 1.35 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio1: Bio 1 w ISR



Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 3.68" for 10-yr event
Inflow = 3.8 cfs @ 12.15 hrs, Volume= 0.532 af
Outflow = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af, Atten= 78%, Lag= 38.8 min
Primary = 0.9 cfs @ 12.80 hrs, Volume= 0.532 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.55' @ 12.80 hrs Surf.Area= 14,356 sf Storage= 9,733 cf (9,163 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 394.3 min calculated for 0.519 af (98% of inflow)
Center-of-Mass det. time= 361.2 min (1,205.2 - 844.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

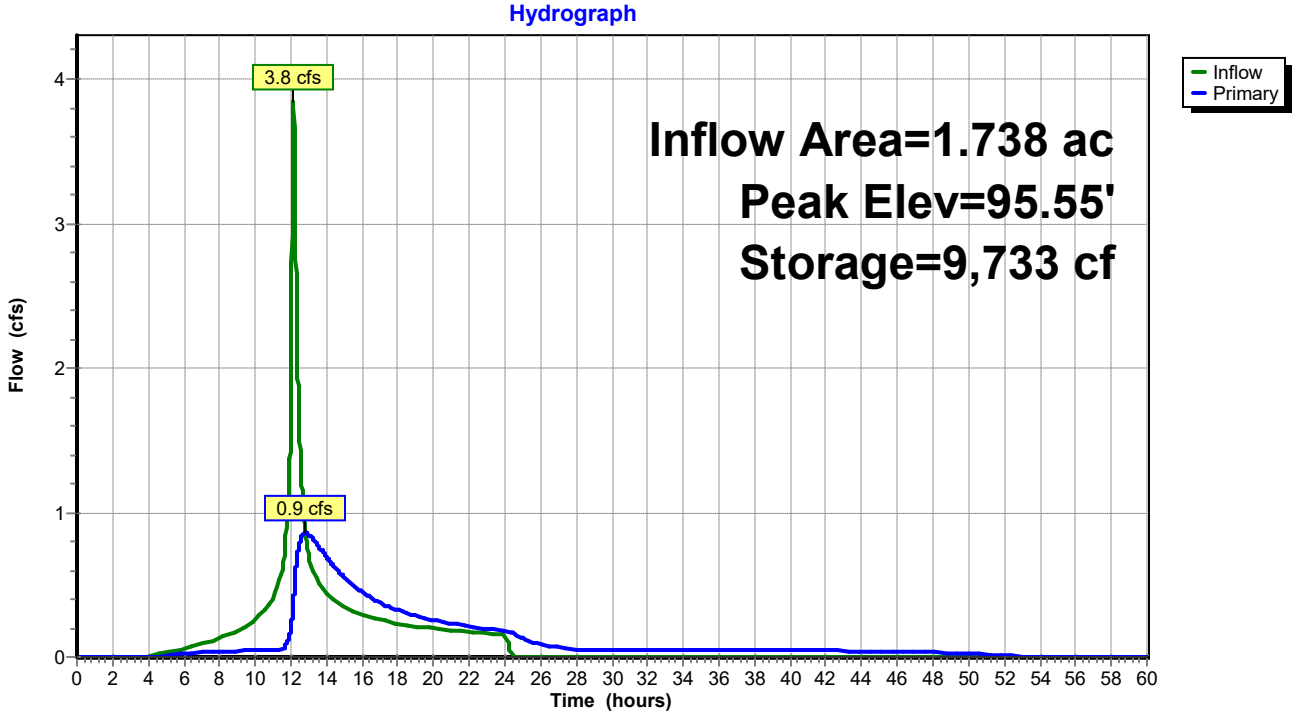
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.9 cfs @ 12.80 hrs HW=95.55' TW=92.93' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.9 cfs of 5.6 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 7.79 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.8 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio2: Bio 2 w ISR



Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 4.30" for 10-yr event
Inflow = 1.1 cfs @ 12.00 hrs, Volume= 0.092 af
Outflow = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af, Atten= 71%, Lag= 8.8 min
Primary = 0.3 cfs @ 12.14 hrs, Volume= 0.092 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.72' @ 12.14 hrs Surf.Area= 1,501 sf Storage= 1,548 cf (1,408 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 376.5 min calculated for 0.089 af (97% of inflow)
Center-of-Mass det. time= 328.6 min (1,131.2 - 802.6)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

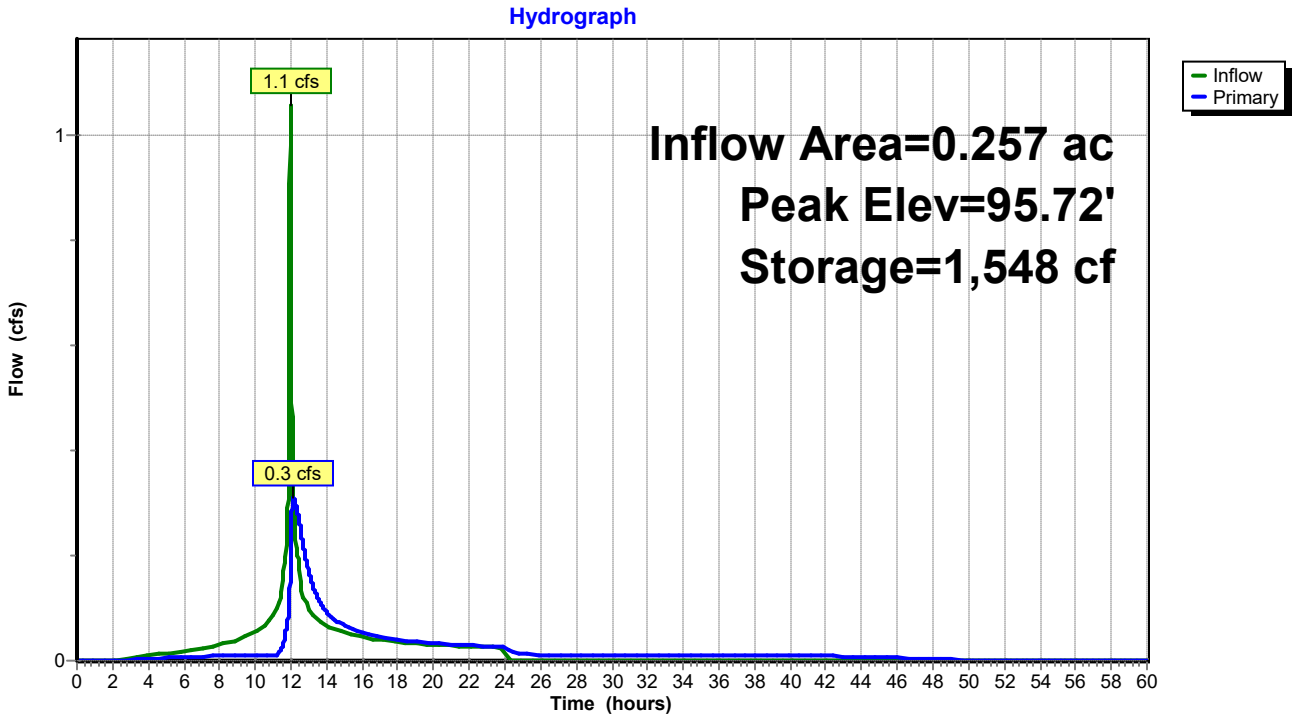
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.3 cfs @ 12.14 hrs HW=95.72' TW=92.88' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.3 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.10 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.7 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.3 cfs @ 2.31 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio3: Bio 3 w ISR

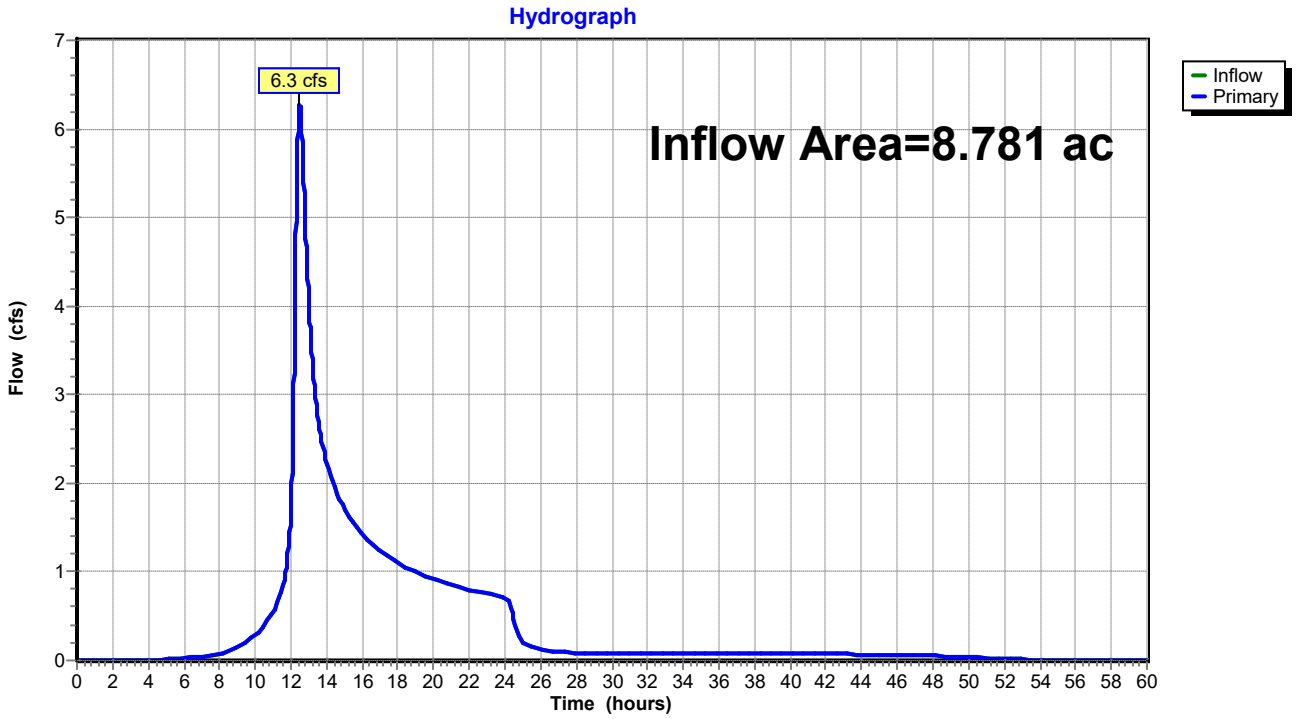


Summary for Link A: A

Inflow Area = 8.781 ac, 10.68% Impervious, Inflow Depth = 2.60" for 10-yr event
Inflow = 6.3 cfs @ 12.50 hrs, Volume= 1.903 af
Primary = 6.3 cfs @ 12.50 hrs, Volume= 1.903 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link A: A

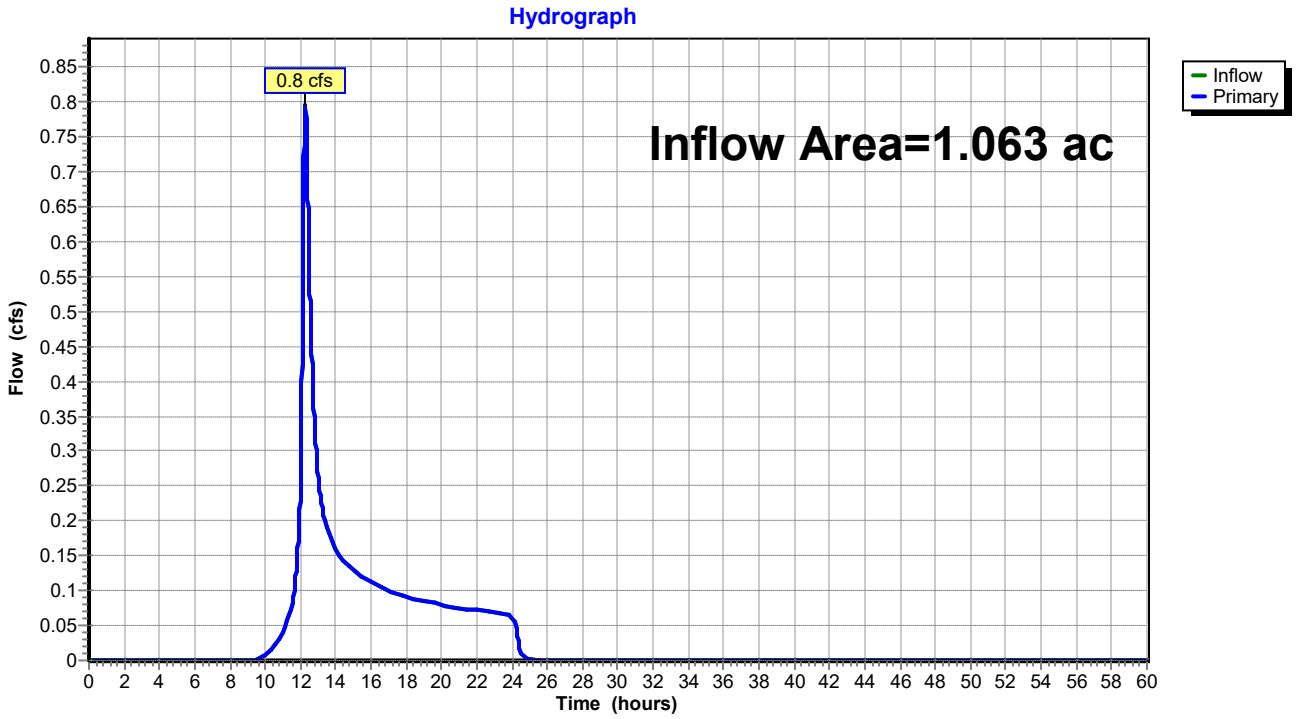


Summary for Link B: B

Inflow Area = 1.063 ac, 0.00% Impervious, Inflow Depth = 1.64" for 10-yr event
Inflow = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af
Primary = 0.8 cfs @ 12.26 hrs, Volume= 0.145 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link B: B

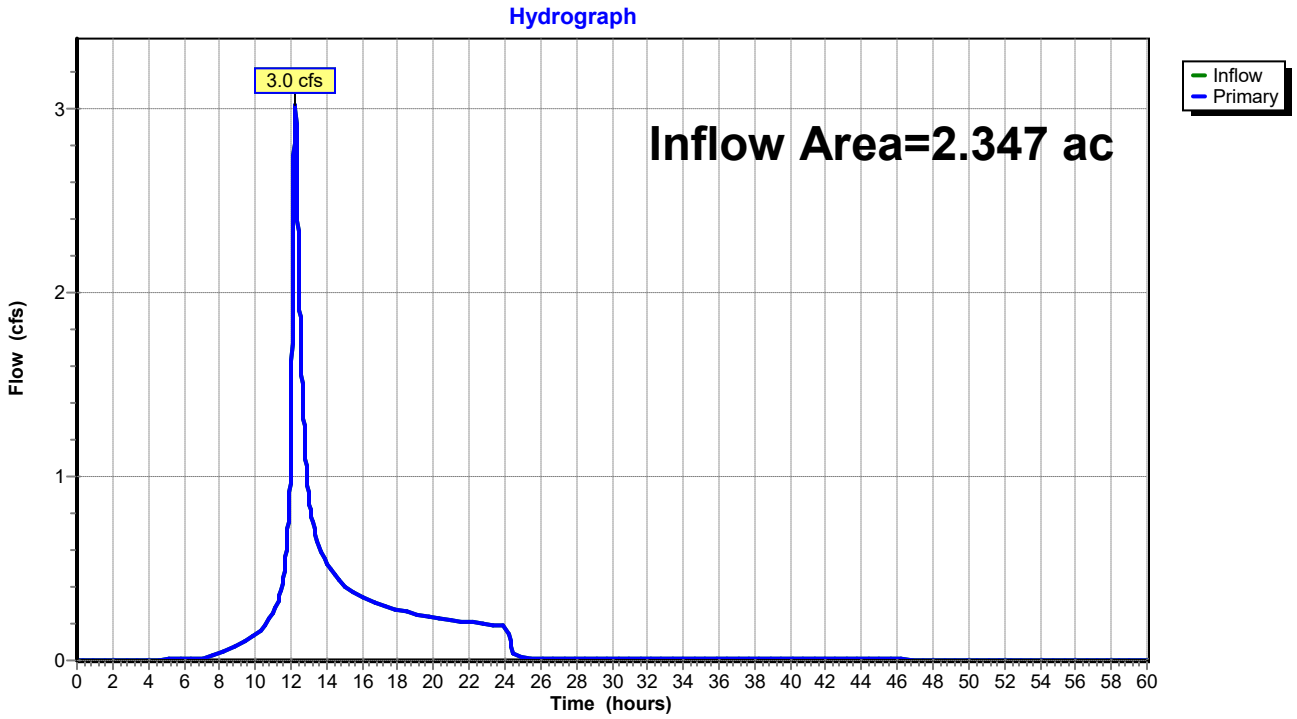


Summary for Link C: C

Inflow Area = 2.347 ac, 5.06% Impervious, Inflow Depth = 2.73" for 10-yr event
Inflow = 3.0 cfs @ 12.24 hrs, Volume= 0.535 af
Primary = 3.0 cfs @ 12.24 hrs, Volume= 0.535 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs

Link C: C



A – 2

NODE LISTING – 25-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=5.36"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=2.3 cfs 0.241 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=5.03"
Flow Length=468' Tc=14.5 min CN=84 Runoff=4.9 cfs 0.728 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=3.31"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=7.9 cfs 1.796 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=2.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.3 cfs 0.232 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=5.71"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.3 cfs 0.122 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=3.73"
Flow Length=402' Tc=20.7 min CN=72 Runoff=3.8 cfs 0.649 af

Reach R1: R1 Avg. Flow Depth=0.22' Max Vel=1.12 fps Inflow=0.6 cfs 0.241 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=0.6 cfs 0.241 af

Reach R2: R2 Avg. Flow Depth=0.23' Max Vel=2.10 fps Inflow=1.3 cfs 0.728 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=1.3 cfs 0.728 af

Reach R3: R3 Avg. Flow Depth=0.29' Max Vel=1.22 fps Inflow=1.3 cfs 0.728 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=1.3 cfs 0.728 af

Reach R4: R4 Avg. Flow Depth=0.43' Max Vel=1.11 fps Inflow=1.9 cfs 0.969 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=1.9 cfs 0.969 af

Reach R5: R5 Avg. Flow Depth=0.16' Max Vel=0.72 fps Inflow=0.4 cfs 0.122 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.4 cfs 0.122 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.83' Storage=4,231 cf Inflow=2.3 cfs 0.241 af
Outflow=0.6 cfs 0.241 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.74' Storage=12,418 cf Inflow=4.9 cfs 0.728 af
Outflow=1.3 cfs 0.728 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.86' Storage=1,770 cf Inflow=1.3 cfs 0.122 af
Outflow=0.4 cfs 0.122 af

Link A: A Inflow=9.7 cfs 2.765 af
Primary=9.7 cfs 2.765 af

Link B: B Inflow=1.3 cfs 0.232 af
Primary=1.3 cfs 0.232 af

Link C: C

Inflow=4.2 cfs 0.771 af
Primary=4.2 cfs 0.771 af

Total Runoff Area = 12.192 ac Runoff Volume = 3.768 af Average Runoff Depth = 3.71"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

A – 2

NODE LISTING – 50-YR

Time span=0.00-60.00 hrs, dt=0.01 hrs, 6001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1: 1 Runoff Area=23,492 sf 66.81% Impervious Runoff Depth=6.67"
Flow Length=46' Slope=0.0350 '/' Tc=5.8 min CN=87 Runoff=2.6 cfs 0.300 af

Subcatchment 2: 2 Runoff Area=75,687 sf 33.25% Impervious Runoff Depth=6.32"
Flow Length=468' Tc=14.5 min CN=84 Runoff=5.8 cfs 0.915 af

Subcatchment 3: 3 Runoff Area=283,339 sf 0.00% Impervious Runoff Depth=4.43"
Flow Length=1,314' Tc=37.0 min CN=68 Runoff=10.3 cfs 2.401 af

Subcatchment 4: 4 Runoff Area=46,302 sf 0.00% Impervious Runoff Depth=3.62"
Flow Length=268' Tc=22.2 min CN=61 Runoff=1.7 cfs 0.321 af

Subcatchment 5: 5 Runoff Area=11,195 sf 46.21% Impervious Runoff Depth=7.03"
Flow Length=15' Slope=0.0600 '/' Tc=1.9 min CN=90 Runoff=1.5 cfs 0.151 af

Subcatchment 6: 6 Runoff Area=91,055 sf 0.00% Impervious Runoff Depth=4.90"
Flow Length=402' Tc=20.7 min CN=72 Runoff=4.8 cfs 0.853 af

Reach R1: R1 Avg. Flow Depth=0.28' Max Vel=1.28 fps Inflow=1.0 cfs 0.300 af
n=0.025 L=548.0' S=0.0036 '/' Capacity=11.6 cfs Outflow=1.0 cfs 0.300 af

Reach R2: R2 Avg. Flow Depth=0.25' Max Vel=2.22 fps Inflow=1.5 cfs 0.914 af
n=0.025 L=68.0' S=0.0125 '/' Capacity=5.7 cfs Outflow=1.5 cfs 0.914 af

Reach R3: R3 Avg. Flow Depth=0.33' Max Vel=1.30 fps Inflow=1.5 cfs 0.914 af
n=0.025 L=326.0' S=0.0028 '/' Capacity=26.7 cfs Outflow=1.5 cfs 0.914 af

Reach R4: R4 Avg. Flow Depth=0.50' Max Vel=1.20 fps Inflow=2.4 cfs 1.214 af
n=0.025 L=170.0' S=0.0015 '/' Capacity=19.5 cfs Outflow=2.4 cfs 1.214 af

Reach R5: R5 Avg. Flow Depth=0.18' Max Vel=0.76 fps Inflow=0.5 cfs 0.151 af
n=0.035 L=151.0' S=0.0056 '/' Capacity=5.1 cfs Outflow=0.5 cfs 0.151 af

Pond Bio1: Bio 1 w ISR Peak Elev=95.95' Storage=4,792 cf Inflow=2.6 cfs 0.300 af
Outflow=1.0 cfs 0.300 af

Pond Bio2: Bio 2 w ISR Peak Elev=95.91' Storage=14,772 cf Inflow=5.8 cfs 0.915 af
Outflow=1.5 cfs 0.914 af

Pond Bio3: Bio 3 w ISR Peak Elev=95.95' Storage=1,917 cf Inflow=1.5 cfs 0.151 af
Outflow=0.5 cfs 0.151 af

Link A: A Inflow=12.7 cfs 3.615 af
Primary=12.7 cfs 3.615 af

Link B: B Inflow=1.7 cfs 0.321 af
Primary=1.7 cfs 0.321 af

Link C: C

Inflow=5.3 cfs 1.004 af
Primary=5.3 cfs 1.004 af

Total Runoff Area = 12.192 ac Runoff Volume = 4.940 af Average Runoff Depth = 4.86"
91.33% Pervious = 11.135 ac 8.67% Impervious = 1.057 ac

APPENDIX B

DESIGN

B – 1

STORMWATER BEST MANAGEMENT PRACTICES

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 1 w/ ISR (Bio 1 w ISR)**

Enter the node name in the drainage analysis if applicable.

0.54 ac	A = Area draining to the practice	
0.36 ac	A_I = Impervious area draining to the practice	
0.67 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.65 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.35 ac-in	WQV= 1" x Rv x A	
1,274 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
127 cf	10% x WQV (check calc for sediment forebay)	
319 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
1,065 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
1,498 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
343 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.03 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.42 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.03 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
24.41 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
Top Grate	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.95 ft	Peak elevation of the 50-year storm event (E_{50})	
96.25 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 6.67" for 50-yr event
Inflow = 2.6 cfs @ 12.03 hrs, Volume= 0.300 af
Outflow = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af, Atten= 62%, Lag= 10.8 min
Primary = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.95' @ 12.21 hrs Surf.Area= 6,011 sf Storage= 4,792 cf (4,449 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 399.5 min calculated for 0.292 af (97% of inflow)
Center-of-Mass det. time= 361.0 min (1,163.0 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

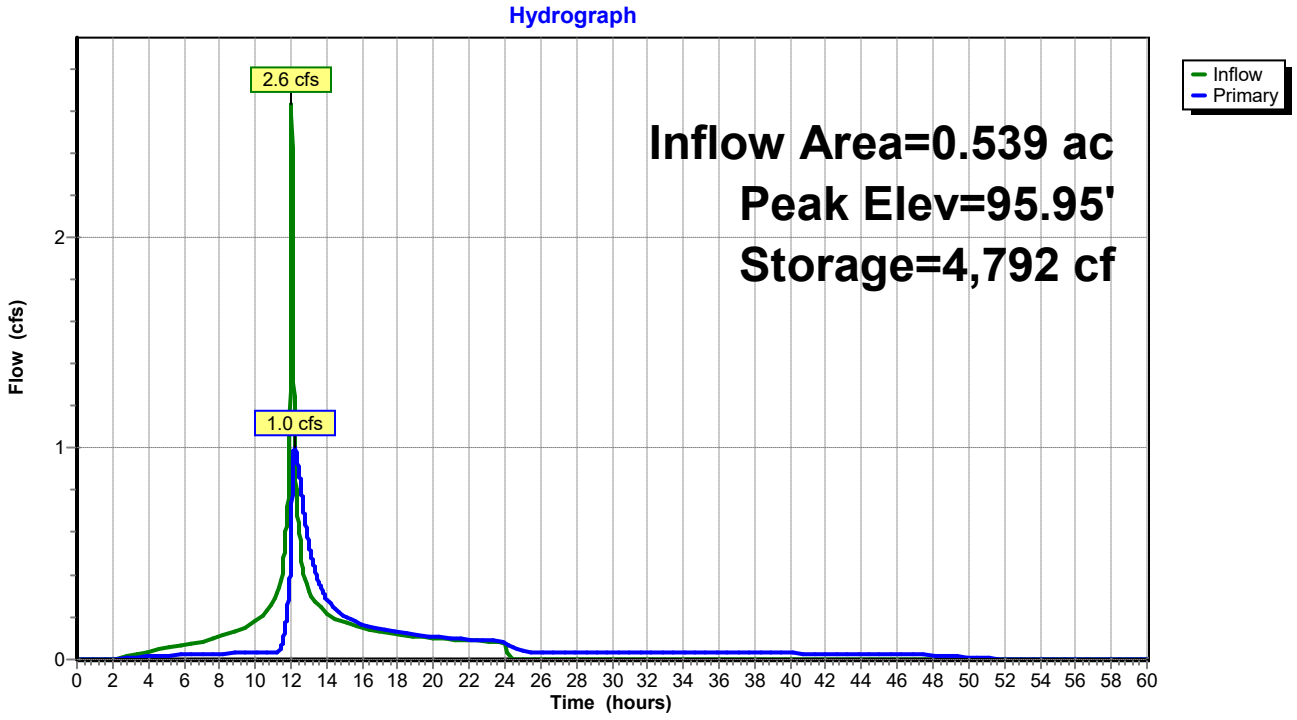
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.21 hrs HW=95.95' TW=93.26' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.0 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.89 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio1: Bio 1 w ISR



Stage-Discharge for Pond Bio1: Bio 1 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.0
92.60	0.0	95.20	0.0
92.65	0.0	95.25	0.0
92.70	0.0	95.30	0.0
92.75	0.0	95.35	0.0
92.80	0.0	95.40	0.0
92.85	0.0	95.45	0.0
92.90	0.0	95.50	0.0
92.95	0.0	95.55	0.1
93.00	0.0	95.60	0.1
93.05	0.0	95.65	0.2
93.10	0.0	95.70	0.3
93.15	0.0	95.75	0.4
93.20	0.0	95.80	0.6
93.25	0.0	95.85	0.7
93.30	0.0	95.90	0.8
93.35	0.0	95.95	1.0
93.40	0.0	96.00	1.2
93.45	0.0	96.05	1.9
93.50	0.0	96.10	3.1
93.55	0.0	96.15	4.6
93.60	0.0	96.20	6.1
93.65	0.0	96.25	**6.2**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		
94.20	0.0		
94.25	0.0		
94.30	0.0		
94.35	0.0		
94.40	0.0		

Stage-Area-Storage for Pond Bio1: Bio 1 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.85	686	0
91.90	686	14
91.95	686	27
92.00	686	41
92.05	686	55
92.10	686	69
92.15	686	82
92.20	686	96
92.25	686	110
92.30	686	123
92.35	686	137
92.40	686	151
92.45	686	165
92.50	686	178
92.55	686	192
92.60	686	206
92.65	686	220
92.70	686	233
92.75	686	247
92.80	686	261
92.85	686	274
92.90	686	288
92.95	686	302
93.00	686	316
93.05	686	329
93.10	686	343
93.15	686	353
93.20	686	364
93.25	686	374
93.30	686	384
93.35	686	394
93.40	686	401
93.45	686	408
93.50	686	415
93.55	686	422
93.60	686	429
93.65	686	436
93.70	686	442
93.75	824	449
93.80	838	463
93.85	852	478
93.90	867	494
93.95	883	510
94.00	899	527
94.05	912	545
94.10	926	564
94.15	940	583
94.20	955	603
94.25	970	623
94.30	985	645
94.35	1,001	667
94.40	1,017	690
94.45	1,034	714
94.50	1,051	739
94.55	1,069	764
94.60	1,086	791
94.65	1,105	818
94.70	1,123	846
94.75	1,142	875
94.80	1,162	906
94.85	1,182	937
94.90	1,786	1,036
94.95	2,391	1,136
95.00	2,996	1,237
95.05	3,054	1,392
95.10	3,114	1,549
95.15	3,174	1,708
95.20	3,236	1,869
95.25	3,299	2,032
95.30	3,363	2,197
95.35	3,428	2,364
95.40	3,494	2,534
95.45	3,589	2,710
95.50	3,703	2,891
95.55	3,780	3,081
95.60	3,859	3,274
95.65	3,939	3,469
95.70	4,021	3,666
95.75	4,103	3,866
95.80	5,798	4,091
95.85	5,869	4,325
95.90	5,940	4,560
95.95	6,012	4,795
96.00	6,083	5,030
96.05	6,226	5,291
96.10	6,369	5,552
96.15	6,513	5,813
96.20	6,656	6,074
96.25	**6,799**	**6,335**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 2 w/ ISR (Bio 2 w ISR)**

Enter the node name in the drainage analysis if applicable.

1.74 ac	A = Area draining to the practice	
0.58 ac	A_I = Impervious area draining to the practice	
0.33 decimal	I = Percent impervious area draining to the practice, in decimal form	
0.35 unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.61 ac-in	WQV= 1" x Rv x A	
2,203 cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
220 cf	10% x WQV (check calc for sediment forebay)	
551 cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay	Method of Pretreatment	
724 cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
2,334 cf	Volume below lowest orifice[1]	**≥ 100%WQV**
570 cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.05 cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.09 ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.05 cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
26.04 hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00 in	Depth of Filter Media	**≥ 18"**
3.00 :1	Pond side slopes	**≥ 3:1**
Grates	What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.91 ft	Peak elevation of the 50-year storm event (E_{50})	
96.25 ft	Berm elevation of the pond	
YES	E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 6.32" for 50-yr event
Inflow = 5.8 cfs @ 12.15 hrs, Volume= 0.915 af
Outflow = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af, Atten= 73%, Lag= 34.6 min
Primary = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.91' @ 12.72 hrs Surf.Area= 16,279 sf Storage= 14,772 cf (14,202 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 295.4 min calculated for 0.901 af (99% of inflow)
Center-of-Mass det. time= 275.6 min (1,098.1 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

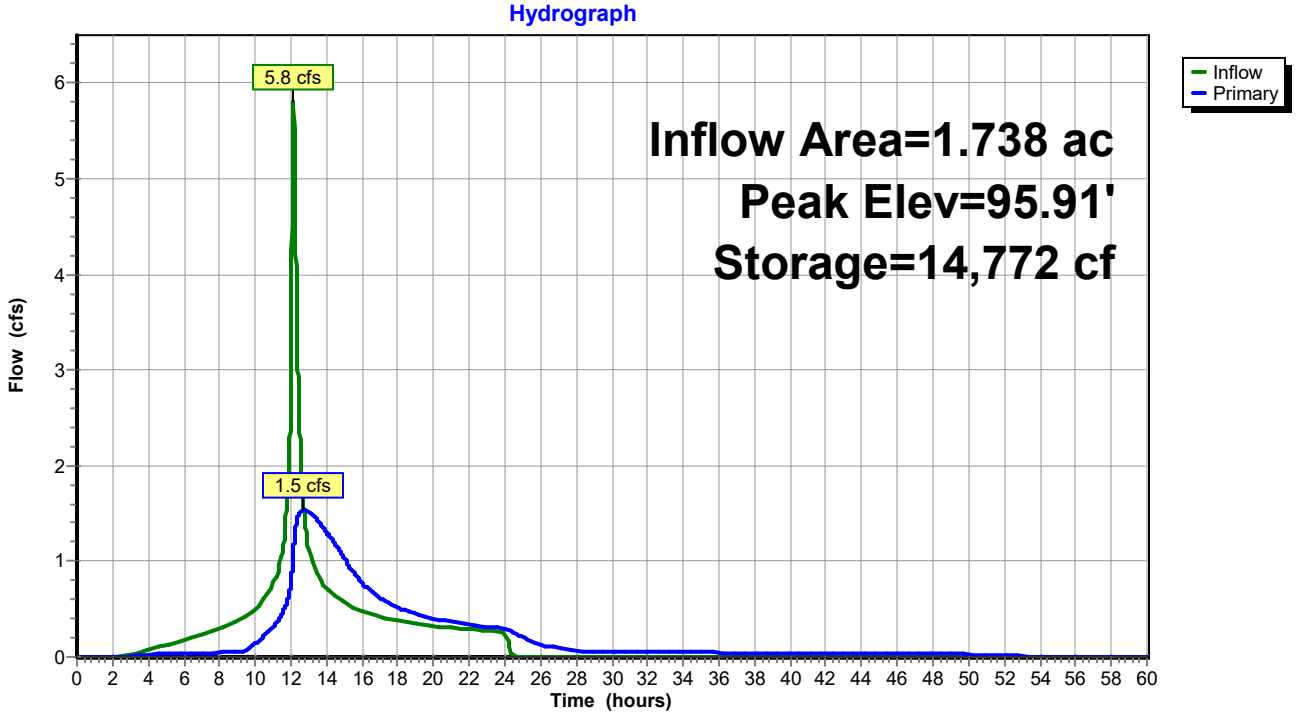
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.5 cfs @ 12.72 hrs HW=95.91' TW=93.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 8.21 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.4 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.58 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio2: Bio 2 w ISR



Stage-Discharge for Pond Bio2: Bio 2 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.60	0.0	94.20	0.0
91.65	0.0	94.25	0.0
91.70	0.0	94.30	0.0
91.75	0.0	94.35	0.0
91.80	0.0	94.40	0.0
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.1
92.60	0.0	95.20	0.1
92.65	0.0	95.25	0.2
92.70	0.0	95.30	0.3
92.75	0.0	95.35	0.4
92.80	0.0	95.40	0.5
92.85	0.0	95.45	0.6
92.90	0.0	95.50	0.7
92.95	0.0	95.55	0.9
93.00	0.0	95.60	1.0
93.05	0.0	95.65	1.1
93.10	0.0	95.70	1.2
93.15	0.0	95.75	1.3
93.20	0.0	95.80	1.4
93.25	0.0	95.85	1.5
93.30	0.0	95.90	1.5
93.35	0.0	95.95	1.6
93.40	0.0	96.00	1.7
93.45	0.0	96.05	2.3
93.50	0.0	96.10	3.4
93.55	0.0	96.15	4.9
93.60	0.0	96.20	6.4
93.65	0.0	96.25	**6.4**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		

Stage-Area-Storage for Pond Bio2: Bio 2 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.60	1,140	0
91.65	1,140	23
91.70	1,140	46
91.75	1,140	68
91.80	1,140	91
91.85	1,140	114
91.90	1,140	137
91.95	1,140	160
92.00	1,140	182
92.05	1,140	205
92.10	1,140	228
92.15	1,140	251
92.20	1,140	274
92.25	1,140	296
92.30	1,140	319
92.35	1,140	342
92.40	1,140	365
92.45	1,140	388
92.50	1,140	410
92.55	1,140	433
92.60	1,140	456
92.65	1,140	479
92.70	1,140	502
92.75	1,140	524
92.80	1,140	547
92.85	1,140	570
92.90	1,140	587
92.95	1,140	604
93.00	1,140	621
93.05	1,140	638
93.10	1,140	656
93.15	1,140	667
93.20	1,140	678
93.25	1,228	690
93.30	1,235	706
93.35	1,242	722
93.40	1,250	739
93.45	1,258	756
93.50	1,266	773
93.55	1,274	791
93.60	1,283	809
93.65	1,291	828
93.70	1,301	847
93.75	1,310	867
93.80	1,320	887
93.85	1,330	908
93.90	1,340	929
93.95	1,350	951
94.00	1,361	973
94.05	1,378	996
94.10	1,395	1,019
94.15	1,413	1,044
94.20	1,432	1,070
94.25	1,451	1,096
94.30	1,471	1,123
94.35	1,491	1,152
94.40	1,512	1,181
94.45	1,534	1,212
94.50	1,556	1,244
94.55	1,579	1,276
94.60	1,602	1,310
94.65	2,402	1,524
94.70	3,203	1,738
94.75	4,005	1,954
94.80	4,807	2,171
94.85	5,609	2,390
94.90	6,413	2,610
94.95	7,217	2,831
95.00	8,021	3,054
95.05	8,876	3,492
95.10	9,734	3,940
95.15	10,605	4,469
95.20	11,476	4,999
95.25	11,576	5,576
95.30	13,025	6,246
95.35	13,291	6,942
95.40	13,556	7,637
95.45	13,822	8,333
95.50	14,087	9,028
95.55	14,353	9,724
95.60	14,618	10,420
95.65	14,884	11,115
95.70	15,149	11,811
95.75	15,415	12,506
95.80	15,680	13,202
95.85	15,946	13,898
95.90	16,211	14,593
95.95	16,477	15,289
96.00	16,742	15,984
96.05	16,983	16,811
96.10	17,223	17,637
96.15	17,464	18,463
96.20	17,704	19,289
96.25	**17,945**	**20,115**

BIORETENTION SYSTEM WITH INTERNAL STORAGE RESERVOIR (UNH Stormwater Center Specification)

Type/Node Name: **Bioretention Pond 3 w/ ISR (Bio 3 w ISR)**

Enter the node name in the drainage analysis if applicable.

0.26	ac	A = Area draining to the practice	
0.12	ac	A_I = Impervious area draining to the practice	
0.46	decimal	I = Percent impervious area draining to the practice, in decimal form	
0.47	unitless	Rv = Runoff coefficient = 0.05 + (0.9 x I)	
0.12	ac-in	WQV= 1" x Rv x A	
435	cf	WQV conversion (ac-in x 43,560 sf/ac x 1ft/12")	
43	cf	10% x WQV (check calc for sediment forebay)	
109	cf	25% x WQV (check calc for water stored in saturated zone)	
Forebay		Method of Pretreatment	
247	cf	If pretrt is sed forebay: V_{SED} (sediment forebay volume)	**≥ 10%WQV**
477	cf	Volume below lowest orifice[1]	**≥ 100%WQV**
140	cf	Water stored in voids of saturated zone	**≥ 26%WQV**
0.01	cfs	$2Q_{avg}$ = 2* WQV / 24 hrs * (1hr / 3600 sec)[2]	
95.16	ft	E_{WQV} = Elevation of WQV (attach stage-storage table)	
0.01	cfs	Q_{WQV} = Discharge at the E_{WQV} (attach stage-discharge table)	**< $2Q_{WQV}$**
24.15	hours	T_{ED} = Drawdown time of extended detention = 2WQV/Q_{WQV}	**≥ 24-hrs**
18.00	in	Depth of Filter Media	**≥ 18"**
3.00	:1	Pond side slopes	**≥ 3:1**
Grate		What mechanism is proposed to prevent the outlet structure from clogging (applicable for orifices/weirs with a dimension of ≤6")?	
95.95	ft	Peak elevation of the 50-year storm event (E_{50})	
96.25	ft	Berm elevation of the pond	
YES		E_{50} ≤ the berm elevation?	**← yes**

1. Volume stored above the wetland soil and below the high flow by-pass.

Designer's Notes: HSG "D" soils utilized in areas of lined ISR and forebay.

Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 7.03" for 50-yr event
Inflow = 1.5 cfs @ 12.00 hrs, Volume= 0.151 af
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af, Atten= 64%, Lag= 7.7 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.95' @ 12.13 hrs Surf.Area= 1,942 sf Storage= 1,917 cf (1,777 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 266.2 min calculated for 0.147 af (98% of inflow)
Center-of-Mass det. time= 236.9 min (1,021.7 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

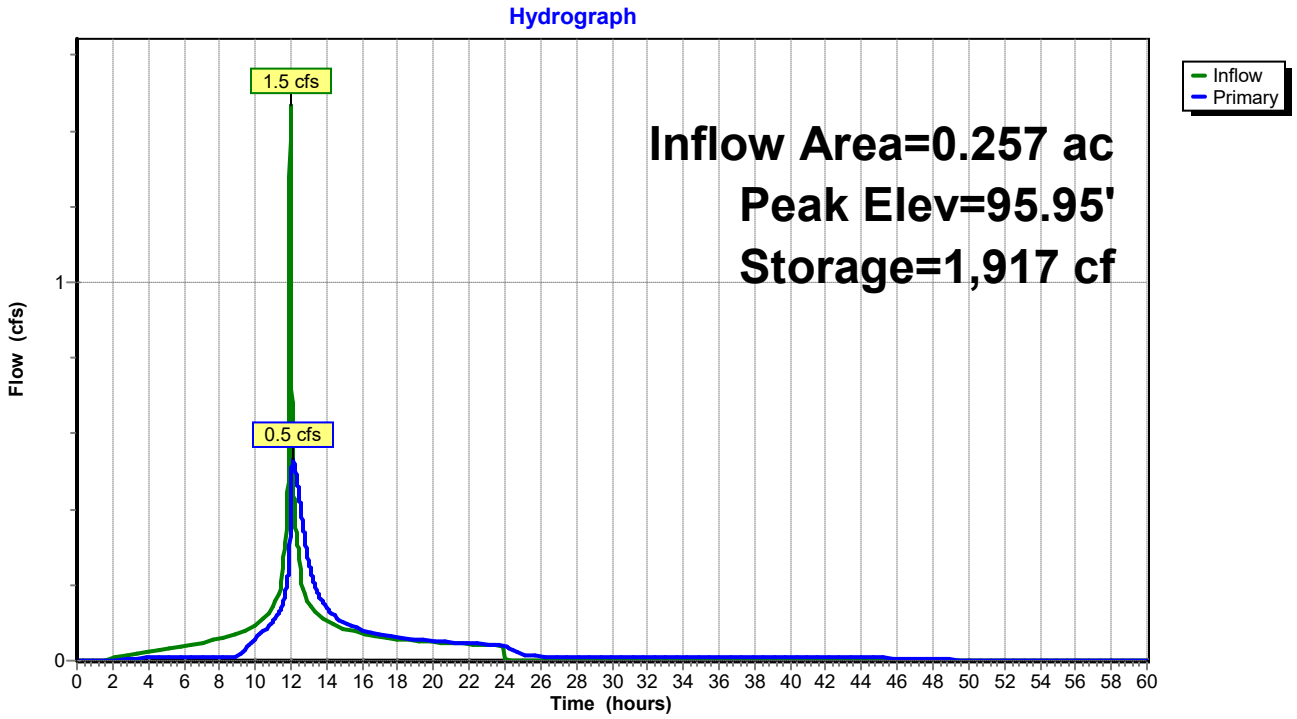
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=95.95' TW=92.92' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.38 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.3 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.5 cfs @ 2.78 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

Pond Bio3: Bio 3 w ISR



Stage-Discharge for Pond Bio3: Bio 3 w ISR

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
91.60	0.0	94.20	0.0
91.65	0.0	94.25	0.0
91.70	0.0	94.30	0.0
91.75	0.0	94.35	0.0
91.80	0.0	94.40	0.0
91.85	0.0	94.45	0.0
91.90	0.0	94.50	0.0
91.95	0.0	94.55	0.0
92.00	0.0	94.60	0.0
92.05	0.0	94.65	0.0
92.10	0.0	94.70	0.0
92.15	0.0	94.75	0.0
92.20	0.0	94.80	0.0
92.25	0.0	94.85	0.0
92.30	0.0	94.90	0.0
92.35	0.0	94.95	0.0
92.40	0.0	95.00	0.0
92.45	0.0	95.05	0.0
92.50	0.0	95.10	0.0
92.55	0.0	95.15	0.0
92.60	0.0	95.20	0.0
92.65	0.0	95.25	0.0
92.70	0.0	95.30	0.0
92.75	0.0	95.35	0.1
92.80	0.0	95.40	0.1
92.85	0.0	95.45	0.1
92.90	0.0	95.50	0.1
92.95	0.0	95.55	0.2
93.00	0.0	95.60	0.2
93.05	0.0	95.65	0.3
93.10	0.0	95.70	0.3
93.15	0.0	95.75	0.3
93.20	0.0	95.80	0.4
93.25	0.0	95.85	0.4
93.30	0.0	95.90	0.5
93.35	0.0	95.95	0.5
93.40	0.0	96.00	0.6
93.45	0.0	96.05	1.2
93.50	0.0	96.10	2.3
93.55	0.0	96.15	3.7
93.60	0.0	96.20	5.4
93.65	0.0	96.25	**6.4**
93.70	0.0		
93.75	0.0		
93.80	0.0		
93.85	0.0		
93.90	0.0		
93.95	0.0		
94.00	0.0		
94.05	0.0		
94.10	0.0		
94.15	0.0		

Stage-Area-Storage for Pond Bio3: Bio 3 w ISR

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
91.60	280	0
91.65	280	6
91.70	280	11
91.75	280	17
91.80	280	22
91.85	280	28
91.90	280	34
91.95	280	39
92.00	280	45
92.05	280	50
92.10	280	56
92.15	280	62
92.20	280	67
92.25	280	73
92.30	280	78
92.35	280	84
92.40	280	90
92.45	280	95
92.50	280	101
92.55	280	106
92.60	280	112
92.65	280	118
92.70	280	123
92.75	280	129
92.80	280	134
92.85	280	140
92.90	280	144
92.95	280	148
93.00	280	153
93.05	280	157
93.10	280	161
93.15	280	164
93.20	280	167
93.25	280	169
93.30	280	172
93.35	280	175
93.40	280	178
93.45	280	181
93.50	280	183
93.55	280	186
93.60	280	189
93.65	280	192
93.70	280	195
93.75	301	197
93.80	304	201
93.85	307	205
93.90	310	210
93.95	313	214
94.00	317	219
94.05	321	223
94.10	325	228
94.15	329	233
94.20	333	239
94.25	337	244
94.30	342	250
94.35	347	256
94.40	352	262
94.45	357	269
94.50	362	276
94.55	368	283
94.60	374	290
94.65	503	323
94.70	633	356
94.75	764	389
94.80	894	423
94.85	1,025	457
94.90	1,050	512
94.95	1,075	566
95.00	1,101	621
95.05	1,126	676
95.10	1,152	732
95.15	1,178	788
95.20	1,206	847
95.25	1,234	913
95.30	1,262	979
95.35	1,290	1,046
95.40	1,318	1,113
95.45	1,346	1,180
95.50	1,375	1,248
95.55	1,404	1,317
95.60	1,433	1,386
95.65	1,462	1,455
95.70	1,491	1,525
95.75	1,521	1,595
95.80	1,859	1,674
95.85	1,887	1,756
95.90	1,915	1,837
95.95	1,942	1,919
96.00	1,970	2,000
96.05	2,085	2,099
96.10	2,200	2,198
96.15	2,315	2,296
96.20	2,430	2,395
96.25	**2,545**	**2,494**

B – 2

POLLUTANT REMOVAL

Pollutant Removal Efficiencies for Best Management Practices for Use in Pollutant Loading Analysis				Values Accepted for Loading Analyses		
BMP Type	**BMP**	**Notes**	**Lit. Ref.**	**TSS**	**TN**	**TP**
Stormwater Ponds	Wet Pond		B, F	70%	35%	45%
	Wet Extended Detention Pond		A, B	80%	55%	68%
	Micropool Extended Detention Pond	TBA				
	Multiple Pond System	TBA				
	Pocket Pond	TBA				
Stormwater Wetlands	Shallow Wetland		A, B, F, I	80%	55%	45%
	Extended Detention Wetland		A, B, F, I	80%	55%	45%
	Pond/Wetland System	TBA				
	Gravel Wetland		H	95%	85%	64%
Infiltration Practices	Infiltration Trench (≥75 ft from surface water)		B, D, I	90%	55%	60%
	Infiltration Trench (<75 ft from surface water)		B, D, I	90%	10%	60%
	Infiltration Basin (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Infiltration Basin (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Dry Wells			90%	55%	60%
	Drip Edges			90%	55%	60%
Filtering Practices	Aboveground or Underground Sand Filter that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Aboveground or Underground Sand Filter that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Aboveground or Underground Sand Filter with underdrain		A, I, F, G, H	85%	10%	45%
	Tree Box Filter	TBA				
	Bioretention System		I, G, H	90%	65%	65%
	Permeable Pavement that infiltrates WQV (≥75 ft from surface water)		A, F, B, D, I	90%	60%	65%
	Permeable Pavement that infiltrates WQV (<75 ft from surface water)		A, F, B, D, I	90%	10%	65%
	Permeable Pavement with underdrain		Use TN and TP values for sand filter w/ underdrain and outlet pipe	90%	10%	45%

B – 3

OUTLET PROTECTION

OUTLET PROTECTION DESIGN CALCS

DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 1

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of outlet pipe (ft)
D= Width of channel (ft)
z= Channel side slope (H:V ft/ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	93
Tailwater elev:	93.26
Tw:	0.26
Q:	1
D_0:	1.00
D:	2
z:	3

Apron Dimensions

w_1=	**8**	(ft)
w_2=	**2**	(ft)
La=	**9**	(ft)

Apron Length:

$Tw > .5D_0$	$Tw < .5D_0$
La: 10.000	La: 8.800

Apron Width:

w_2: 2

w_1: 8

w_1=	8.00
w_2=	2.00
La=	8.8

RipRap Sizing

d_{50}=	0.08	(ft)
d_{50}=	0.92	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.12	TO	0.15	100
0.10	TO	0.14	85
0.08	TO	0.12	50
0.02	TO	0.04	15

Minimum Depth of Rock= 0.23 (ft)

Summary for Pond Bio1: Bio 1 w ISR

Inflow Area = 0.539 ac, 66.81% Impervious, Inflow Depth = 6.67" for 50-yr event
Inflow = 2.6 cfs @ 12.03 hrs, Volume= 0.300 af
Outflow = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af, Atten= 62%, Lag= 10.8 min
Primary = 1.0 cfs @ 12.21 hrs, Volume= 0.300 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 93.10' Surf.Area= 686 sf Storage= 343 cf
Peak Elev= 95.95' @ 12.21 hrs Surf.Area= 6,011 sf Storage= 4,792 cf (4,449 cf above start)
Flood Elev= 96.25' Surf.Area= 6,799 sf Storage= 6,335 cf (5,992 cf above start)

Plug-Flow detention time= 399.5 min calculated for 0.292 af (97% of inflow)
Center-of-Mass det. time= 361.0 min (1,163.0 - 802.0)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	1,065 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.85'	5,270 cf	**Bioretention Area 1 w/ ISR (Irregular)** Listed below
		6,335 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	138	98.0	0	0	138
94.00	213	102.7	44	44	217
95.00	558	145.0	372	415	1,060
95.75	1,216	368.9	649	1,065	10,218

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.85	686	126.0	0.0	0	0	686
93.10	686	126.0	40.0	343	343	844
93.35	686	126.0	30.0	51	394	875
94.85	686	126.0	20.0	206	600	1,064
95.00	2,438	192.7	100.0	221	821	2,756
95.42	2,626	198.7	100.0	1,063	1,884	2,960
95.50	2,734	202.1	100.0	214	2,099	3,070
95.75	2,887	206.8	100.0	703	2,801	3,231
95.76	4,525	471.9	100.0	37	2,838	17,549
96.00	4,867	476.4	100.0	1,127	3,965	17,907
96.25	5,583	456.2	100.0	1,305	5,270	19,410

Device	Routing	Invert	Outlet Devices
#1	Primary	93.10'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 93.10' / 93.00' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	93.10'	**0.9" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	92.18'	**6.0" Round Culvert** L= 12.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 92.18' / 92.18' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf

#4	Device 3	91.85'	**10.000 in/hr Exfiltration over Surface area below 94.90'** Phase-In= 0.01'
#5	Device 3	95.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.50'	**12.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.0 cfs @ 12.21 hrs HW=95.95' TW=93.26' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.0 cfs of 5.8 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 7.89 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.2 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.4 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 2.5 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.0 cfs @ 2.15 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

OUTLET PROTECTION DESIGN CALCS

NON DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 2

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of the pipe (ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	92.75
Tailwater elev:	93
Tw:	0.25
Q:	1.6
D_0:	1

Apron Dimensions

w_1=	**3**	(ft)
w_2=	**13**	(ft)
La=	**10**	(ft)

Apron Length:

$Tw > .5D_0$		$Tw < .5D_0$
La: 11.800		La: 9.880

Apron Width:

$Tw > .5D_0$		$Tw < .5D_0$
w_2: 7.72		w_2: 12.88

w_1: 3

w_1=	3.00
w_2=	12.88
La=	9.88

RipRap Sizing

d_{50}=	0.15	(ft)
d_{50}=	1.80	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.22	TO	0.30	100
0.19	TO	0.27	85
0.15	TO	0.22	50
0.04	TO	0.07	15

Minimum Depth of Rock= 0.45 (ft)

Summary for Pond Bio2: Bio 2 w ISR

Inflow Area = 1.738 ac, 33.25% Impervious, Inflow Depth = 6.32" for 50-yr event
Inflow = 5.8 cfs @ 12.15 hrs, Volume= 0.915 af
Outflow = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af, Atten= 73%, Lag= 34.6 min
Primary = 1.5 cfs @ 12.72 hrs, Volume= 0.914 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 1,140 sf Storage= 570 cf
Peak Elev= 95.91' @ 12.72 hrs Surf.Area= 16,279 sf Storage= 14,772 cf (14,202 cf above start)
Flood Elev= 96.25' Surf.Area= 17,945 sf Storage= 20,115 cf (19,545 cf above start)

Plug-Flow detention time= 295.4 min calculated for 0.901 af (99% of inflow)
Center-of-Mass det. time= 275.6 min (1,098.1 - 822.5)

Volume	Invert	Avail.Storage	Storage Description
#1	93.25'	724 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	19,390 cf	**Bioretention Area 2 w/ ISR (Irregular)** Listed below
		20,115 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.25	88	52.0	0	0	88
94.00	221	66.1	112	112	228
95.00	672	193.2	426	538	2,854
95.25	819	197.9	186	724	3,008

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	1,140	158.0	0.0	0	0	1,140
92.85	1,140	158.0	40.0	570	570	1,338
93.10	1,140	158.0	30.0	86	656	1,377
94.60	1,140	158.0	20.0	342	998	1,614
95.00	7,349	356.1	100.0	1,518	2,515	9,719
95.09	8,838	402.3	100.0	727	3,243	12,508
95.10	9,005	407.4	100.0	89	3,332	12,836
95.20	10,688	457.3	100.0	983	4,315	16,270
95.25	10,757	458.3	100.0	536	4,851	16,346
95.26	11,994	798.0	100.0	114	4,965	50,307
96.00	15,923	1,473.3	100.0	10,295	15,260	172,367
96.25	17,126	1,550.7	100.0	4,130	19,390	190,996

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**1.1" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 16.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900

			n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'
#5	Device 3	95.10'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.10'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.5 cfs @ 12.72 hrs HW=95.91' TW=93.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 1.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.1 cfs @ 8.21 fps)
    - **3=Culvert** (Passes 0.1 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.7 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.4 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 1.5 cfs @ 3.58 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

OUTLET PROTECTION DESIGN CALCS

NON DEFINED CHANNEL

Job #: 24085
Date: 8/6/2024
Structure: Outlet from BioPond 3

Variables:

Q= Discharge from the pipe (cfs)
$D_{0=}$ Diameter of the pipe (ft)
Tw= Tailwater depth above the invert of the pipe (ft)
La= Apron length
w_1= Apron width at pipe outlet
w_2= Apron width at downstream end of apron

Input:

Outlet elev:	92.75
Tailwater elev:	92.92
Tw:	0.17
Q:	0.5
D_0:	1

Apron Dimensions

w_1=	**3**	(ft)
w_2=	**11**	(ft)
La=	**8**	(ft)

Apron Length:

$Tw > .5D_0$		$Tw < .5D_0$
La: 8.500		La: 7.900

Apron Width:

$Tw > .5D_0$		$Tw < .5D_0$
w_2: 6.40		w_2: 10.90

w_1: 3

w_1=	3.00
w_2=	10.9
La=	7.9

RipRap Sizing

d_{50}=	0.05	(ft)
d_{50}=	0.56	(in)

RipRap Gradation

Stone Size			% of Weight Smaller Then the Given Size
0.07	TO	0.09	100
0.06	TO	0.08	85
0.05	TO	0.07	50
0.01	TO	0.02	15

Minimum Depth of Rock= 0.14 (ft)

Summary for Pond Bio3: Bio 3 w ISR

Inflow Area = 0.257 ac, 46.21% Impervious, Inflow Depth = 7.03" for 50-yr event
Inflow = 1.5 cfs @ 12.00 hrs, Volume= 0.151 af
Outflow = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af, Atten= 64%, Lag= 7.7 min
Primary = 0.5 cfs @ 12.13 hrs, Volume= 0.151 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.01 hrs
Starting Elev= 92.85' Surf.Area= 280 sf Storage= 140 cf
Peak Elev= 95.95' @ 12.13 hrs Surf.Area= 1,942 sf Storage= 1,917 cf (1,777 cf above start)
Flood Elev= 96.25' Surf.Area= 2,545 sf Storage= 2,494 cf (2,354 cf above start)

Plug-Flow detention time= 266.2 min calculated for 0.147 af (98% of inflow)
Center-of-Mass det. time= 236.9 min (1,021.7 - 784.8)

Volume	Invert	Avail.Storage	Storage Description
#1	93.75'	247 cf	**Sediment Forebay (Irregular)** Listed below (Recalc)
#2	91.60'	2,247 cf	**Bioretention Area 3 w/ ISR (Irregular)** Listed below
		2,494 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
93.75	21	22.0	0	0	21
95.75	274	61.0	247	247	292

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
91.60	280	76.0	0.0	0	0	280
92.85	280	76.0	40.0	140	140	375
93.10	280	76.0	30.0	21	161	394
94.60	280	76.0	20.0	84	245	508
94.85	900	120.0	100.0	140	385	1,195
95.16	1,014	125.8	100.0	296	682	1,314
95.20	1,030	126.6	100.0	41	723	1,331
95.75	1,247	137.0	100.0	625	1,348	1,561
95.76	1,563	182.5	100.0	14	1,362	2,718
96.00	1,696	187.1	100.0	391	1,753	2,860
96.25	2,271	194.9	100.0	494	2,247	3,102

Device	Routing	Invert	Outlet Devices
#1	Primary	92.85'	**12.0" Round Culvert** L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 92.85' / 92.75' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf
#2	Device 1	92.85'	**0.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 2	91.93'	**6.0" Round Culvert** L= 7.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 91.93' / 91.93' S= 0.0000 '/' Cc= 0.900 n= 0.012, Flow Area= 0.20 sf
#4	Device 3	91.60'	**10.000 in/hr Exfiltration over Surface area below 94.70'** Phase-In= 0.01'

#5	Device 3	95.20'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#6	Device 1	95.20'	**3.0" W x 9.5" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#7	Device 1	96.00'	**48.0" x 48.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.5 cfs @ 12.13 hrs HW=95.95' TW=92.92' (Dynamic Tailwater)
- **1=Culvert** (Passes 0.5 cfs of 6.1 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 0.0 cfs @ 8.38 fps)
    - **3=Culvert** (Passes 0.0 cfs of 1.3 cfs potential flow)
      - **4=Exfiltration** (Passes < 0.1 cfs potential flow)
      - **5=Orifice/Grate** (Passes < 3.3 cfs potential flow)
  - **6=Orifice/Grate** (Orifice Controls 0.5 cfs @ 2.78 fps)
  - **7=Orifice/Grate** (Controls 0.0 cfs)

APPENDIX C

INSPECTION AND MAINTENANCE

C – 1

STORMWATER MANAGEMENT SYSTEM INSPECTION & MAINTENANCE PLAN

Stormwater Management System Inspection & Maintenance Plan

Prepared for:

LOT 2 SITE DEVELOPMENT
Map G, Lot 2-1

Crosby Road
Dover, New Hampshire
Strafford County

AUGUST 2024

Owner of Record:

DEL SOL DOVER, LLC
340 Central Avenue
Suite 202
Dover, New Hampshire 03820

Prepared By:

CIVILWORKS NEW ENGLAND
P.O. Box 1166
181 Watson Road
Dover, New Hampshire 03821

Introduction

Civilworks NE, has prepared the following Stormwater Management System Inspection & Maintenance Plan for **Del Sol Dover, LLC.** The intent of this plan is to provide a list of procedures that document the inspection and maintenance requirements of the Stormwater Management System for this site.

The inspection and maintenance requirements outlined in this document are required to be performed in perpetuity. In the event the property is sold, future owners will be responsible for implementing the responsibilities outlined in this document.

The following inspection and maintenance program is necessary in order to keep the Stormwater Management System functioning properly. These measures will also help to minimize potential environmental impacts to the areas surrounding the developed site. By following the enclosed procedures, the property owners, and maintenance personnel will be able to maintain the functional design of the Stormwater Management System and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

This plan also requires the Owner/Operator to prepare and implement a salt minimization plan to reduce salt usage on-site and ultimately within the watershed. This plan will allow the owner/operator to monitor and modify how much salt is needed, when it should be applied, where it needs to be applied, with the ultimate goal of reducing salt-use without compromising safety. It is expected that salt-use reduction will lead to long-term cost-savings as a result of purchasing less salt and reduced impacts on vegetation (e.g., landscaping) and corrosion of infrastructure.

The salt minimization plan should include the retention of a contractor who has completed the Green SnowPro Training course and obtained NHDES Salt Application Certification.

It is anticipated that this be a living document that will be updated at regular intervals (recommend updating annually in advance of the winter season in order to facilitate adjustments).

Owner:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

In the event of a change in ownership, this Inspection and Maintenance Plan shall be transferred to the new party; transfer shall be documented to NH DES in writing.

Contact / Responsible Party:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

Chad Kageleiry
Phone: (603) 749 2800
Email: chad@summitlanddev.com

The contact information for the Contact / Responsible Party shall be kept current; transfer shall be documented to NHDES in writing.

Management Company:

Del Sol Dover, LLC
340 Central Avenue
Suite 202
Dover, NH 03820

The contact information for the Management Party shall be kept current.

Inspection Schedule / Record Retention

Inspection frequency should, at a minimum, be in accordance with New Hampshire Stormwater Manual, Volume 2, latest edition, as updated by NHDES. See the Inspection and Maintenance Plan for frequency requirements. Inspections shall include a photograph of each practice that is subject to the I&M requirements each time it is inspected. A copy of the completed Stormwater Management System's Inspection & Maintenance Log, inspection photographs, and Deicing Salt Quantity Use Log shall be maintained, kept on-site, and be made available to local, state, or federal regulators as applicable by law. All Inspection and Maintenance records must be provided to NHDES upon request and to the City of Dover Community Services Department annually before Dec 15th.

Stormwater Management System Components

The Stormwater Management System associated with the project is designed to mitigate both the quantity and quality of site-generated stormwater runoff. As a result, its design includes the following elements:

- Pipes/Culverts
- Outlet Structures
- Energy Dissipation Structures (Rip Rap)
- Bioretention Basin w/ Internal Storage Reservoir (ISR)
- Grassed Lined Conveyance Swale
- Stone Lined Conveyance Swale
- Pre-Treatment Structures
  - Sediment Forebay
- Pavement
- Litter / Trash Removal

Design elements are identified in the design plans, a copy of which shall be maintained with this Inspection and Maintenance Plan.

Control of Invasive Species

During maintenance activities, check for the presence of invasive plants and remove in a safe manner. Invasive plants shall be controlled to prevent them from reproducing, spreading, or re-growing. See the University of New Hampshire – Cooperative Extension's "Method for Disposing Non-Native Invasive Plants", included at the end of this manual, for guidance on the removal and disposal of invasive species.

Inspection and Maintenance Plan

By implementing the following procedures, the owners will be able to maintain the functional design of the Stormwater Management System and maximize the system's ability to remove sediment and other contaminants from site generated stormwater runoff.

PIPES/CULVERTS:

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

OUTLET STRUCTURE(S):

- Inspect once per year.
- Inspect for clogging and sediment accumulation.
- Remove all debris immediately and sediment accumulations ≥ 2 inches.

ENERGY DISSIPATION STRUCTURES (RIP RAP):

- Inspect at least once a year.
- Inspect for sediment accumulation.
- Remove all debris immediately.
- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- If stones become displaced from the riprap areas, they should be replaced immediately and chinked in to assure stability. Add additional riprap as needed. Vegetation growing through the riprap should be eliminated at least yearly.

BIORETENTION BASIN W/ ISR:

- Inspection, by a **qualified professional**, of the Bioretention Basin at least twice annually, and following any rainfall event exceeding 2.5 inches in a 24-hour period, with maintenance or rehabilitation conducted as warranted by such inspection. If the Bioretention Basin systems do not drain within 72-hours following a rainfall event, a **qualified professional** should assess the condition and determine measures required to restore filtration practice (as applicable).
- Inlet and outlet pipes, inlet and outlet structures, containment structures, energy dissipation structures or practices, and other structural appurtenances should be inspected by a **qualified professional**, and corrective action implemented (e.g., maintenance, repairs, or replacement) as indicated by such inspection.
- Embankments and spillways should be inspected by a **qualified professional** for settlement, erosion, seepage, animal burrows, woody vegetation, and other conditions that could degrade the embankment and reduce its stability for impounding water. Immediate corrective action should be implemented if any such conditions are found.
- Vegetation should be inspected at least annually and maintained in healthy condition, including pruning, removal and replacement of dead or diseased vegetation, and removal of invasive species.
- The bottoms, interior and exterior side slopes, and crest of earthen detention basins should be mowed at least once annually. The vegetation should be maintained in a healthy condition, as appropriate to the function of the facility and type of vegetation, to prevent the establishment of woody vegetation.

- Pretreatment measures should be inspected at least twice annually, and cleaned of accumulated sediment as warranted by inspection, but no less than once annually.
- Trash and debris should be removed from the pond and any inlet or outlet structures whenever observed.
- Accumulated sediment should be removed when it significantly affects pond capacity.

GRASS LINED CONVEYANCE SWALE:

- Inspect once per year.
- Inspect for erosion, sediment accumulation, vegetation loss, and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and dead vegetation.
- Perform periodic mowing of swale (at least twice annually), maintain a 4" stand of vegetative growth.

STONE LINED CONVEYANCE SWALE

- Inspect once per year.
- Inspect for erosion, sediment accumulation, woody vegetation and presence of invasive species.
- Remove debris and accumulated sediment, based on inspection.
- Repair eroded areas as needed; remove invasive species and woody vegetation.
- Reset any dislodged stones.

PRE-TREATMENT STRUCTURES:

SEDIMENT FOREBAY:

- Vegetated areas shall be mowed to maintain a 4" start of vegetative growth.
- Inspect at least once per year.
- Inspect for sediment accumulation.
- Remove all debris immediately.

PAVEMENT:

- Minimize sanding.
- Minimize application of salt for ice control.
- Clean periodically (1-2 times per year) using a sweeper or vacuum sweeper. Vacuum sweeping is the preferred method.

LITTER / TRASH REMOVAL:

- Routinely patrol site for litter pick up.

DE-ICING AGENTS:

- To address the concerns associated with the application of chlorides and other deicing materials, NHDES recommends that the Owner/Operator develop a Road Salt and Deicing Minimization Plan for the parking lots and roadways. The plan should develop the policies that the development will keep in place to minimize salt and other deicer use after the project has been completed. The plan should include tracking the use of salt and other deicers for each storm event and compiling salt use data annually. (See Deicing Salt Quantity Use Log).
- Use sand as primary agent for driveway and access way safety during ice and snow conditions.
- Minimize the use of salt during the winter.

- Use de-icing or anti-caking agents, added to enhance performance and application characteristics of sand mixtures, only as necessary and at minimum application rates.
- Recommend using a certified Winter Operator (Green SnowPro Trained) for applying de-icing agents.
- Monitor weather and apply de-icing agents based on weather conditions and temperatures.

ANTI-ICING AND SALT MINIMIZATION:

- Owner to develop a Road Salt and Deicing Minimization Plan.
- Provide a written policy that the “Development” will keep in place to minimize salt and other deicer use after the project has been completed.
- Use the attached form to track the use of salt and other deicers for each storm event and compiling salt use data annually.

Inspection & Maintenance Table

System Component / BMP	Minimum Inspection Frequency	Minimum Inspection Requirements	Maintenance / Cleanout Threshold
Pipes/Culverts	Annually	• Check for clogging • Check for sediment accumulation	Remove when noticed Clean when necessary
Outlet Structure(s)	Annually	• Inspect once per year. • Inspect for clogging and sediment accumulation. • Remove all debris immediately and sediment accumulations ≥ 2 inches.	≥ 2 in. sediment Remove immediately
Energy Dissipation (ED) Structures (Rip Rap)	Annually	• Check for erosion • Check for displaced stones • Check for woody vegetation • Check for sediment accumulation	≥ 3 in. sediment Remove annually Replace/ reset Dislodged stones immediately
Bioretention Basin w/ ISR • Inlet/Outlet Piping • Pond • Sediment • Drawdown • Trash/Debris • Vegetation (Veg.) • Embankments	Bi-Annually “ “ Annually Periodically “ “ “ “	• Check for erosion, settlement, seepage, etc. • Check for sediment accum. in pond • Check drainage time • Check for and remove trash/debris • Maintain >75% veg. (pond & slopes) Maintain healthy stand of veg.	Repair immediately ≥ 2 in sediment >72 hours Remove all trash/debris Restore veg. in-kind Mow when ≥ 6 in
Grass Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Ensure swale is stabilized • Maintain healthy stand of veg., min 4” • Inspect for invasive species	≥ 1 in. sediment Repair immediately Restore vegetation in-kind Mow twice per year Remove/Dispose of accordingly
Stone Lined Conveyance Swale	Annually	• Check for sediment accumulation • Check for erosion • Inspect for woody/ invasive vegetation • Check for dislodged stones	≥ 1 in. sediment Repair immediately Remove/Dispose of accordingly
Pre-Treatment Structures: Sediment Forebay	Annually	• Check for sediment accumulation • Check for woody vegetation growth • Check for debris • Vegetated areas shall be mowed to maintain a 4” start of vegetation growth.	Remove/ Dispose of accordingly Mow twice per year
Pavement: • Sanding • Salt Applications • Sweep/Vacuum • Trash/Debris	Limit use As required 1 - 2 x’s Year Periodically	• Minimize use to prevent tracking issues • RECORD APPLICATION RATES • Sweep or vacuum to prevent tracking issues • Check for trash/debris	Sweep to prevent issues Minimize (as required) Sweep/Vac as needed Remove when noticed
Litter / Trash Removal	Periodically	• Check for litter and trash	Remove when noticed

Inspection & Maintenance Checklist/Log

The following pages contain a blank copy of the Stormwater Management System's Inspection & Maintenance Log and a Deicing Salt Quantity Use Log. These forms are provided to assist the owners with the inspection and maintenance of the aforementioned Stormwater Management System.

Stormwater Management System's Inspection & Maintenance Log

Date of Inspection/Maintenance_____ Inspector:_____

System Component / BMP	Cleaning / Repair Needed (List Items / Comments)	Date of Cleaning/Repair	Performed By

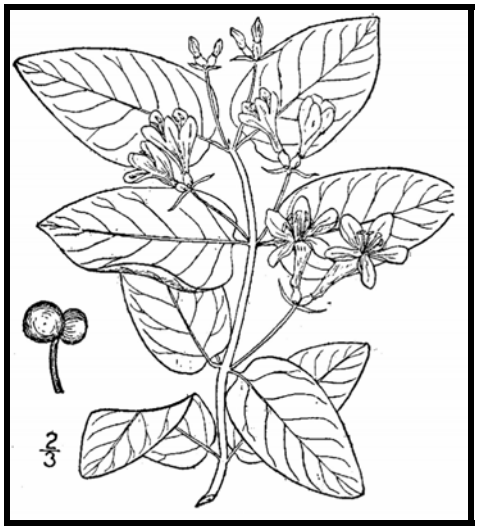
Deicing Salt Quantity Use Log

Date	Amount of Material Applied	Comments

University of New Hampshire Cooperative Extension

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

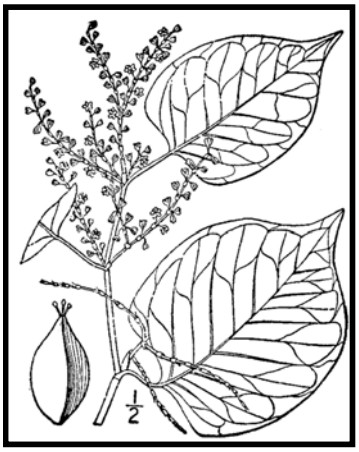
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

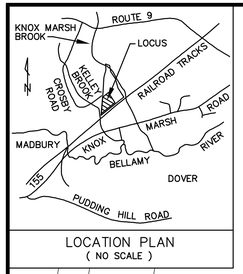
This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
 </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

Non-Woody Plants	Method of Reproducing	Methods of Disposal
garlic mustard *(Alliaria petiolata)* spotted knapweed *(Centaurea maculosa)* ▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling. black swallow-wort *(Cynanchum nigrum)* ▪ May cause skin rash. Wear gloves and long sleeves when handling. pale swallow-wort *(Cynanchum rossicum)* giant hogweed *(Heracleum mantegazzianum)* ▪ Can cause major skin rash. Wear gloves and long sleeves when handling. dame's rocket *(Hesperis matronalis)* perennial pepperweed *(Lepidium latifolium)* purple loosestrife *(Lythrum salicaria)* Japanese stilt grass *(Microstegium vimineum)* mile-a-minute weed *(Polygonum perfoliatum)*	**Fruits and Seeds** 	**Prior to flowering** Depends on scale of infestation Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material. **During and following flowering** Do nothing until the following year or remove flowering heads and bag and let rot. Small infestation ▪ Pull or cut plant and leave on site with roots exposed. Large infestation ▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting). ▪ Monitor. Remove any re-sprouting material.
common reed (*Phragmites australis*) Japanese knotweed *(Polygonum cuspidatum)* Bohemian knotweed *(Polygonum x bohemicum)*	**Fruits, Seeds, Plant Fragments** Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn't materially influence disposal activities.	**Small infestation** ▪ Bag all plant material and let rot. ▪ Never pile and use resulting material as compost. ▪ Burn. **Large infestation** ▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile. ▪ Monitor and remove any sprouting material. ▪ Pile, let dry, and burn.

January 2010

UNH Cooperative Extension programs and policies are consistent with pertinent Federal and State laws and regulations, and prohibits discrimination in its programs, activities and employment on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sex, sexual orientation, or veteran's, marital or family status. College of Life Sciences and Agriculture, County Governments, NH Dept. of Resources and Economic Development, Division of Forests and Lands, NH Fish and Game ,and U.S. Dept. of Agriculture cooperating.



LOCATION PLAN
(NO SCALE)

LEGEND:

= SEDIMENT FOREBAY

= ENERGY DISSIPATION STRUCTURES (RIP RAP)

= BIO-RETENTION BASIN W/ ISR

= STONE LINED CONVEYANCE SWALE

= GRASSED LINED CONVEYANCE SWALE

FORMER HANSON ROAD

50' WETLAND BUFFER

WATER - DOVER PARA01-020-WI

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
{75' WIDE R.O.W.}

GAS 4"ø PP

WATER

DOVER PARA01-025-WI

HYDRANT #319

BIORETENTION POND 1 W/ ISR (BIO1 W/ ISR)

EDGE OF PAVEMENT

PROPOSED 9,600 S.F. BUILDING

EDGE OF PAVEMENT

PROPOSED GRAVEL 125'x180' LAYDOWN AREA

EDGE OF GRAVEL

BIORETENTION POND 2 W/ ISR (BIO2 W/ ISR)

BIORETENTION POND 3 W/ ISR (BIO3 W/ ISR)

EXISTING GRASSED LINED CONVEYANCE SWALE

C / 2-1

NEW PARCEL AREA
273,596 S.F.
6.28 Ac.

NH STATE PLANE NAD 83 - GAS OBS.

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-24
SCALE: 1"=40'
DRAWN BY: MJM
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: SITE.DWG

BMP LOCATION PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

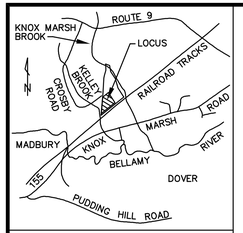
BMP

APPENDIX D

WATERSHED PLANS

D – 1

PRE-DEVELOPMENT CONDITIONS



LOCATION PLAN
(NO SCALE)

NH STATE PLANE
NAD 83 - GPS OBS.

DISCHARGE PT. B

DISCHARGE PT. C

DISCHARGE PT. A

PRE-DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
A	8.27	1,314	37.0
B	1.55	268	22.2
C	2.38	402	20.7

FORMER HANSON ROAD

G / 1-E
VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

G / 2-1B
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820
5075 / 142

CATCH BASIN
#7080 RIM = 96.0'
CATCH BASIN
#7081 RIM = 95.9'

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
[75' WIDE R.O.W.]

G / 1-C2

G / 1-C3
WILLIAM C. COLBATH
211 CROSBY ROAD
DOVER, NH 03820
2171 / 590

GRAVEL LANDING AREA

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

NHFG WILDIFE RESTRICTED AREA

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

G / 2-1

G / 2-1A
DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NH 03820
5075 / 142

G / 5
BOSTON & MAINE RR

NHFG WILDIFE RESTRICTED AREA

A

B

C

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EDGE OF WETLAND
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- (A) SUBCATCHMENT DESIGNATION

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-2024
SCALE: 1"=50'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: DRN.DWG

PRE-DEVELOPMENT WATERSHED PLAN

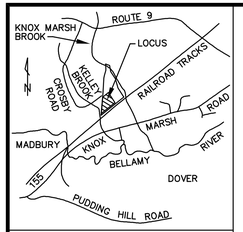
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

WS-1

D – 2

POST-DEVELOPMENT CONDITIONS



LOCATION PLAN
(NO SCALE)

NH STATE PLANE
NAD 83 - GPS OBS.

POST-DEVELOPMENT WATERSHED CHARACTERISTICS

SUBCATCHMENT DESIGNATION	AREA (ACRES)	LONGEST FLOW PATH (FEET)	Tc (MIN)
1	0.54	46	5.8
2	1.74	468	14.5
3	6.50	1314	37.0
4	1.06	268	22.2
5	0.26	15	1.9
6	2.09	402	20.7

DISCHARGE PT. B

DISCHARGE PT. C

DISCHARGE PT. A

FORMER HANSON ROAD

G / 1-E
VIRTUOUS REALTY, LLC
C/O TURBOCAM, INC
607 CALEF HIGHWAY #200
BARRINGTON, NH 03825
1802 / 737

G / 2-1B
DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820
5075 / 142

CATCH BASIN
#7080 RIM = 96.0'

CATCH BASIN
#7081 RIM = 95.9'

EXISTING EDGE OF PAVEMENT

CROSBY ROAD
[75' WIDE R.O.W.]

G / 1-C2

G / 1-C3
WILLIAM C. COLBATH
211 CROSBY ROAD
DOVER, NH 03820
2171 / 590

BIO-RETENTION BASIN 1 W/ ISR

PROPOSED 80'x120' BUILDING

BIO-RETENTION BASIN 2 W/ ISR

BIO-RETENTION BASIN 3 W/ ISR

NHFG WILDLIFE RESTRICTED AREA

REACH R1

REACH R2

REACH R3 AND LFP 3

REACH R4 AND LFP 3

REACH R5

LIMITS OF FORMER HANSON ROAD RIGHT OF WAY

NEW PARCEL AREA
267,845 S.F.
6.15 Ac.

G / 2-1

G / 2-1A
DEL SOL DOVER, LLC
340 CENTRAL AVENUE, SUITE 202
DOVER, NH 03820
5075 / 142

G / 5
BOSTON & MAINE RR

GRAPHIC SCALE
50 0 25 50 100 200
(IN FEET)

LEGEND:

- EX 2' CONTOUR
- EX 10' CONTOUR
- PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EDGE OF WETLAND
- 154 PROPOSED FINISH GRADE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED BUILDING
- SUBCATCHMENT BOUNDARY
- LONGEST FLOW PATH WITH DIRECTION OF FLOW
- ④ SUBCATCHMENT DESIGNATION

NOT FOR CONSTRUCTION FOR PERMIT USE ONLY

GNE CIVILWORKS NEW ENGLAND
CIVIL & WATERSHED ENGINEERING
181 Watson Road, PO Box 1166
Dover, New Hampshire 03821
603.749.0443

NO.	REVISION	APP'D	DATE

DATE: 8-6-2024
SCALE: 1"=50'
DRAWN BY: SRD
DESIGN BY: JFG
APPROVED BY:SJH
PROJECT NO: 24085
FILE: DRN.DWG

POST-DEVELOPMENT WATERSHED PLAN

DEL SOL DOVER, LLC
340 CENTRAL AVENUE
SUITE 202
DOVER, NH 03820

LOT 2 DEVELOPMENT
DEL SOL DOVER, LLC
DOVER, NH

WS-2

HALEY WARD

ENGINEERING | ENVIRONMENTAL | SURVEYING

NH DES WETLAND APPLICATION

For Jenny L. Lang

Map L, Lot 95-1L | 15 Landing Way, Dover, NH

Applicant:

Jenny L. Lang

15 Landing Way, Dover, NH

August 7, 2024

JN: 5010180.3402.25

Prepared By:

Haley Ward, Inc.

200 Griffin Rd., Unit 14 | Portsmouth, New Hampshire 03801

Corporate Office

One Merchants Plaza

Suite 701

Bangor, ME 04401

T: 207.989.4824

F: 207.989.4881

HALEYWARD.COM

7 August 2024

Wetland Inspector
New Hampshire Department of Environmental Services
Wetlands Bureau
29 Hazen Drive / P.O. Box 95
Concord, New Hampshire 03302

Re: NHDES Major Impact Wetland Permit Application | Tax Map L, Lot 95-1L | 15 Landing Way, Dover, New Hampshire 03820

Dear Wetland Inspector:

This letter transmits a New Hampshire Department of Environmental Services (NHDES) Major Impact Wetland Permit Application request to construct a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed wood pier, a 3' x 40' gangway and a 10' x 30' float totaling 96 sq. ft. of permanent impact to the previously developed 100' Tidal Buffer Zone and 900 sq. ft. of permanent impact to tidal wetlands.

Attached to this application you will find a "NH DES Dock Permit Plan-C2" which depicts the existing lot, jurisdictional areas, abutting parcels, existing structures, proposed work, and permanent impact areas.

Per Env-Wt 306.05, Certified Wetland Scientist Steve Riker from Ambit Engineering, Inc. classified all jurisdictional areas and identified the predominant functions of all relevant resources. The Highest Observable Tide Line marks the reference line for the 100' TBZ, as well the beginning of Tidal Wetland on the attached plan set. Attached to this application is a Wetland Functions and Values Assessment and Coastal Vulnerability Assessment summarizing these functions; as this project is subject to the requirements of Env-Wt 603.04 and Env-Wt 603.05.

Below the highest observable tide line (HOTL), the proposed structure will be supported on piles, thereby minimizing impacts to tidal wetland resources. The project will not negatively impact the functions and values of the adjacent tidal wetland. The docking structure will not contribute to additional storm water or pollution and no affects on any fish and wildlife species that currently use the site for food, cover, and/or habitat are anticipated. The tidal docking structure will not impede tidal flow or alter hydrology. The float and gangway will be temporary docking structures which will be removed during the winter months as to not interfere with ice floe.

The docking structure has been designed to provide recreational boating access utilizing the natural grade of the dock location. There is no grading of the shoreline required to construct the dock. No construction activity will disturb the area adjacent to the use. Work within the tidal wetland will be performed from a crane barge at low tide, "in the dry", to eliminate direct contact between construction equipment and the protected

200 GRIFFIN RD. UNIT 14, PORTSMOUTH, NH 03802 603.430.9282 | HALEYWARD.COM

resource. The barge floats into position and the piles are driven by the crane equipped with a vibratory hammer. Portions of the docking structure are pre-fabricated off site and transported to the site via crane barge.

The construction sequence for the proposed structure are as follows:

- Mobilize crane barge, push boat, work skiff, materials and prefabricated components such as the gangway and float to the site via the Piscataqua River.
- Mobilize equipment trucks to the site.
- Position barge alongside the proposed location of the new dock, waterward of any emergent vegetation to minimize impacts.
- Drive piles with vibratory hammer to refusal at low tide to minimize sedimentation. No excavation in or adjacent to the tidal wetland are proposed. All equipment to operate from a crane barge or skiff.
- Cut piles, Install beam caps, Construct pier super structure. Materials will be lifted from the barge and set into position by the crane..
- Install float support moorings.
- Install gangway and float.

The project represents the alternative with the least adverse impacts to areas and environments while allowing reasonable use of the property.

Per Env-Wt 603.02(b), attached to this application you will find a plan set which depicts the existing lot, jurisdictional areas, all natural resources in the area, abutting parcels, existing structures, and proposed structures. Also included in this application are maps created in accordance with Env-Wt 603.03 and Env-Wt 603.05.

In order to complete the application package for this project, the DES Wetlands Bureau rules in Chapter Env-Wt 306.05 (a)(2) has been evaluated and addressed below.

(2) a. Contains any documented occurrences of protected species or habitat for such species, using the NHB DataCheck tool;

Attached to this application are the results of the NHB review and it resulted in Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and short-nosed sturgeon (*Acipenser brevirostrum*). Haley Ward will coordinate with NHF&G and correspondence will be forwarded to NH DES upon receipt.

(2) b. Is a bog;

Utilizing the NH DES WPPT, the subject property is not a bog, nor does it contain any portion of a bog.

(2) c. Is a floodplain wetland contiguous to a tier 3 or higher watercourse;

Utilizing the NH DES WPPT, the subject property does contain a floodplain wetland contiguous to a tier 3 or higher watercourse.

(2) d. Does the property contain a designated prime wetlands or a duly established 100-foot buffer; or

The property does not contain a prime wetland or duly established 100 foot buffer.

(2) e. Does the property contain a sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone;

The property does not contain a sand dune. The property does contain a tidal wetland and tidal waters.

The DES Wetlands Bureau rules in Chapter Env-Wt 306.05 (a)(4) and (a)(7) has been evaluated and addressed below.

(4) a. Is the subject property within LAC jurisdiction;

The property does not fall within an area of LAC jurisdiction.

(4) b. Does the subject property fall within or contain any areas that are subject to time of year restrictions under Env-Wt 307;

The property does not fall within or contain any areas that are subject to time of year restrictions.

(7) Does the project have potential to impact impaired waters, class A waters, or outstanding resource waters;

The nature of the proposed project does not have the potential to impact an impaired water.

The DES Wetlands Bureau rules in Chapter Env-Wt 603.02 (e) & (f) have been evaluated and addressed below.

(e)(1) The project meets the standard conditions in Env-Wt 307;

The project meets the standard conditions in Env-Wt 307 as the proposed docking structure meets the standards of Env-Wq 1000, RSA 483-B and Env-Wq 1400. Sediment and erosion controls will also be used and maintained during the proposed construction ensuring protection of water quality on the site. Since the construction will be conducted during low tide conditions, it is not anticipated that there will be any impacts to fish or shellfish populations. Under Env-Wt 306.05 (a)(2)a. a NHB review has been performed to ensure there are no impacts to protected species or habitats of such species. The protection of Prime Wetlands or Duly-Established 100 foot buffers does not apply as none exist on or adjacent to the subject lot.

(e)(2) The project meets the approval criteria in Env-Wt 313.01;

The project meets the approval criteria in Env-Wt 313.01 as the project requires a functional assessment (attached), meets the avoidance and minimization

requirements specified in Env-Wt 313.03, does not require compensatory mitigation, meets applicable conditions specified in Env-Wt 307 (above), meets project specific criteria listed in Env-Wt 600 (above), and the project is located entirely within the boundary of the applicant's property.

(f)(1) The project design narrative as described in Env-Wt 603.06;

The project design narrative is provided above.

(f)(2) Design plans that meet the requirements of Env-Wt 603.07;

The design plans meet the above standard.

(f)(3) The water depth supporting information required by Env-Wt 603.08;

The design plans provide water depth information.

(f)(4) A statement regarding impact on navigation and passage required by Env-Wt 603.09.

The Permit Plan Set will be provided to the Pease Development Authority, Division of Ports and Harbors, for formal review and comment by the Harbormaster. That documentation will be provided to NH DES upon receipt.

In accordance with New Hampshire Administrative Rule Env-Wt 606.02(a) and 606.06(e), the marine contractor will utilize a vibratory hammer to install piles. The vibratory hammer uses vibration to install the pile in the marine sediment, instead of a standard hammer which uses a physical force to drive the pile. Using a vibratory hammer results in much lower noise impact and is the least impacting alternative to drive piles for dock construction.

The proposed pile locations for the dock are located above the Mean Low Water (MLW) line and will be installed at low tide. Installation during "the dry" greatly reduces the amount of noise that is transmitted into the water column, as no water will be present at the pile location.

Lastly, the proposed structure will use CCA (Chromated Copper Arsenate) treated lumber. The proposed piles will be CCA treated 12" diameter southern yellow pine. Attached to this application is a Safety Data Sheet for CCA treated wood. Per the data sheet, toxicity is limited to inhalation of wood dust originating from CCA treated lumber. Additionally, per the Safety Data Sheet, 12. Ecological Information (page 12) "The product is not classified as environmentally hazardous. However, this does exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment." The product is also insoluble in water. The marine contractor that will be constructing the proposed docking structure receives the timber piles and lumber pre-treated. The marine contractor does not treat the lumber, and therefore there is no risk of spilling the treatment chemical in or near resource areas.

Please contact me if you have any questions or concerns regarding this application.

Respectfully submitted,

Steve Riker, CWS
Project Scientist/Project Manager
sriker@haleyward.com

Cc: Jenny L. Lang-Owner/Applicant
Dover Conservation Commission

6 August, 2024

To Whom It May Concern:

RE: State of New Hampshire DES Wetlands Bureau Standard Dredge and Fill Application for proposed tidal docking structure within the previously developed 100' Tidal Buffer Zone and jurisdictional wetlands for *Jenny Lang of 15 Landing Way Dover, NH 03820*

This letter is to inform the City of Dover in accordance with State Law that the following entities:

Riverside Marine Construction, Inc.
Ambit Engineering, Inc

Are authorized to represent me as my agent in the approval process.
Please feel free to call me if there are any questions regarding this authorization.

Sincerely,

Jenny Lang, Owner
15 Landing Way
Dover, NH 03820

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION

Water Division / Land Resources Management

Check the Status of your Application

RSA/Rule: RSA 482-A/Env-Wt 100-900

APPLICANT'S NAME: Jenny L. Lang **TOWN NAME:** Dover

Administrative Use Only	Administrative Use Only	Administrative Use Only	File No.:
			Check No.:
			Amount:
			Initials:

A person may request a waiver of the requirements in Rules Env-Wt 100-900 to accommodate situations where strict adherence to the requirements would not be in the best interest of the public or the environment but is still in compliance with RSA 482-A. A person may also request a waiver of the standards for existing dwellings over water pursuant to RSA 482-A:26, III(b). For more information, please consult the Waiver Request Form.

SECTION 1 - REQUIRED PLANNING FOR ALL PROJECTS (Env-Wt 306.05; RSA 482-A:3, I(d)(2))

Please use the Wetland Permit Planning Tool (WPPT), the Natural Heritage Bureau (NHB) DataCheck Tool, the Aquatic Restoration Mapper, or other sources to assist in identifying key features such as: Priority Resource Areas (PRAs), protected species or habitats, coastal areas, designated rivers, or designated prime wetlands.

Has the required planning been completed?	(●) Yes ( ) No
Does the property contain a PRA? If yes, provide the following information:	(●) Yes ( ) No
• Does the project qualify for an Impact Classification Adjustment (e.g. NH Fish and Game Department (NHFG) and NHB agreement for a classification downgrade) or a Project-Type Exception (e.g. Maintenance or Statutory Permit-by-Notification (SPN) project)? See Env-Wt 407.02 and Env-Wt 407.04.	( ) Yes (●) No
• Protected species or habitat? o If yes, species or habitat name(s): Atlantic sturgeon, short-nos o NHB Project ID #: 24-1881	(●) Yes ( ) No
• Bog?	( ) Yes (●) No
• Floodplain wetland contiguous to a tier 3 or higher watercourse?	(●) Yes ( ) No
• Designated prime wetland or duly-established 100-foot buffer?	( ) Yes (●) No
• Sand dune, tidal wetland, tidal water, or undeveloped tidal buffer zone?	(●) Yes ( ) No
Is the property within a Designated River corridor? If yes, provide the following information: • Name of Local River Management Advisory Committee (LAC): • A copy of the application was sent to the LAC on Month: Day: Year:	( ) Yes (●) No

For dredging projects, is the subject property contaminated? • If yes, list contaminant:	○ Yes ◉ No
Is there potential to impact impaired waters, class A waters, or outstanding resource waters?	○ Yes ◉ No
For stream crossing projects, provide watershed size (see WPPT or Stream Stats): N/A	

SECTION 2 - PROJECT DESCRIPTION (Env-Wt 311.04(i))

Provide a description of the project and the purpose of the project, the need for the proposed impacts to jurisdictional areas, an outline of the scope of work to be performed, and whether impacts are temporary or permanent.

The project proposes to install a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed wood pier, a 3' x 40' gangway and a 10' x 30' float totaling 96 sq. ft. of permanent impact to the previously developed 100' Tidal Buffer Zone and 900 sq. ft. of permanent impact to tidal wetlands.

SECTION 3 - PROJECT LOCATION

Separate wetland permit applications must be submitted for each municipality within which wetland impacts occur.

ADDRESS:	15 Landing Way
TOWN/CITY:	Dover
TAX MAP/BLOCK/LOT/UNIT:	Map L, Lot 95-1L
US GEOLOGICAL SURVEY (USGS) TOPO MAP WATERBODY NAME: ☐ N/A	Piscataqua River
(Optional) LATITUDE/LONGITUDE in decimal degrees (to five decimal places):	X:1,206,187.9764 Y: 236,738.1083

SECTION 4 - APPLICANT (DESIRED PERMIT HOLDER) INFORMATION (Env-Wt 311.04(a))

If the applicant is a trust or a company, then complete with the trust or company information.

NAME: Jenny L. Lang		
MAILING ADDRESS: 15 Landing Way		
TOWN/CITY: Dover	STATE: NH	ZIP CODE: 03820
EMAIL ADDRESS: langj_39@hotmail.com		
FAX:	PHONE:	

ELECTRONIC COMMUNICATION: By initialing here, I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 5 - AUTHORIZED AGENT INFORMATION (Env-Wt 311.04(c))

☐ N/A

LAST NAME, FIRST NAME, M.I.: Riker, Steven, D.		
COMPANY NAME: Haley Ward		
MAILING ADDRESS: 200 Griffin Road, Unit 14		
TOWN/CITY: Portsmouth	STATE: NH	ZIP CODE: 03820
EMAIL ADDRESS: sriker@haleyward.com		
FAX:	PHONE: 603-430-9282	

ELECTRONIC COMMUNICATION: By initialing here, I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 6 - PROPERTY OWNER INFORMATION (IF DIFFERENT THAN APPLICANT) (Env-Wt 311.04(b))

If the owner is a trust or a company, then complete with the trust or company information.

☐ Same as applicant

NAME:		
MAILING ADDRESS:		
TOWN/CITY:	STATE:	ZIP CODE:
EMAIL ADDRESS:		
FAX:	PHONE:	

ELECTRONIC COMMUNICATION: By initialing here, I hereby authorize NHDES to communicate all matters relative to this application electronically.

SECTION 7 - RESOURCE-SPECIFIC CRITERIA ESTABLISHED IN Env-Wt 400, Env-Wt 500, Env-Wt 600, Env-Wt 700, OR Env-Wt 900 HAVE BEEN MET (Env-Wt 313.01(a)(3))

Describe how the resource-specific criteria have been met for each chapter listed above (please attach information about stream crossings, coastal resources, prime wetlands, or non-tidal wetlands and surface waters):

See attached narrative.

SECTION 8 - AVOIDANCE AND MINIMIZATION

Impacts within wetland jurisdiction must be avoided to the maximum extent practicable (Env-Wt 313.03(a)).* Any project with unavoidable jurisdictional impacts must then be minimized as described in the Wetlands Best Management Practice Techniques For Avoidance and Minimization and the Wetlands Permitting: Avoidance, Minimization and Mitigation fact sheet. For minor or major projects, a functional assessment of all wetlands on the project site is required (Env-Wt 311.03(b)(10)).*

Please refer to the application checklist to ensure you have attached all documents related to avoidance and minimization, as well as functional assessment (where applicable). Use the Avoidance and Minimization Checklist, the Avoidance and Minimization Narrative, or your own avoidance and minimization narrative.

**See Env-Wt 311.03(b)(6) and Env-Wt 311.03(b)(10) for shoreline structure exemptions.*

SECTION 9 - MITIGATION REQUIREMENT (Env-Wt 311.02)

If unavoidable jurisdictional impacts require mitigation, a mitigation pre-application meeting must occur at least 30 days but not more than 90 days prior to submitting this Standard Dredge and Fill Permit Application.

Mitigation Pre-Application Meeting Date: Month: Day: Year:

(☒ N/A - Mitigation is not required)

SECTION 10 - THE PROJECT MEETS COMPENSATORY MITIGATION REQUIREMENTS (Env-Wt 313.01(a)(1)c)

Confirm that you have submitted a compensatory mitigation proposal that meets the requirements of Env-Wt 800 for all permanent unavoidable impacts that will remain after avoidance and minimization techniques have been exercised to the maximum extent practicable: ☐ I confirm submittal.

(☒ N/A – Compensatory mitigation is not required)

SECTION 11 - IMPACT AREA (Env-Wt 311.04(g))

For each jurisdictional area that will be/has been impacted, provide square feet (SF) and, if applicable, linear feet (LF) of impact, and note whether the impact is after-the-fact (ATF; i.e., work was started or completed without a permit).

For intermittent and ephemeral streams, the linear footage of impact is measured along the thread of the channel. *Please note, installation of a stream crossing in an ephemeral stream may be undertaken without a permit per Rule Env-Wt 309.02(d), however other dredge or fill impacts should be included below.*

For perennial streams/rivers, the linear footage of impact is calculated by summing the lengths of disturbances to the channel and banks.

Permanent (PERM.) impacts are impacts that will remain after the project is complete (e.g., changes in grade or surface materials).

Temporary (TEMP.) impacts are impacts not intended to remain (and will be restored to pre-construction conditions) after the project is completed.

JURISDICTIONAL AREA		PERM. SF	PERM. LF	PERM. ATF	TEMP. SF	TEMP. LF	TEMP. ATF
Wetlands	Forested Wetland			☐			☐
	Scrub-shrub Wetland			☐			☐
	Emergent Wetland			☐			☐
	Wet Meadow			☐			☐
	Vernal Pool			☐			☐
	Designated Prime Wetland			☐			☐
	Duly-established 100-foot Prime Wetland Buffer			☐			☐
Surface	Intermittent / Ephemeral Stream			☐			☐
	Perennial Stream or River			☐			☐
	Lake / Pond			☐			☐
	Docking - Lake / Pond			☐			☐
	Docking - River			☐			☐
Banks	Bank - Intermittent Stream			☐			☐
	Bank - Perennial Stream / River			☐			☐
	Bank / Shoreline - Lake / Pond			☐			☐
Tidal	Tidal Waters	900		☐			☐
	Tidal Marsh			☐			☐
	Sand Dune			☐			☐
	Undeveloped Tidal Buffer Zone (TBZ)			☐			☐
	Previously-developed TBZ	96		☐			☐
	Docking - Tidal Water			☐			☐
TOTAL		996					

SECTION 12 - APPLICATION FEE (RSA 482-A:3, I)

☐ **MINIMUM IMPACT FEE**: Flat fee of $400.

☐ **NON-ENFORCEMENT RELATED, PUBLICLY-FUNDED AND SUPERVISED RESTORATION PROJECTS, REGARDLESS OF IMPACT CLASSIFICATION:** Flat fee of $400 (refer to RSA 482-A:3, 1(c) for restrictions).

☒ **MINOR OR MAJOR IMPACT FEE:** Calculate using the table below:

Permanent and temporary (non-docking):	SF	× $0.40 =	$
Seasonal docking structure: 420	SF	× $2.00 =	$ 840
Permanent docking structure: 576	SF	× $4.00 =	$ 2304
Projects proposing shoreline structures (including docks) add $400 =			$ 400
		Total =	$ 3544
The application fee for minor or major impact is the above calculated total or $400, whichever is greater =			*$*

SECTION 13 - PROJECT CLASSIFICATION (Env-Wt 306.05) Indicate the project classification.		
☐ Minimum Impact Project	■ Minor Project	☐ Major Project

SECTION 14 - REQUIRED CERTIFICATIONS (Env-Wt 311.11)	
Initial each box below to certify:	
Initials: SR	To the best of the signer's knowledge and belief, all required notifications have been provided.
Initials: SR	The information submitted on or with the application is true, complete, and not misleading to the best of the signer's knowledge and belief.
Initials: SR	The signer understands that: • The submission of false, incomplete, or misleading information constitutes grounds for NHDES to: 1. Deny the application. 2. Revoke any approval that is granted based on the information. 3. If the signer is a certified wetland scientist, licensed surveyor, or professional engineer licensed to practice in New Hampshire, refer the matter to the joint board of licensure and certification established by RSA 310-A:1.
Initials: SR	If the applicant is not the owner of the property, each property owner signature shall constitute certification by the signer that he or she is aware of the application being filed and does not object to the filing.

SECTION 15 - REQUIRED SIGNATURES (Env-Wt 311.04(d); Env-Wt 311.11)		
SIGNATURE (OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (APPLICANT, IF DIFFERENT FROM OWNER):	PRINT NAME LEGIBLY:	DATE:
SIGNATURE (AGENT, IF APPLICABLE): Steven D. Riker	PRINT NAME LEGIBLY: Steven D. Riker	DATE: 8/7/24

SECTION 16 - TOWN / CITY CLERK SIGNATURE (Env-Wt 311.04(f))	
As required by RSA 482-A:3, I(a)(1), I hereby certify that the applicant has filed four application forms, four detailed plans, and four USGS location maps with the town/city indicated below.	
TOWN/CITY CLERK SIGNATURE:	PRINT NAME LEGIBLY:
TOWN/CITY:	DATE:

DIRECTIONS FOR TOWN/CITY CLERK:
Per RSA 482-A:3, I(a)(1)

1. IMMEDIATELY sign the original application form and four copies in the signature space provided above.
2. Return the signed original application form and attachments to the applicant so that the applicant may submit the application form and attachments to NHDES by mail or hand delivery.
3. IMMEDIATELY distribute a copy of the application with one complete set of attachments to each of the following bodies: the municipal Conservation Commission, the local governing body (Board of Selectmen or Town/City Council), and the Planning Board.
4. Retain one copy of the application form and one complete set of attachments and make them reasonably accessible for public review.

DIRECTIONS FOR APPLICANT:
Submit the original permit application form bearing the signature of the Town/City Clerk, additional materials, and the application fee to NHDES by mail or hand delivery at the address at the bottom of this page. Make check or money order payable to “Treasurer – State of NH”.

COASTAL RESOURCE WORKSHEET

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

RSA/Rule: RSA 482-A/ Env-Wt 600

APPLICANT LAST NAME, FIRST NAME, M.I.: **Jenny L. Lang**

Applicability: This worksheet may be used to present the information required for projects in coastal areas in addition to the information required for Lower-Scrutiny Approvals, Expedited Permits, and Standard Permits under Env-Wt 603.01.

Please refer to Env-Wt 605.03 for impacts requiring compensatory mitigation.

SECTION 1 - REQUIRED INFORMATION (Env-Wt 603.02; Env-Wt 603.06; Env-Wt 603.09)

The following information is required for projects in coastal areas.

Describe the purpose of the proposed project, including the overall goal of the project, the core project purpose including a concise description of the facilities and work that could impact jurisdictional areas, and the intended project outcome. Specifically identify all natural resource assets in the area proposed to be impacted and include maps created through a data screening in accordance with Env-Wt 603.03 (refer to Section 2) and Env-Wt 603.04 (refer to Section 3) as attachments.

The project proposes the construction of a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed wood pier, a 3' x 40' gangway and a 10' x 30' float totaling 96 sq. ft. of permanent impact to the previously developed 100' Tidal Buffer Zone and 900 sq. ft. of permanent impact to tidal wetlands. Since the proposed tidal dock will serve to provide a water dependent function, practicable alternatives along the 108+/-feet of shoreline are reduced due to the presence of saltmarsh, and maintaining adequate navigation space from abutting tidal docks. The proposed structure has been placed to provide the intended function and provide safe navigation to and from the proposed float location. The proposed tidal docking structure will provide recreational boating access to the Piscataqua River.

For standard permit projects, provide:

☐ A Coastal Functional Assessment (CFA) report (refer to Section 3); and

☒ A vulnerability assessment (refer to Section 4).

Explain all recommended methods and other considerations to protect the natural resource assets during and as a result of project construction in accordance with Env-Wt 603.04, Env-Wt 311.07, and Env-Wt 313.

A Coastal Functional Assessment and a Coastal Vulnerability Assessment is attached to this application per Env-Wt 603.04. An Avoidance & Minimization Form is attached to this application, and also described in the attached narrative letter per Env-Wt 311.07 and Env-Wt 313.

Provide a narrative showing how the project meets the standard conditions in Env-Wt 307 and the approval criteria in Env-Wt 313.01.

The project plan set, specifically the Details-Sheet D1 includes all notes demonstrating compliance with Env-Wt 307 and Env-Wt 313.01.

Provide a project design narrative that includes the following:

☒ A discussion of how the proposed project:

- Uses best management practices and standard conditions in Env-Wt 307;
- Meets all avoidance and minimization requirements in Env-Wt 311.07 and Env-Wt 313.03;
- Meets approval criteria in Env-Wt 313.01;
- Meets evaluation criteria in Env-Wt 313.01(c);
- Meets CFA requirements in Env-Wt 603.04; and
- Considers sea-level rise and potential flooding evaluated pursuant to Env-Wt 603.05;

☒ A construction sequence, erosion/siltation control methods to be used, and a dewatering plan; and

☒ A discussion of how the completed project will be maintained and managed.

The completed project will result in a permanent fixed pier, with an attached gangway and associated float. The gangway and float are/will be seasonal structures and will be removed in the non-boating season. Other than removal and re-installation, there is no maintenance or management of the tidal docking structure over its expected life span, which is 50-100 years.

☒ Provide design plans that meet the requirements of Env-Wt 603.07 (refer to Section 5);

☒ Provide water depth supporting information required by Env-Wt 603.08 (refer to Section 6); and

☒ For any major project that proposes to construct a structure in tidal waters/wetlands or to extend an existing structure seaward, provide a statement from the Pease Development Authority Division of Ports and Harbors ("DP&H") chief harbormaster, or designee, for the subject location relative to the proposed structure's impact on navigation. If the proposed structure might impede existing public passage along the subject shoreline on foot or by non-motorized watercraft, the applicant shall explain how the impediments have been minimized to the greatest extent practicable.

Review and comment by the Pease Development Authority will be provided to NH DES upon receipt.

SECTION 2 - DATA SCREENING (Env-Wt 603.03, in addition to Env-Wt 306.05)

Please use the Wetland Permit Planning Tool, or any other database or source, to indicate the presence of:

☒ Existing salt marsh and salt marsh migration pathways;

☒ Eelgrass beds;

☒ Documented shellfish sites;

☒ Projected sea-level rise; and

☒ 100-year floodplain.

Conduct data screening as described to identify documented essential fish habitat, and tides and currents that may be impacted by the proposed project, by using the following links:

☒ National Oceanic and Atmospheric Administration (NOAA) Tides & Currents; and

☒ NOAA Essential Fish Habitat Mapper.

☒ Verify or correct the information collected from the data screenings by conducting an on-site assessment of the subject property in accordance with Env-Wt 406 and Env-Wt 603.04.

SECTION 3 - COASTAL FUNCTIONAL ASSESSMENT/ AVOIDANCE AND MINIMIZATION (Env-Wt 603.04; Env-Wt 605.01; Env-Wt 605.02; Env-Wt 605.03)

Projects in coastal areas shall:

☒ Not impair the navigation, recreation, or commerce of the general public; and

☒ Minimize alterations in prevailing currents.

An applicant for a permit for work in or adjacent to tidal waters/wetlands or the tidal buffer zone shall demonstrate that the following have been avoided or minimized as required by Env-Wt 313.04:

☒ Adverse impacts to beach or tidal flat sediment replenishment;

☒ Adverse impacts to the movement of sediments along a shore;

☒ Adverse impacts on a tidal wetland's ability to dissipate wave energy and storm surge; and

☒ Adverse impacts of project runoff on salinity levels in tidal environments.

For standard permit applications submitted for minor or major projects:

☒ Attach a CFA based on the data screening information and on-site evaluation required by Env-Wt 603.03. The CFA for tidal wetlands or tidal waters shall be:

- ☒ Performed by a qualified coastal professional; and
- ☒ Completed using one of the following methods:

  a. The US Army Corps of Engineers (USACE) Highway Methodology Workbook, dated 1993, together with the USACE New England District *Highway Methodology Workbook Supplement*, dated 1999; or

  b. An alternative scientifically-supported method with cited reference and the reasons for the alternative method substantiated.

For any project that would impact tidal wetlands or tidal waters or associated sand dunes, the applicant shall:

☐ Use the results of the CFA to select the location of the proposed project having the least impact to tidal wetlands, tidal waters or associated sand dunes;

☐ Design the proposed project to have the least impact to tidal wetlands, tidal waters or associated sand dunes;

☐ Where impact to wetland and other coastal resource functions is unavoidable, limit the project impacts to the least valuable functions, avoiding and minimizing impact to the highest and most valuable functions; and

☐ Include on-site minimization measures and construction management practices to protect coastal resource areas.

Projects in coastal areas shall use results of this CFA to:

☐ Minimize adverse impacts to finfish, shellfish, crustacea, and wildlife;

☐ Minimize disturbances to groundwater and surface water flow;

☐ Avoid impacts that could adversely affect fish habitat, wildlife habitat, or both; and

☐ Avoid impacts that might cause erosion to shoreline properties.

SECTION 4 - VULNERABILITY ASSESSMENT (Env-Wt 603.05)

Refer to the New Hampshire Coastal Flood Risk Summary Part 1: Science and New Hampshire Coastal Flood Risk Summary Part II: Guidance for Using Scientific Projections or other best available science to:

a. Determine the time period over which the project is designed to serve;

A Coastal Vulnerability Assessment is attached to this appication.

b. Identify the project's relative risk tolerance to flooding and potential damage or loss likely to result from flooding to buildings, infrastructure, salt marshes, sand dunes and other valuable coastal resource areas;

See attached CVA

c. Reference the projected sea-level rise (SLR) scenario that most closely matches the end of the project design life and the project's tolerance to risk or loss;

See attached CVA

d. Identify areas of the proposed project site subject to flooding from SLR;

See attached CVA

e. Identify areas currently located within the 100-year floodplain and subject to coastal flood risk;

See attached CVA

f. Describe how the project design will consider and address the selected SLR scenario within the project design life, including in the design plans;
See attached CVA

g. Where there are conflicts between the project's purpose and the vulnerability assessment results, schedule a pre-application meeting with the department to evaluate design alternatives, engineering approaches, and use of the best available science.

☐ Pre-application meeting date held: **N/A**

SECTION 5 - DESIGN PLANS (Env-Wt 603.07, in addition to Env-Wt 311)

Submit design plans for the project in both plan and elevation views that clearly depict and identify all required elements:

☒ The plan view shall depict the following:

- ☒ The engineering scale used, which shall be no larger than one inch equals 50 feet;
- ☒ The location of tidal datum lines depicted as a line with the associated elevation noted, based on North American Vertical Datum of 1988 (NAVD 88), derived from https://tidesandcurrents.noaa.gov/datum_options.html, as described in Section 6.
- ☒ An imaginary extension of property boundary lines into the waterbody and a 20-foot setback from those property line extensions;
- ☒ The location of all special aquatic sites at or within 100 feet of the subject property;
- ☒ Existing bank contours;
- ☒ The name and license number, if applicable, of each individual responsible for the plan, including:
  a. The agent for tidal docking structures who determined elevations represented on plans; and
  b. The qualified coastal professional who completed the CFA report and located the identified resources on the plan; and
- ☒ The location and dimensions of all existing and proposed structures and landscape features on the property;
- ☒ Tidal datum(s) with associated elevations noted, based on NAVD 88; and
- ☒ Location of all special aquatic sites within 100-feet of the property.

☒ The elevation view shall depict the following:

- ☒ The nature and slope of the shoreline;
- ☒ The location and dimensions of all proposed structures, including permanent piers, pilings, float stop structures, ramps, floats, and dolphins; and
- ☒ Water depths depicted as a line with associated elevation at highest observable tide, mean high tide, and mean low tide, and the date and tide height when the depths were measured. Refer to Section 6 for more instructions regarding water depth supporting information.

☒ See specific design and plan requirements for certain types of coastal projects:

- Overwater structures (Env-Wt 606);
- Dredging activities (Env-Wt 607);
- Tidal beach maintenance (Env-Wt 608);
- Tidal shoreline stabilization (Env-Wt 609);
- Protected tidal zone (Env-Wt 610);
- Sand Dunes (Env-Wt 611).

SECTION 6 - WATER DEPTH SUPPORTING INFORMATION REQUIRED (Env-Wt 603.08)

Using current predicted NOAA tidal datum for the location, and tying field measurements to NAVD 88, field observations of at least 3 tide events, including at least one minus tide event, shall be located to document the range of the tide in the proposed location showing the following levels:

☒ Mean lower low water;

☒ Mean low water;

☒ Mean high water;

☒ Mean tide level;

☒ Mean higher high water;

☒ Highest observable tide line; and

☒ Predicted sea-level rise as identified in the vulnerability assessment in Env-Wt 603.05.

The following data shall be presented in the application project narrative to support how water depths were determined:

☒ The date, time of day, and weather conditions when water depths were recorded; and

☒ The name and license number of the licensed land surveyor who conducted the field measurements.

☐ For tidal stream crossing projects, provide water depth information to show how the tier 4 stream crossing is designed to meet Env-Wt 904.07(c) and (d), and for repair, rehabilitation or replacement of tier 4 stream crossings, demonstrate how the requirements of Env-Wt 904.09 are met.

SECTION 7 - GENERAL CRITERIA FOR TIDAL BEACHES, TIDAL SHORELINE, AND SAND DUNES (Env-Wt 604.01)

Any person proposing a project in or on a tidal beach, tidal shoreline, or sand dune, or any combination thereof, shall evaluate the proposed project based on:

☒ The standard conditions in Env-Wt 307;

☒ The avoidance and minimization requirements in Env-Wt 311.07 and Env-Wt 313.03;

☒ The approval criteria in Env-Wt 313.01;

☒ The evaluation criteria in Env-Wt 313.05;

☒ The project specific criteria in Env-Wt 600;

☒ The CFA required by Env-Wt 603.04; and

☒ The vulnerability assessment required by Env-Wt 603.05.

New permanent impacts to sand dunes that provide coastal storm surge protection for protected species or habitat shall not be allowed except:

☐ To protect public safety; and

☐ Only if constructed by a state agency, coastal resiliency project, or for a federal homeland security project.

Projects in or on a tidal beach, tidal shoreline, or sand dune shall support integrated shoreline management that:

☒ Optimizes the natural function of the shoreline, including protection or restoration of habitat, water quality, and self-sustaining stability to flooding and storm surge; and

☒ Protects upland infrastructure from coastal hazards with a preference for living shorelines over hardened shoreline practices.

SECTION 8 - GENERAL CRITERIA FOR TIDAL BUFFER ZONES (Env-Wt 604.02)

The 100-foot statutory limit on the extent of the tidal buffer zone shall be measured horizontally. Any person proposing a project in or on an undeveloped tidal buffer zone shall evaluate the proposed project based on:

☒ The standard conditions in Env-Wt 307;

☒ The avoidance and minimization requirements in Env-Wt 311.07 and Env-Wt 313.03;

☒ The approval criteria in Env-Wt 313.01;

☒ The evaluation criteria in Env-Wt 313.05;

☒ The project specific criteria in Env-Wt 600;

☒ The CFA required by Env-Wt 603.04; and

☒ The vulnerability assessment required by Env-Wt 603.05.

Projects in or on a tidal buffer zone shall preserve the self-sustaining ability of the buffer area to:

☒ Provide habitat values;

☒ Protect tidal environments from potential sources of pollution;

☒ Provide stability of the coastal shoreline; and

☒ Maintain existing buffers intact where the lot has disturbed area defined under RSA 483-B:4, IV.

SECTION 9 - GENERAL CRITERIA FOR TIDAL WATERS/WETLANDS (Env-Wt 604.03)

Except as allowed under Env-Wt 606, permanent new impacts to tidal wetlands shall be allowed only to protect public safety or homeland security. Evaluation of impacts to tidal wetlands and tidal waters shall be based on:

☒ The standard conditions in Env-Wt 307;

☒ The avoidance and minimization requirements in Env-Wt 311.07 and Env-Wt 313.03;

☒ The approval criteria in Env-Wt 313.01;

☒ The evaluation criteria in Env-Wt 313.05;

☒ The project specific criteria in Env-Wt 600;

☒ The CFA required by Env-Wt 603.04; and

☒ The vulnerability assessment required by Env-Wt 603.05.

Projects in tidal surface waters or tidal wetlands shall:

☒ Optimize the natural function of the tidal wetland, including protection or restoration of habitat, water quality, and self-sustaining stability to storm surge;

☒ Be designed with a preference for living shorelines over hardened stabilization practices; and

☒ Be limited to public infrastructure or restoration projects that are in the interest of the general public, including a road, a bridge, energy infrastructure, or a project that addresses predicted sea-level rise and coastal flood risk.

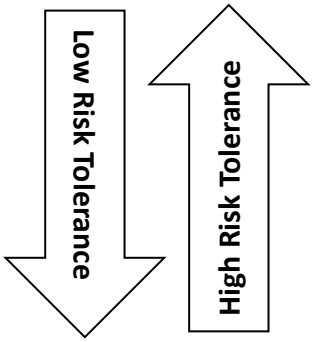
SECTION 10 – GUIDANCE

Your application must follow the New Hampshire Coastal Risk and Hazards Commission's Guiding Principles or other best available science. Below are some of these guidance principles:

- Incorporate science-based coastal flood risk projections into planning;
- Apply risk tolerance* to assessment, planning, design and construction;
- Protect natural resources and public access;
- Create a bold vision, start immediately, and respond incrementally and opportunistically as projected coastal flood risks increase over time; and
- Consider the full suite of actions including effectiveness and consequences of actions.

*Risk tolerance is a project's willingness to accept a higher or lower probability of flooding impacts. The diagram below gives examples of project with lower and higher risk tolerance:

Critical Infrastructures, historic sites, essential ecosystems, and high value assets typically have lower risk tolerance, and thus should be planned, designed, and constructed using higher coastal flood risk projections.



Sheds, pathways, and small docks typically have higher risk tolerance and thus may be planned, designed, and constructed using less protective coastal flood risk projections.

STANDARD DREDGE AND FILL WETLANDS PERMIT APPLICATION ATTACHMENT A: MINOR AND MAJOR PROJECTS

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

RSA/ Rule: RSA 482-A/ Env-Wt 311.10; Env-Wt 313.01(a)(1); Env-Wt 313.03

APPLICANT LAST NAME, FIRST NAME, M.I.: Jenny L. Lang

Attachment A can be used to satisfy some of the additional requirements for minor and major projects regarding avoidance and minimization, as well as functional assessment.

PART I: AVOIDANCE AND MINIMIZATION

In accordance with Env-Wt 313.03(a), the Department shall not approve any alteration of any jurisdictional area unless the applicant demonstrates that the potential impacts to jurisdictional areas have been avoided to the maximum extent practicable and that any unavoidable impacts have been minimized, as described in the Wetlands Best Management Practice Techniques For Avoidance and Minimization.

SECTION I.I - ALTERNATIVES (Env-Wt 313.03(b)(1))

Describe how there is no practicable alternative that would have a less adverse impact on the area and environments under the Department's jurisdiction.

SINCE THE PROPOSED TIDAL DOCK WILL SERVE TO PROVIDE A WATER DEPENDENT FUNCTION, PRACTICABLE ALTERNATIVES ALONG THE 108 +/-FEET OF SHORELINE ARE REDUCED DUE TO THE PRESENCE OF SALTMARSH, FRESHWATER WETLAND, AND MAINTAINING ADEQUATE NAVOGATION SPACE FROM ABUTTING TIDAL DOCKS. THE PROPOSED STRUCTURE HAS BEEN LOCATED ALONG THE SUBJECT SHORELINE TO IMPACT THE LEAST AMOUNT SALTMARSH AREA POSSIBLE, DEMONSTRATING THE LEAST IMPACTING ALTERNATIVE.

SECTION I.II - MARSHES (Env-Wt 313.03(b)(2))

Describe how the project avoids and minimizes impacts to tidal marshes and non-tidal marshes where documented to provide sources of nutrients for finfish, crustacea, shellfish and wildlife of significant value.

The proposed location represents the least impacting alternative as impacts to salt marshes to construct the proposed dock are located to impact the least amount of square footage over saltmarsh as possible.

SECTION I.III – HYDROLOGIC CONNECTION (Env-Wt 313.03(b)(3))

Describe how the project maintains hydrologic connections between adjacent wetland or stream systems.

The proposed docking structure will be constructed on piles within the tidal wetland further reducing permanent impacts to the tidal wetland resource. Since the docking structure will be constructed on piles, the structure will not impede tidal flow or alter hydrology, it will not deter use by wildlife species that currently use the wetland area, and it will not impede any migrational fish movement.

SECTION I.IV - JURISDICTIONAL IMPACTS (Env-Wt 313.03(b)(4))

Describe how the project avoids and minimizes impacts to wetlands and other areas of jurisdiction under RSA 482-A, especially those in which there are exemplary natural communities, vernal pools, protected species and habitat, documented fisheries, and habitat and reproduction areas for species of concern, or any combination thereof.

Per the NHB Review (attached), protected species have been identified on or near the project site. Haley Ward will coodinate with NHF&G and correspondence will be forwarded to NH DES upon receipt.

SECTION I.V - PUBLIC COMMERCE, NAVIGATION, OR RECREATION (Env-Wt 313.03(b)(5))

Describe how the project avoids and minimizes impacts that eliminate, depreciate or obstruct public commerce, navigation, or recreation.

The proposed tidal docking structure has been designed to not impede recreation, public commerce, and navigation. The docking structure does not extend into any federal or local navigation channel.

SECTION I.VI - FLOODPLAIN WETLANDS (Env-Wt 313.03(b)(6))

Describe how the project avoids and minimizes impacts to floodplain wetlands that provide flood storage.

The project does not propose any impacts to floodplain wetlands as the dock will be constructed on piles therefore providing no significant decrease in flood storage potential.

SECTION I.VII - RIVERINE FORESTED WETLAND SYSTEMS AND SCRUB-SHRUB –MARSH COMPLEXES (Env-Wt 313.03(b)(7))

Describe how the project avoids and minimizes impacts to natural riverine forested wetland systems and scrub-shrub – marsh complexes of high ecological integrity.

The project does not propose impacts to riverine forested wetland systems and scrub shrub marsh complexes.

SECTION I.VIII - DRINKING WATER SUPPLY AND GROUNDWATER AQUIFER LEVELS (Env-Wt 313.03(b)(8))

Describe how the project avoids and minimizes impacts to wetlands that would be detrimental to adjacent drinking water supply and groundwater aquifer levels.

The wetland resources associated with the project site are not hydrologically connected to a groundwater aquifer or drinking water supply.

SECTION I.IX - STREAM CHANNELS (Env-Wt 313.03(b)(9))

Describe how the project avoids and minimizes adverse impacts to stream channels and the ability of such channels to handle runoff of waters.

The project does not propose any impacts to stream channels.

PART II: FUNCTIONAL ASSESSMENT
REQUIREMENTS Ensure that project meets requirements of Env-Wt 311.10 regarding functional assessment (Env-Wt 311.04(j); Env-Wt 311.10).
FUNCTIONAL ASSESSMENT METHOD USED: Wetland functions and values were assessed using the Highway Methodology Workbook, Wetland Functions and Values: A Descriptive Approach. U.S. Army Corps of Engineers. 1999. The Highway Methodology Workbook Supplement, Wetland Functions and Values: A Descriptive Approach. U.S. Army Corps of Engineers. New England Division. 32pp. NAEEP-360-1-30a.
NAME OF CERTIFIED WETLAND SCIENTIST (FOR NON-TIDAL PROJECTS) OR QUALIFIED COASTAL PROFESSIONAL (FOR TIDAL PROJECTS) WHO COMPLETED THE ASSESSMENT: SAM HAYDEN, CWS
DATE OF ASSESSMENT: 8/7/2024
Check this box to confirm that the application includes a NARRATIVE ON FUNCTIONAL ASSESSMENT: ☒
For minor or major projects requiring a standard permit without mitigation, the applicant shall submit a wetland evaluation report that includes completed checklists and information demonstrating the RELATIVE FUNCTIONS AND VALUES OF EACH WETLAND EVALUATED. Check this box to confirm that the application includes this information, if applicable: ☒ Note: The Wetlands Functional Assessment worksheet can be used to compile the information needed to meet functional assessment requirements.

AVOIDANCE AND MINIMIZATION WRITTEN NARRATIVE

Water Division/Land Resources Management

Wetlands Bureau

Check the Status of your Application

RSA/ Rule: RSA 482-A/ Env-Wt 311.04(j); Env-Wt 311.07; Env-Wt 313.01(a)(1),b; Env-Wt 313.01(c)

APPLICANT LAST NAME, FIRST NAME, M.I.: Jenny L. Lang

An applicant for a standard permit shall submit with the permit application a written narrative that explains how all impacts to functions and values of all jurisdictional areas have been avoided and minimized to the maximum extent practicable. This attachment can be used to guide this narrative (attach additional pages if needed). Alternatively, the applicant may attach a completed Avoidance and Minimization Checklist (NHDES-W-06-050) to the permit application.

SECTION 1 - WATER ACCESS STRUCTURES (Env-Wt 311.07(b)(1))

Is the primary purpose of the proposed project to construct a water access structure?

Yes. The project proposes to construct a tidal docking structure for recreational boating access.

SECTION 2 - BUILDABLE LOT (Env-Wt 311.07(b)(1))

Does the proposed project require access through wetlands to reach a buildable lot or portion thereof?

N/A

SECTION 3 - AVAILABLE PROPERTY (Env-Wt 311.07(b)(2))

For any project that proposes permanent impacts of more than one acre or that proposes permanent impacts to a PRA, or both, are any other properties reasonably available to the applicant, whether already owned or controlled by the applicant or not, that could be used to achieve the project's purpose without altering the functions and values of any jurisdictional area, in particular wetlands, streams, and PRAs?

N/A. The proposal includes the construction of a tidal docking structure, providing a water dependent function.

SECTION 4 - ALTERNATIVES (Env-Wt 311.07(b)(3))

Could alternative designs or techniques, such as different layouts, different construction sequencing, or alternative technologies be used to avoid impacts to jurisdictional areas or their functions and values on the subject property or on other property that is reasonably available to the applicant as described in the *Wetlands Best Management Practice Techniques for Avoidance and Minimization*?

The project proposes the construction of a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed wood pier, a 3' x 40' gangway and a 10' x 30' float totaling 96 sq. ft. of permanent impact to the previously developed 100' Tidal Buffer Zone and 900 sq. ft. of permanent impact to tidal wetlands. Overall structure length will be 170 feet located on 108+/- of frontage along the Piscataqua River. Since the proposed tidal dock will serve to provide a water dependent function, practicable alternatives along the 108 +/-feet of shoreline are reduced due to the presence of saltmarsh and maintaining adequate navigation space between abutting tidal docks.

SECTION 5 - CONFORMANCE WITH Env-Wt 311.10(c) (Env-Wt 311.07(b)(4))

How does the project conform to Env-Wt 311.10(c)? Please note that for a minimum impact project, the applicant may replace this explanation with a certification signed by a certified wetland scientist that the project is located and designed to minimize impacts to wetlands functions and values.

The proposed docking structure will be constructed on piles within the tidal wetland further reducing permanent impacts to the tidal wetland resource. The docking structure has been designed to allow the adjacent tidal resource to maintain its current functions and values. The tidal docking structure will not impede tidal flow or alter hydrology, it will not deter use by wildlife species that currently use the wetland area, and it will not impede any migrational fish movement. As a result, The project will have no impact on the functions and values of the adjacent tidal wetland. A Wetland Functions and Values Assessment is attached to this application.

Map by NH GRANIT

Legend

- Parcels
- State
- County
- City/Town
- Coastal 2019 1-foot RGB

Map Scale

1: 6,494

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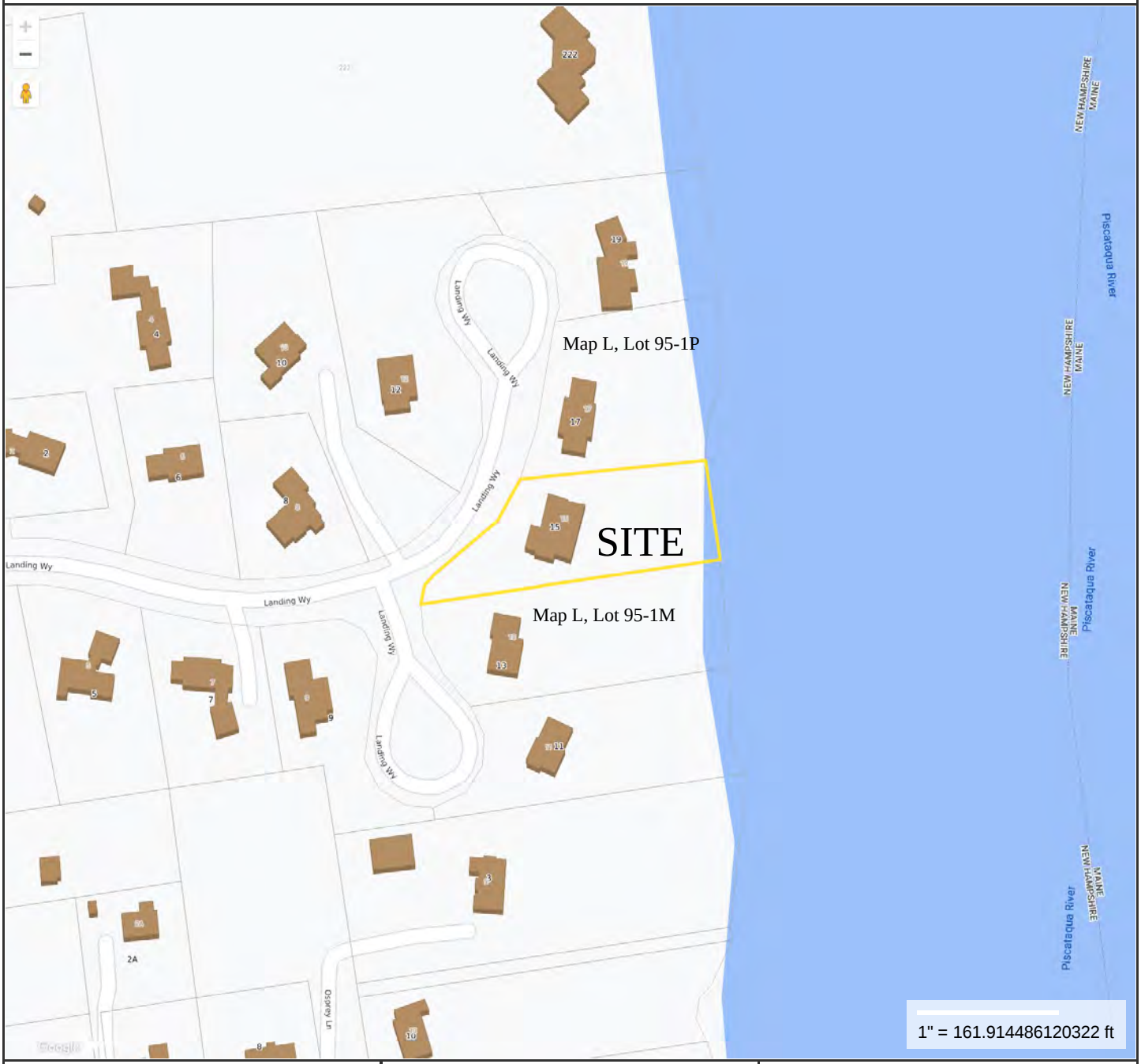
Map Generated: 8/7/2024

Notes

USGS Topo Map



Property Information

Location	15 LANDING WY
Owner	LANG JENNY L
Land Use	
Zoning Code	R-20
Property Id	L0095-01I000

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

City of Dover, NH makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 10/30/2023
Data updated Daily

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Ambit Engineering Abutter List

Jenny L. Lang
15 Landing Way
Dover, NH

Job #5010180.3402.25

Applicant/Owner(s)

Map	Lot	Deed	Owner (s) First/Trust	Owner(s) Last, Trustee	Mailing Address	City	State	Zip
L	95-1L		Jenny L.	Lang	15 Landing Way	Dover	NH	03820

Engineer	**Haley Ward**		**200 Griffin Road, Unit #14**	**Portsmouth**	**NH**	**03801**

Job # 0180.3402.25 **Abutters**

Map	Lot	Deed	Owner(s) First/Trust	Owner(s) Last /Trustee	Mailing Address	City	State	Zip
L	95-1M		Jill Z. Peter Revocable Trust	Jill Z. & Bryan D. Peter, Trustees	13 Landing Way	Dover	NH	03820
L	95-1P		Joyce Chagen & Brendan Greeley		17 Landing Way	Dover	NH	03820

7 August 2024

Joyce Chagen & Brendan Greeley
17 Landing Way
Dover, NH 03820

RE: New Hampshire Wetland Application for proposed tidal docking structure for Jenny L. Lang, 15 Landing Way, Dover, NH.

Dear Property Owner,

Under NH RSA 482-A this letter is to inform you in accordance with State Law that a NH DES Wetland Permit Application will be filed with the New Hampshire Department of Environmental Services (DES) Wetlands Bureau for a permit to **impact the previously developed 100' Tidal Buffer Zone and tidal wetlands,** on behalf of your abutter, **Jenny L. Lang.**

This letter is sent to inform you as an abutter to the above-referenced property (according to local Municipal records) that **Jenny L. Lang** proposes a project that requires construction in the previously developed 100 foot Tidal Buffer Zone and tidal wetlands, both jurisdictional areas.

Plans are on file at this office, and once the application is filed, that show the proposed project and wetland and other jurisdictional impacts will be available for viewing during normal business hours at the office of the **Dover** clerk, **Dover City offices**, or once received by DES, at the offices of the DES Wetlands Bureau, (8 a.m. to 4 p.m.) (603) 271-2147. It is suggested that you call ahead to the appropriate office to ensure the application is available for review.

Please feel free to call if you have any questions or comments.

Sincerely,

Steve Riker, CWS
Project Scientist/Project Manager
sriker@haleyward.com

7 August 2024

Jill Z. Peter Revocable Trust
Jill Z. Peter & Bryan D. Peter Trustees
13 Landing Way
Dover, NH 03820

RE: New Hampshire Wetland Application for proposed tidal docking structure for Jenny L. Lang, 15 Landing Way, Dover, NH.

Dear Property Owner,

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Sincerely,

Steve Riker, CWS
Project Scientist/Project Manager
sriker@haleyward.com

9589 0710 5270 2012 7988 66

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- ☐ Return Receipt (electronic) $
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- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
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PORTSMOUTH NH 03801
AUG - 1 2024
Postmark Here
USPS

To: Joyce Chagen & Brendan Greeley
17 Landing Way
Dover, NH 03820

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 2012 7988 59

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Extra Services & Fees *(check box, add fee as appropriate)*
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- ☐ Return Receipt (electronic) $
- ☐ Certified Mail Restricted Delivery $
- ☐ Adult Signature Required $
- ☐ Adult Signature Restricted Delivery $

Postage
$

PORTSMOUTH NH 03801
AUG - 1 2024
Postmark Here
USPS

To: Jill Z. Peter Rev. Trust
Jill Z. & Bryan D. Peter, Trustees
13 Landing Way
Dover, NH 03820

See Reverse for Instructions

15 Landing Way
Dover, NH

Photo No. 1 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing northeasterly toward docking structure on Map L, 95-1P. **Photo By:** SDR	

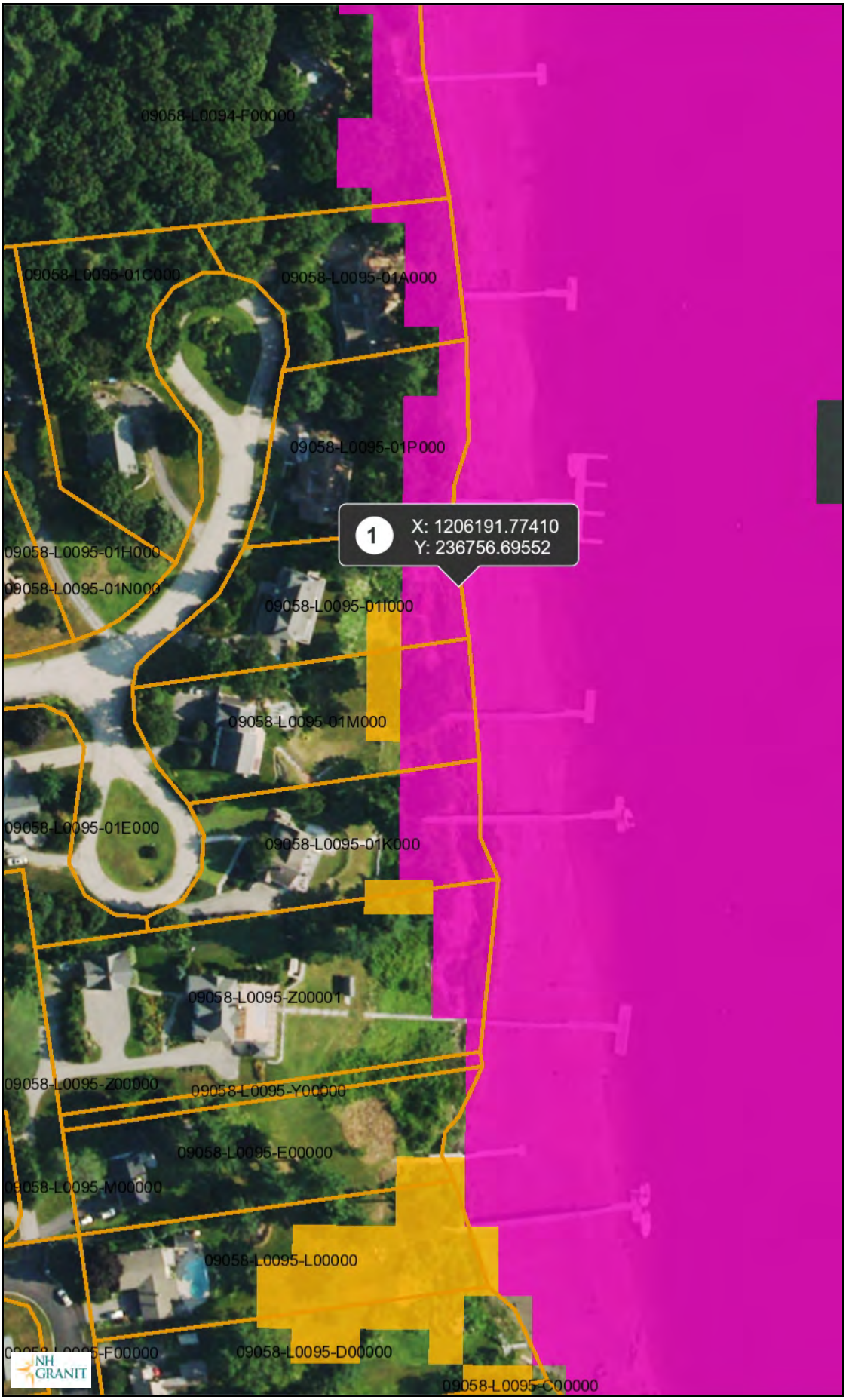
Photo No. 2 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing easterly toward proposed tidal dock location. **Photo By:** SDR	

Photo No. 3 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing southeasterly toward docking structure on Map L, Lot 95-1M. **Photo By:** SDR	

Photo No. 4 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing easterly toward proposed tidal dock location. **Photo By:** SDR	

Photo No. 5	
Photo Date: 9/29/23	
Site Location: 15 Landing Way, Dover, NH	
Description: Facing northeasterly toward docking structure on Map L, 95-1P.	
Photo By: SDR	

Map by NH GRANIT



Legend

Parcels - polygons

Highest Ranked Wildlife Hat

- Not Top Ranked
- Highest Ranked Habitat in NH
- Highest Ranked Habitat in Region
- Supporting Landscape

Coastal 2019 1-foot RGB

Map Scale

1: 1,624

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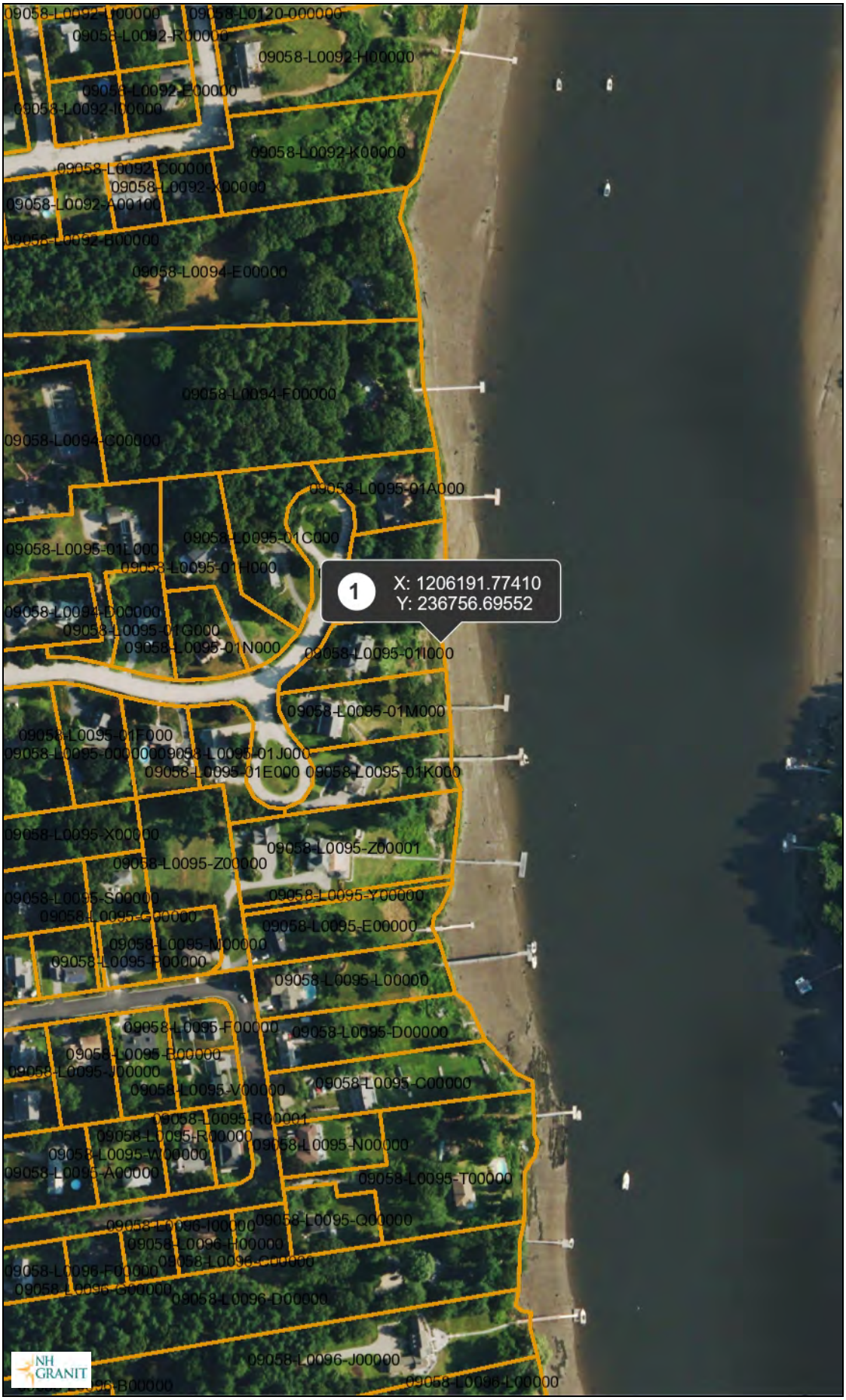
Map Generated: 8/7/2024

Notes

Highest Ranked Wildlife Habitat

Map by NH GRANIT



Legend

- Parcels - polygons
- 2023 Coastal 2019 1-foot RGB

Map Scale

1: 3,247

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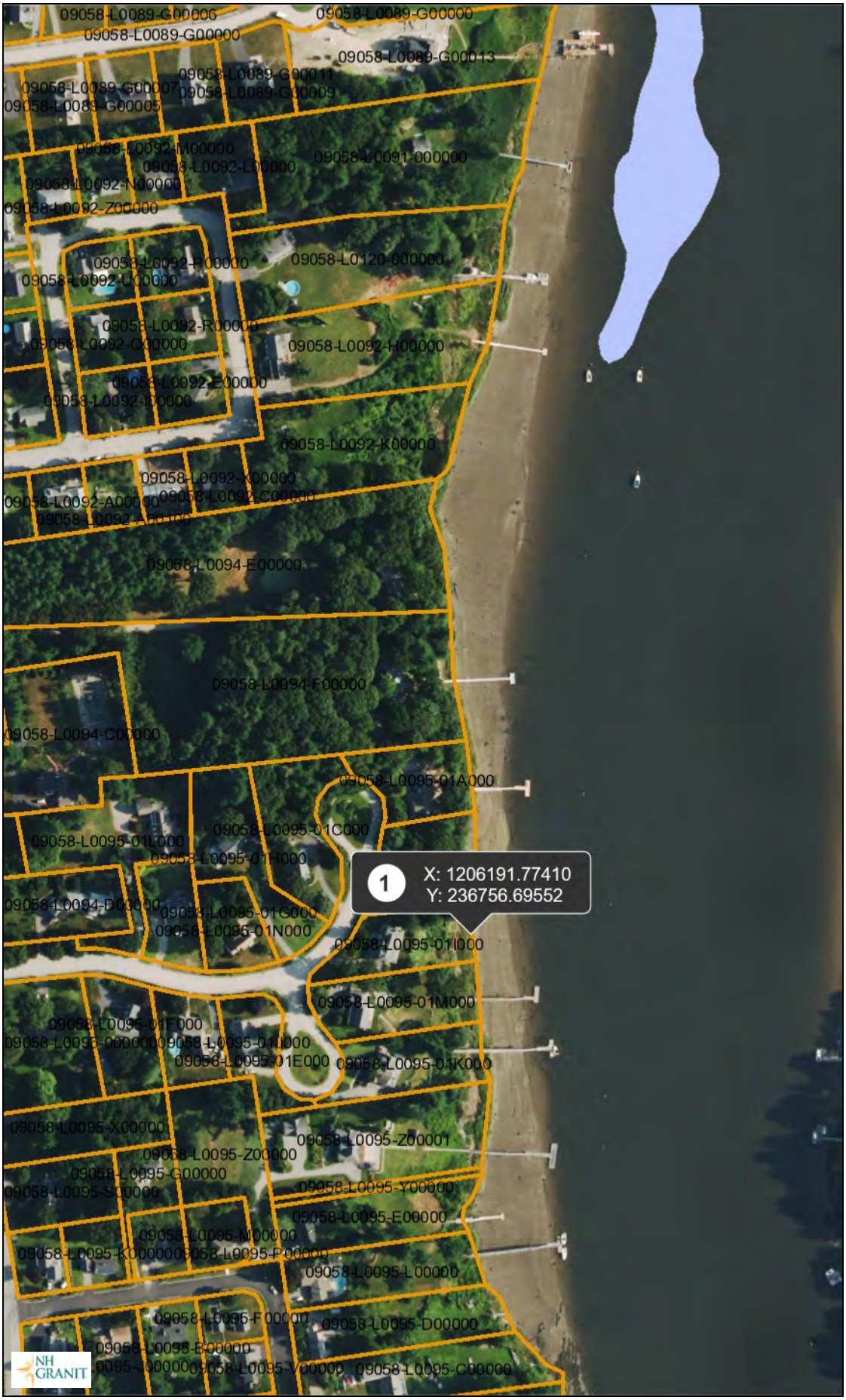
Map Generated: 8/7/2024

Notes

2023 Eelgrass

Map by NH GRANIT



Legend

- Parcels - polygons

Current Shellfish Beds

- Blue Mussel
- Oyster
- Razor Clam
- Softshell Clam
- Surf Clam

Coastal 2019 1-foot RGB

Map Scale

1: 3,247

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Map Generated: 8/7/2024

Notes

Current Shellfish Beds

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

To: John Chagnon, Ambit Engineering, Inc.
200 Griffin Road Unit 3
Portsmouth, NH 03801
jrc@ambitengineering.com

From: NHB Review
NH Natural Heritage Bureau
Main Contact: Ashley Litwinenko - nhbreview@dncr.nh.gov

cc: NHFG Review, David Simmons

Date: 06/25/2024 (valid until 06/25/2025)
Re: DataCheck Review by NH Natural Heritage Bureau and NH Fish & Game
Permits: NHDES - Standard Dredge & Fill - Major, USACE - General Permit

NHB ID: NHB24-1881

Town: Dover
Location: 15 Landing Way

Project Description: The project proposes the installation of a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed pier, a 3' x 40' gangway and a 10' x 30' float to provide recreational boating access on the Cocheco River.

Next Steps for Applicant:

NHB's database has been searched for records of rare species and exemplary natural communities. Please carefully read the comments and consultation requirements below.

NHB Comments: No comments at this time.

NHFG Comments: Please refer to NHFG consultation requirements below.

NHB Consultation

If this NHB DataCheck letter includes records of rare plants and/or natural communities/systems, please contact NHB and provide any requested supplementary materials by emailing nhbreview@dncr.nh.gov.

If this NHB DataCheck letter DOES NOT include any records of rare plants and/or natural communities/systems, no further consultation with NHB is required.

NH Fish and Game Department Consultation

If this NHB DataCheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB DataCheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://www.wildlife.nh.gov/wildlife-and-habitat/nongame-and-endangered-species/environmental-review. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB DataCheck results letter number and "Fis 1004 consultation request" in the subject line**.

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email NHFGreview@wildlife.nh.gov, and include the NHB DataCheck results letter number and "review request" in the email subject line.
Contact NH Fish & Game at (603) 271-0467 with questions.

NHB Database Records:
The following record(s) have been documented in the vicinity of the proposed project.
Please see the map and detailed information about the record(s) on the following pages.

Vertebrate species	State[1]	Federal	Notes
Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)	T	T	Contact the NH Fish & Game Dept (see above) and the US Fish & Wildlife Service (see below).
Shortnose Sturgeon (*Acipenser brevirostrum*)	E	E	Contact the NH Fish & Game Dept (see above) and the US Fish & Wildlife Service (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "SC" = Special Concern, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list.
An asterisk (*) indicates that the most recent report for that occurrence was 20 or more years ago.

For all animal reviews, refer to 'IMPORTANT: NHFG Consultation' section above. Contact for federally-listed animals: David Simmons, USFWS, at (603) 223-2541. Contact for federally-listed species: David Simmons, USFWS, at (603) 223-2541.

Disclaimer: NHB's database can only tell you of known occurrences that have been reported to NHFG/NHB. Known occurrences are based on information gathered by qualified biologists or members of the public, reported to our offices, and verified by NHB/NHFG.
However, many areas have never been surveyed, or have only been surveyed for certain species.
NHB recommends surveys to determine what species/natural communities are present onsite.

NHB24-1881

Dover
Shortnose Sturgeon
Atlantic Sturgeon
Legend
Site bounds
Animal
towns
0
0.1
0.2
0.3
0.4
0.5
Miles

NHB24-1881 EOCODE: AFCAA01042*003*NH

New Hampshire Natural Heritage Bureau - Animal Record

Atlantic Sturgeon (*Acipenser oxyrinchus oxyrinchus*)

Legal Status	Conservation Status
Federal: Listed Threatened	Global: Rare or uncommon
State: Listed Threatened	State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2016: 1 individual, sex unknown, detected in the lower Piscataqua River. 2015: 1 individual, sex unknown, detected in Portsmouth Harbor. 2012: 1 individual, sex unknown, detected in Little Bay.
General Area: 2016: Tidal waters in Portsmouth Harbor, Little Bay, and the Piscataqua River.
General Comments: --
Management Comments: --

Location

Survey Site Name: Piscataqua River
Managed By:

County:
Town(s): Out-Of-State
Size: 7749.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 2016: Tidal waters of Portsmouth Harbor, Little Bay, and the Piscataqua River.

Dates documented

First reported: 2012-06-02 Last reported: 2016-05-27

The U.S. Fish & Wildlife Service has jurisdiction over Federally listed species. Please contact them at 70 Commercial Street, Suite 300, Concord NH 03301 or at (603) 223-2541.

NHB24-1881 EOCODE: AFCAA01010*001*NH

New Hampshire Natural Heritage Bureau - Animal Record

Shortnose Sturgeon (*Acipenser brevirostrum*)

Legal Status	**Conservation Status**
Federal: Listed Endangered	Global: Rare or uncommon
State: Listed Endangered	State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank: --

Detailed Description: 2016: 2 individuals, 1 female and 1 sex unknown, detected in Portsmouth Harbor and the lower Piscataqua River. 2015: 3 females and 2 other individuals, sex unknown detected in Portsmouth Harbor. 2014: 1 female detected moving from Portsmouth Harbor up the Piscataqua River to the mouth of the Cocheco River. 2012: 1 female detected in Little Bay. 2011: 1 female detected in Little Bay. 2010: 1 female detected in Little Bay.
General Area: 2016: Tidal waters in Portsmouth Harbor, Little Bay, and the Piscataqua River.
General Comments: --
Management Comments: --

Location

Survey Site Name: Piscataqua River
Managed By:

County:
Town(s): Out-Of-State
Size: 7749.3 acres Elevation:

Precision: Within 1.5 miles of the area indicated on the map (location information is vague or uncertain).

Directions: 2016: Tidal waters of Portsmouth Harbor, Little Bay, and the Piscataqua River.

Dates documented

First reported: 2010-11-03 Last reported: 2016-10-20

The U.S. Fish & Wildlife Service has jurisdiction over Federally listed species. Please contact them at 70 Commercial Street, Suite 300, Concord NH 03301 or at (603) 223-2541.

NHB24-1881 EOCODE: AFCAA01010*001*NH

Doc # 0032419 May 29, 2008 11:38 AM
Book 3648 Page 0120 Page 1 of 3
Register of Deeds, Strafford County

Return to:

Jenny L. Lang
15 Landing Way
Dover, NH 03820

STATE OF NEW HAMPSHIRE		
DEPARTMENT OF REVENUE ADMINISTRATION		REAL ESTATE TRANSFER TAX
****9 Thousand 7 Hundred 50 Dollars		
DATE		AMOUNT
05/29/2008	ST812582	$ ****9750.00
VOID IF ALTERED		

WARRANTY DEED

KNOW ALL MEN BY THESE PRESENTS: That we, **Patrick J. O'Brien and Anne M. O'Brien,** husband and wife, **Trustees of the Anne M. O'Brien Revocable Trust of 1990 u/d/t December 7, 1990** with a mailing address of 15 Landing Way Dover, NH 03820, for consideration paid, grant to **Jenny L. Lang**, single, of 509 Howell Avenue Cincinnati, OH 45220, with WARRANTY COVENANTS:

SEE ATTACHED EXHIBIT A.

MEANING and INTENDING to describe and convey the same premises conveyed to the grantors herein by deed of Patrick J. O'Brien and Anne M. O'Brien dated January 25, 1993 recorded at Book 1657 Page 332 in the Strafford County Registry of Deeds.

We, the grantors herein hereby release all rights of homestead in the above-described premises.

The undersigned, Patrick J. O'Brien and Anne M. O'Brien, Trustees of Anne M. O'Brien Revocable Trust of 1990 u/d/t December 7, 1990 under Trust Agreement dated hereby have full and absolute power in said Trust Agreement to convey any interest in real estate and improvements thereon held in said Trust and to hold any interest in real estate and no purchaser or third party shall be bound to inquire whether the Trustee have said power or are properly exercising said power or to see the application of any Trust assets paid to the Trustees for conveyance thereof. Patrick J. O'Brien and Anne M. O'Brien continue and remain the Trustees of the above Trust and are duly authorized to execute such documents as may be necessary to sell certain property located at 15 Landing Way Dover, NH 03820.

Executed this 27 day of May, 2008.

ANNE M. O'BRIEN REVOCABLE TRUST OF 1990 U/D/T DECEMBER 7, 1990

By: Patrick J. O'Brien
Its: Trustee
Duly Authorized

Patrick J. O'Brien, Individually

By: Anne M. O'Brien
Its: Trustee
Duly Authorized

Anne M. O'Brien, Individually

State of New Hampshire
County of Rockingham

5/27, 2008

Then personally appeared before me the said Patrick J. O'Brien and Anne M. O'Brien, Trustees of the Anne M. O'Brien Revocable Trust of 1990 u/d/t December 7, 1990, Patrick J. O'Brien, Individually and Anne M. O'Brien, Individually and acknowledged the foregoing to be their voluntary act and deed.

Notary Public/Justice of The Peace
Commission expiration:

EXHIBIT A

A certain tract or parcel of land with the improvements thereon situated in Dover, Strafford County, New Hampshire, and being Lot 7 as shown on plan entitled "Plan of Lots River Knoll Estates For Matt R. and Helen Williams, Jr., Dover Point Road, Dover, New Hampshire 03820" by Roaring Brook Consultants Civil, Structural and Construct. Engineering, Scale 1" = 50', recorded in Strafford County Registry of Deeds in Plan Book 27, Page 55, and being more particularly bounded and described as follows:

Beginning at a point at the northwesterly corner of Lot 6 and at a curve generally to the north and east having a radius of forty-five feet (45'); thence following said curve thirty and sixteen hundredths (30.16) along the southeasterly sideline of the fifty foot (50') right-of-way to a point at a curve to the left having a radius of two hundred forty feet (240'); thence following said curve generally north and east one hundred forty-one and fifty-five hundredths feet (141.55') along the easterly sideline of the fifty foot (50') right-of-way to a point at the southwesterly corner of Lot 8 as shown on said plan; thence South 81° 49' 5" W two hundred twenty-five feet (225'), more or less, along the southerly sideline of Lot 6 to a point along the shores of the Piscataqua River; thence South along the westerly shoreline of the Piscataqua River to a point at the northeasterly corner of Lot 6 as shown on said plan; thence North 83° 57' 05" W three hundred forty-five (345'), more or less, along the northerly sideline of Lot 6 as shown on said plan to the point of beginning.

SAFETY DATA SHEET

1. Identification

Product identifier CCA Treated Wood

Other means of identification

SDS number 92-KPC

Recommended use Preservative Treated Wood for various weather protected and exterior uses.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Company Name Koppers Performance Chemicals Inc.

Address 1016 Everee Inn Rd., Griffin, GA 30224

Telephone number 770-233-4200

Contact person Regulatory Manager, KPC Inc.

Emergency Telephone Number CHEMTREC 1-800-424-9300

E-mail KPCmgrsds@koppers.com

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Carcinogenicity (inhalation) Category 1A

OSHA defined hazards Combustible dust

Label elements

Signal word Danger

Hazard statement May cause cancer by inhalation. May form combustible dust concentrations in air.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Wear protective gloves/protective clothing/eye protection/face protection. Prevent dust accumulation to minimize explosion hazard. Observe good industrial hygiene practices.

Response If exposed or concerned: Get medical advice/attention. Take off contaminated clothing and wash before reuse. In case of fire: Use water fog, foam, carbon dioxide, dry chemical for extinction. Collect spillage.

Storage Store away from incompatible materials.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Arsenic Pentoxide	1303-28-2	<3
Copper Oxide	1317-39-1	<1.5
Trivalent Chromium	1308-38-9	<3.5
Wood	N/A	<85

Composition comments	All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume. Components not listed are either non-hazardous or are below reportable limits. Depending on the additives applied to the treating solution, this wood may also contain <1 % of mold inhibitors, <1% of a non-hazardous oil emulsion, and <% of a colorant.

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. Get medical attention immediately. Some species may cause allergic respiratory reactions with asthma-like symptoms in sensitized individuals.
Skin contact	Remove contaminated clothing. Wash skin thoroughly with soap and water for several minutes. Prolonged contact with treated wood and/or treated wood dust, especially when freshly treated at the plant, may cause irritation to the skin. Abrasive handling or rubbing of the treated wood may increase skin irritation. Some wood species, regardless of treatment, may cause dermatitis or allergic skin reactions in sensitized individuals. In case of rashes, wounds or other skin disorders: Seek medical attention and bring along these instructions.
Eye contact	Do not rub eye. Immediately flush eye(s) with plenty of water. Remove any contact lenses and open eyelids wide apart. If irritation persists get medical attention.
Ingestion	Rinse mouth thoroughly if dust is ingested. Get medical attention if any discomfort continues.
Most important symptoms/effects, acute and delayed	Wood dust: May cause nasal dryness, irritation and mucostasis. Coughing, wheezing, sneezing, sinusitis and prolonged colds have also been reported. Depending on wood species may cause respiratory sensitization and/or irritation. Symptoms can include irritation, redness, scratching of the cornea, and tearing. May cause eczema-like skin disorders (dermatitis). Airborne treated or untreated wood dust may cause nose, throat, or lung irritation and other respiratory effects.
Indication of immediate medical attention and special treatment needed	If one ounce of treated wood dust per 10 lbs. of body weight are ingested, acute arsenic intoxication is a possibility.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Carbon dioxide (CO2). Dry chemical powder. Apply extinguishing media carefully to avoid creating airborne dust.
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	Explosion hazard: Avoid generating dust; fine dust dispersed in air in sufficient concentrations and in the presence of an ignition source is a potential dust explosion hazard. Depending on moisture content, and more importantly, particle diameter and airborne concentration, wood dust in a contained area may explode in the presence of an ignition source. Wood dust may similarly deflagrate (combustion without detonation like an explosion) if ignited in an open or loosely contained area. An airborne concentration of 40 grams (40,000 mg) of dust per cubic meter of air is often used as the LEL for wood dusts. Reference NFPA Standards- 654 and 664 for guidance. Toxic vapors from wood and preservative may be given off in a fire. Ash will contain free arsenic and chromium and may be toxic.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	In case of fire and/or explosion do not breathe fumes. Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	May form combustible dust concentrations in air.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Use only non-sparking tools. Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Dust deposits should not be allowed to accumulate on surfaces, as these may form an explosive mixture if they are released into the atmosphere in sufficient concentration. Wear appropriate protective equipment and clothing during clean-up. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Take precautionary measures against static discharge. Use only non-sparking tools. Avoid dispersal of dust in the air (i.e., clearing dust surfaces with compressed air). Stop the flow of material, if this is without risk.

Large Spills: Wet down with water and dike for later disposal. Shovel the material into waste container. Following product recovery, flush area with water.

Small Spills: Sweep up or vacuum up spillage and collect in suitable container for disposal.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Minimize dust generation and accumulation. Avoid significant deposits of material, especially on horizontal surfaces, which may become airborne and form combustible dust clouds and may contribute to secondary explosions. Routine housekeeping should be instituted to ensure that dusts do not accumulate on surfaces. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Explosion-proof general and local exhaust ventilation. Avoid prolonged exposure. Wear appropriate personal protective equipment. Avoid release to the environment. Do not burn preserved wood. Do not use preserved wood as Mulch. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Keep away from heat, spark, open flames and other sources of ignition. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

U.S. - OSHA

Components	Type	Value	Form
Wood Dust (CAS N/A)	PEL	5 mg/m3	Respirable dust.
		15 mg/m3	Total fraction.

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Trivalent Chromium (CAS 1308-38-9)	PEL	0.5 mg/m3

ACGIH

Components	Type	Value	Form
Wood Dust (CAS N/A)	TWA	1 mg/m3	Inhalable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value
Arsenic Pentoxide (CAS 1303-28-2)	TWA	0.01 mg/m3
Trivalent Chromium (CAS 1308-38-9)	TWA	0.5 mg/m3

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Arsenic Pentoxide (CAS 1303-28-2)	Ceiling	0.002 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value	Form
Copper Oxide (CAS 1317-39-1)	TWA	1 mg/m3	Dust and mist.
Trivalent Chromium (CAS 1308-38-9)			
Wood Dust (CAS N/A)	TWA	0.5 mg/m3	
	TWA	1 mg/m3	Dust.

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Arsenic Pentoxide (CAS 1303-28-2)	35 µg/l	Inorganic arsenic, plus methylated metabolites, as As	Urine	*

* - For sampling details, please see the source document.

Appropriate engineering controls
Explosion-proof general and local exhaust ventilation. Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection
Wear dust-resistant safety goggles with side shields where there is danger of eye contact.

Skin protection

Hand protection
When handling wood, wear leather or fabric gloves.

Other
Wear suitable protective clothing. Use of an impervious apron is recommended.

Respiratory protection
If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Use a NIOSH-approved respirator if there is a potential for exposure to dust exceeding exposure limits (See 29 CRF 1910.134, respiratory protection standard).

Thermal hazards
Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations
If wood dust contacts the skin, workers should wash the affected areas with soap and water. Clothing contaminated with wood dust should be removed, and provisions should be made for the safe removal of the chemical from the clothing. Persons laundering the clothes should be informed of the hazardous properties of wood dust. A worker who handles wood dust should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, applying cosmetics, or taking medication. Workers should not eat, drink, use tobacco products, apply cosmetics, or take medication in areas where wood dust is handled, or processed.

9. Physical and chemical properties

Appearance

Physical state
Solid.

Form
Solid.

Color
Yellow/green.

Odor
Wood odor.

Odor threshold
Not available.

pH
Not applicable.

Melting point/freezing point
Not available.

Initial boiling point and boiling range
Not available.

Flash point
Not available.

Evaporation rate
Not available.

Flammability (solid, gas)
Combustible solid.

Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not applicable.
Vapor density	Not applicable.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Highly insoluble.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not applicable.
Other information	
Density	As wood.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Keep away from heat, sparks and open flame. Minimize dust generation and accumulation. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	Toxic vapors from wood and preservative may be given off in a fire. Ash will contain free arsenic and chromium and may be toxic.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Wood dust, treated or untreated, is irritating to the nose, throat and lungs. Prolonged or repeated inhalation of wood dusts may cause respiratory irritation, recurrent bronchitis and prolonged colds. Some species may cause allergic respiratory reactions with asthma-like symptoms in sensitized individuals. Prolonged exposure to wood dusts by inhalation has been reported to be associated with nasal and paranasal cancer.
Skin contact	Handling may cause splinters. Prolonged contact with treated wood and/or treated wood dust, especially when freshly treated at the plant, may cause irritation to the skin. Abrasive handling or rubbing of the treated wood may increase skin irritation. Some wood species, regardless of treatment, may cause dermatitis or allergic skin reactions in sensitized individuals.
Eye contact	Dust may irritate the eyes.
Ingestion	Not likely, due to the form of the product. However, ingestion of dusts generated during working operations may cause nausea and vomiting. If one ounce of treated wood dust per 10 lbs. of body weight are ingested, acute arsenic intoxication is a possibility. Certain species of wood and their dusts may contain natural toxins, which can have adverse effects in humans.
Symptoms related to the physical, chemical and toxicological characteristics	Wood dust: May cause nasal dryness, irritation and mucostasis. Coughing, wheezing, sneezing, sinusitis and prolonged colds have also been reported. Depending on wood species may cause respiratory sensitization and/or irritation. Symptoms can include irritation, redness, scratching of the cornea, and tearing. May cause eczema-like skin disorders (dermatitis). Airborne treated or untreated wood dust may cause nose, throat, or lung irritation and other respiratory effects.

Information on toxicological effects

Acute toxicity	Not expected to be acutely toxic.
Skin corrosion/irritation	Dust may irritate skin.
Serious eye damage/eye irritation	Dust may irritate the eyes.

Respiratory or skin sensitization

ACGIH Sensitization

Wood (CAS N/A)	Dermal sensitization Respiratory sensitization

Respiratory sensitization Exposure to wood dusts can result in hypersensitivity,

Skin sensitization Exposure to wood dust can result in the development of contact dermatitis. The primary irritant dermatitis resulting from skin contact with wood dusts consist of erythema, blistering, and sometimes erosion and secondary infections occur.

Germ cell mutagenicity No component of this product present at levels greater than or equal to 0.1% is identified as a mutagen by OSHA.

Carcinogenicity May cause cancer by inhalation.
This classification is based on an increased incidence of nasal and paranasal cancers in people exposed to wood dusts.

IARC Monographs. Overall Evaluation of Carcinogenicity

Arsenic Pentoxide (CAS 1303-28-2)	1 Carcinogenic to humans.
Trivalent Chromium (CAS 1308-38-9)	3 Not classifiable as to carcinogenicity to humans.
Wood (CAS N/A)	1 Carcinogenic to humans.

NTP Report on Carcinogens

Arsenic Pentoxide (CAS 1303-28-2)	Known To Be Human Carcinogen.
Wood Dust (CAS N/A)	Known To Be Human Carcinogen.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Arsenic Pentoxide (CAS 1303-28-2)	Cancer

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not likely, due to the form of the product.

Chronic effects Chronic exposure to wood dusts can result in pneumonitis, and coughing, wheezing, fever and the other signs and symptoms associated with chronic bronchitis. Individuals with pre-existing disease in or a history of ailments involving the skin, kidney, liver, respiratory tract, eyes, or nervous system are at a greater than normal risk of developing adverse effects from woodworking operations with this product.

Further information The effects of industrial exposure to the chrome-copper-arsenic preservative used to treat CCA wood has been evaluated in three independent epidemiology studies. In each case the authors concluded that workers exposed on a daily basis to these preservatives were at no increased risk of death or disease as a result of their exposure.
Recreational exposure to children using CCA treated wood playground equipment has been evaluated. The results of this study indicate that the amount of arsenic transferred from the wood surface to the child is within the normal variation of total arsenic exposure to children and that the maximum risks of skin cancer associated with the exposure approximates the skin cancer risk from the sunlight experienced during play periods. Leaf, stem, and fruit of grape plants grown adjacent to CCA treated wood poles did not take up preservative components from the poles above background levels (limit of detection 0.2 and 0.05 ppm for chrome and arsenic, respectively).

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available on bioaccumulation.

Mobility in soil The product is insoluble in water.

Mobility in general The product is not volatile but may be spread by dust-raising handling.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. DO NOT BURN! Ash may be toxic and a hazardous waste; combustion vapors may be toxic. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste P List: Reference

Arsenic Pentoxide (CAS 1303-28-2) P011

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are listed on or exempt from the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Arsenic Pentoxide (CAS 1303-28-2)	Cancer
	Liver
	Skin
	Respiratory irritation
	Nervous system
	Acute toxicity

CERCLA Hazardous Substance List (40 CFR 302.4)

Arsenic Pentoxide (CAS 1303-28-2)	LISTED
Copper Oxide (CAS 1317-39-1)	LISTED
Trivalent Chromium (CAS 1308-38-9)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - No
Delayed Hazard - Yes
Fire Hazard - Yes
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Arsenic Pentoxide	1303-28-2	1		100	10000

SARA 311/312 Hazardous chemical Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Arsenic Pentoxide	1303-28-2	<3
Copper Oxide	1317-39-1	<1.5
Trivalent Chromium	1308-38-9	<3.5

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Arsenic Pentoxide (CAS 1303-28-2)
Trivalent Chromium (CAS 1308-38-9)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Arsenic Pentoxide (CAS 1303-28-2)
Trivalent Chromium (CAS 1308-38-9)

US. New Jersey Worker and Community Right-to-Know Act

Arsenic Pentoxide (CAS 1303-28-2)
Copper Oxide (CAS 1317-39-1)
Trivalent Chromium (CAS 1308-38-9)
Wood Dust (CAS N/A)

US. Pennsylvania Worker and Community Right-to-Know Law

Arsenic Pentoxide (CAS 1303-28-2)
Trivalent Chromium (CAS 1308-38-9)
Wood Dust (CAS N/A)

US. Rhode Island RTK

Arsenic Pentoxide (CAS 1303-28-2)
Copper Oxide (CAS 1317-39-1)
Trivalent Chromium (CAS 1308-38-9)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Wood Dust (CAS N/A)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 05-April-2015
Revision date 01-June-2015
Version # 02

Further information

HMIS® is a registered trade and service mark of the NPCA.
E - Safety Glasses, Gloves, Dust Respirator

PERCENTAGE OF HAZARDOUS INGREDIENTS COMPONENT %:

0.25 pcf
Arsenic Pentoxide 0.3%, Copper Oxide 0.15%, Chromium Trioxide 0.4%, Wood Dust* 84.28%
0.4 pcf
Arsenic Pentoxide 0.4%, Copper Oxide 0.2%, Chromium Trioxide 0.6%, Wood Dust* 83.98%
0.6 pcf
Arsenic Pentoxide 0.6%, Copper Oxide 0.3%, Chromium Trioxide 0.9%, Wood Dust* 83.47%
1.0 pcf
Arsenic Pentoxide 1.0%, Copper Oxide 0.6%, Chromium Trioxide 1.4%, Wood Dust* 82.45%
2.5 pcf
Arsenic Pentoxide 2.6%, Copper Oxide 1.3%, Chromium Trioxide 3.3%, Wood Dust* 78.88%

* This represents the maximum amount of wood dust that could be generated if the wood was completely machined.

The above percentages are based on the applicable retention, a wood density of 32 pcf., and a moisture contact of 15%, the above values may vary due to the variability of treatment and the natural variability of wood.

HMIS® ratings

Health: 1*
Flammability: 1
Physical hazard: 0
Personal protection: E

NFPA ratings

Disclaimer

Koppers Performance Chemicals Inc. cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

HALEY WARD
ENGINEERING | ENVIRONMENTAL | SURVEYING

COASTAL VULNERABILITY ASSESSMENT

For Jenny L. Lang
Map L, Lot 95-1L | 15 Landing Way, Dover, NH

Applicant:
Jenny L. Lang
15 Landing Way, Dover, NH

August 7, 2024
JN: 5010180.3402.25

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INTRODUCTION

This Coastal Vulnerability Assessment (CVA) is being provided in support of a New Hampshire Department of Environmental Services (NHDES) Wetland Permit Application for the construction of a tidal docking structure at 15 Landing Way, Dover, NH (herein referred to as "project site"). The project site is a residential lot located on the eastern side of Landing Way and to the west of the Piscataqua River with one occupied residential dwelling. The surrounding land use is residential with similar docking structures.

METHODS

In September 2023, Steven D. Riker, CWS from Haley Ward, Inc. conducted a site visit to evaluate coastal characteristics of the project site. This CVA was completed utilizing the NH Coastal Flood Risk Science and Technical Advisory Panel (2019). New Hampshire Coastal Flood Risk Summary Part: Guidance for Using Scientific Projections. Report Published by the University of New Hampshire (herein referred to as Guidance Document).

1.1 – PROJECT TYPE

This project proposes the construction of a tidal docking structure on the residential lot to provide the applicant with recreational boating access to the Piscataqua River. For more details regarding construction of the docking structure and construction sequences; please refer to the NH DES Wetlands Bureau Application Letter to the Wetlands Inspector and attached NHDES Permit Plan – C2 and Detail Sheet D1.

1.2 – PROJECT LOCATION

The project location is 15 Landing Way, Dover, NH, Tax Map L, Lot 95-1L and consists of +/- .70 acres of residential upland. Access to the project site will be from the Piscataqua River, with barges and equipment floating in at high tide.

1.3 – TIMELINE FOR DESIRED USEFUL LIFE

This analysis will use 2100 for a timeframe, as a docking structure has a life expectancy of approximately 50-75 years.

2.1 – PROJECT RISK TOLERANCE

The proposed project is considered to have a high-risk tolerance considering the proposed tidal docking structure has a relatively low cost, is relatively easy to modify, proposes little to no implications on public function and/or safety; and has relatively low sensitivity to inundation given the elevation and position of the structure on the landscape.

2.2 – RISK TOLERANCE OF IMPORTANT ACCESS AND SERVICE AREAS

The proposed project is considered to have a high-risk tolerance considering that the docking structure has a relatively low cost, is relatively easy to modify, proposes little to no implications on public function and/or safety; and has relatively low sensitivity to

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inundation, as docks are designed to withstand fluctuating tidal conditions including storm surge.

3.1 – RELATIVE SEA LEVEL RISE SCENARIO (RSLS)

Based on Table 3 in the Guidance Document (see table below), the RSLS for this project (based on the previously determined high risk tolerance) is considered to be on the lower magnitude, and higher probability. The following table depicts the probable see level rise from 2000 through 2150.

Table 3 from the Guidance Document:

Risk Tolerance	High	Medium	Low	Extremely Low
Example Project	Walking Trail *Docking structure & Stone Revetment	Local Road Culvert	Wastewater Treatment Facility	Hospital
Timeframe	Manage to the following sea level rise (ft*) *Compared to the sea level in the year 2000*			
	Lower magnitude Higher probability ←			→ Higher magnitude Lower probability
2030	**0.7**	**0.9**	**1.0**	**1.1**
2050	**1.3**	**1.6**	**2.0**	**2.3**
2100	**2.9**	**3.8**	**5.3**	**6.2**
2150	**4.6**	**6.4**	**9.9**	**11.7**

*Added by Ambit Engineering, Inc. based on the application of the Guidance Document towards our project.

3.2 – RELATIVE SEA LEVEL RISTE (RSLR) IMPACTS TO THE PROJECT EVALUATION

Please see the attached Figure 1 – Projected SLR's; which depicts the project site and relevant Highest Observable Tide Line (HOTL), Mean High Water (MHW), and the projected SLR's for the years 2030, 2050, 2100 and 2150. Relative to surrounding topography and considering the High-Risk Tolerance of this project; the projected RSLR is not expected to be a major consideration for this project. There are no current restrictions on the project site or associated with the proposed project.

3.3 – OTHER FACTORS

Other factors were evaluated in conjunction with RSLR including surface water levels, groundwater levels, and current velocities which will increase with sediment erosion and deposition, which will also change. The project's position in the landscape was also considered relative to other infrastructure. The closest surface water to the project site is the adjacent Piscataqua River, projections of RSLR of which have already been depicted and discussed.

Highest Observable Tide Line (HOTL) associated with the project site is located at approximately elevation 9. Considering a 2.9-foot RSLR in the year 2100 resulting in an elevation of 11.9, and the pier proposed at elevation 14, the proposed docking structure will function as intended throughout the systems expected useful life.

4.1 – RSLR AND COASTAL STORMS

Due to the project site location being immediately adjacent to the Piscataqua River, it is anticipated that RSLR and storm surge on the proposed project site will be comparable to adjacent properties with similar docking structures. Considering the high-risk tolerance of this project, it is not anticipated that this project has a significant level of vulnerability to RSLR and coastal storms given the standard to which modern tidal docks are constructed.

4.2 – OTHER FACTORS

Other factors such as surface water levels, groundwater levels, wind and current velocities have been considered. Considering the high-risk tolerance of this project, it is not anticipated that this project has a significant level of vulnerability to groundwater levels, wind and current velocities given the standard to which modern tidal docks are constructed.

5.1 – PROJECTED RSL-INDUCED GROUNDWATER RISE

Projected groundwater rise will likely rise with projected RSLR on the project site, however given that the project provides a structure that has a water dependent use, groundwater rise will not be a strong consideration.

6.1 – BEST AVAILABLE PRECIPITATION ESTIMATES

Please see the attached Extreme Precipitation Tables from the Northeast Regional Climate Center.

7.1 – CUMULATIVE COASTAL FLOOD RISK TO THE PROJECT

Based on the high risk tolerance of this project combined with all other factors including RSLR, coastal storms, RSLR-induced groundwater rise, extreme precipitation and/or freshwater flooding occurring together; this project is not considered to be at high risk from coastal flooding.

7.2 – POSSIBLE ACTIONS TO MITIGATE COASTAL FLOOD RISK

Given the high-risk tolerance of the proposed project, it is not anticipated that it is necessary to mitigate for coastal flood risk beyond what has already been incorporated into the design plan for the docking structure. The projected SLR scenario through 2100 is 2.9' (See profile view on Sheet D1), and the proposed docking structure has been designed to account for this projection.

Extreme Precipitation Tables

Northeast Regional Climate Center

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

Smoothing	Yes
State	
Location	
Longitude	70.745 degrees West
Latitude	43.071 degrees North
Elevation	0 feet
Date/Time	Tue, 21 Jan 2020 12:37:30 -0500

Precipitation estimates multiplied by 1.15 are listed below:

1-yr: 3.06
2-yr: 3.69
10-yr: 5.59
50-yr: 8.49

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.04	**1yr**	0.70	0.98	1.21	1.56	2.03	2.66	2.92	**1yr**	2.35	2.81	3.22	3.94	4.55	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.52	1.94	2.49	3.21	3.57	**2yr**	2.84	3.43	3.94	4.68	5.33	**2yr**
5yr	0.37	0.58	0.73	0.98	1.25	1.61	**5yr**	1.08	1.47	1.89	2.43	3.14	4.07	4.58	**5yr**	3.60	4.40	5.04	5.94	6.70	**5yr**
10yr	0.41	0.65	0.82	1.12	1.45	1.89	**10yr**	1.25	1.73	2.23	2.90	3.75	4.86	5.53	**10yr**	4.30	5.32	6.09	7.11	7.98	**10yr**
25yr	0.48	0.76	0.97	1.34	1.78	2.34	**25yr**	1.54	2.15	2.78	3.64	4.74	6.17	7.10	**25yr**	5.46	6.83	7.81	9.02	10.05	**25yr**
50yr	0.54	0.86	1.10	1.54	2.08	2.77	**50yr**	1.79	2.53	3.30	4.33	5.67	7.38	8.58	**50yr**	6.54	8.25	9.43	10.81	11.97	**50yr**
100yr	0.60	0.97	1.25	1.78	2.43	3.27	**100yr**	2.09	2.99	3.92	5.17	6.77	8.85	10.37	**100yr**	7.83	9.98	11.39	12.96	14.26	**100yr**
200yr	0.68	1.11	1.43	2.05	2.84	3.85	**200yr**	2.45	3.53	4.63	6.14	8.09	10.60	12.54	**200yr**	9.38	12.06	13.76	15.54	17.00	**200yr**
500yr	0.80	1.32	1.72	2.50	3.50	4.79	**500yr**	3.02	4.40	5.79	7.72	10.23	13.47	16.13	**500yr**	11.92	15.51	17.68	19.77	21.47	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	**1yr**	0.62	0.86	0.93	1.33	1.69	2.25	2.48	**1yr**	1.99	2.38	2.87	3.20	3.91	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.37	1.82	2.33	3.06	3.45	**2yr**	2.71	3.32	3.82	4.55	5.09	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.11	2.73	3.78	4.18	**5yr**	3.35	4.02	4.72	5.53	6.23	**5yr**
10yr	0.39	0.59	0.73	1.03	1.33	1.60	**10yr**	1.14	1.56	1.80	2.38	3.05	4.36	4.85	**10yr**	3.86	4.66	5.43	6.40	7.18	**10yr**
25yr	0.44	0.67	0.83	1.19	1.56	1.90	**25yr**	1.35	1.86	2.10	2.75	3.52	4.74	5.87	**25yr**	4.20	5.64	6.62	7.77	8.66	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.16	**50yr**	1.52	2.12	2.34	3.06	3.91	5.36	6.76	**50yr**	4.75	6.50	7.69	9.01	9.99	**50yr**
100yr	0.53	0.81	1.01	1.46	2.01	2.46	**100yr**	1.73	2.41	2.62	3.40	4.32	6.03	7.80	**100yr**	5.34	7.50	8.92	10.47	11.53	**100yr**
200yr	0.59	0.89	1.13	1.63	2.27	2.81	**200yr**	1.96	2.75	2.93	3.76	4.76	6.77	8.99	**200yr**	5.99	8.64	10.34	12.17	13.33	**200yr**
500yr	0.68	1.02	1.31	1.90	2.70	3.36	**500yr**	2.33	3.28	3.41	4.28	5.40	7.89	10.84	**500yr**	6.99	10.43	12.56	14.89	16.15	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.29	0.44	0.54	0.72	0.89	1.09	**1yr**	0.77	1.06	1.26	1.74	2.20	2.97	3.17	**1yr**	2.63	3.05	3.58	4.37	5.04	**1yr**
2yr	0.34	0.52	0.64	0.87	1.07	1.27	**2yr**	0.92	1.24	1.48	1.96	2.52	3.42	3.71	**2yr**	3.03	3.57	4.10	4.84	5.62	**2yr**
5yr	0.40	0.62	0.77	1.05	1.34	1.62	**5yr**	1.15	1.59	1.89	2.54	3.26	4.34	4.97	**5yr**	3.84	4.78	5.38	6.39	7.17	**5yr**
10yr	0.47	0.72	0.89	1.25	1.61	1.98	**10yr**	1.39	1.94	2.29	3.11	3.97	5.34	6.22	**10yr**	4.72	5.98	6.84	7.86	8.77	**10yr**
25yr	0.58	0.88	1.09	1.56	2.05	2.58	**25yr**	1.77	2.52	2.96	4.08	5.17	7.74	8.37	**25yr**	6.85	8.05	9.20	10.36	11.43	**25yr**
50yr	0.67	1.03	1.28	1.84	2.47	3.14	**50yr**	2.13	3.07	3.61	5.02	6.35	9.69	10.50	**50yr**	8.57	10.10	11.51	12.76	13.99	**50yr**
100yr	0.79	1.20	1.50	2.17	2.98	3.83	**100yr**	2.57	3.74	4.39	6.18	7.81	12.11	13.17	**100yr**	10.72	12.66	14.41	15.74	17.13	**100yr**
200yr	0.93	1.40	1.77	2.57	3.58	4.68	**200yr**	3.09	4.57	5.36	7.61	9.61	15.19	16.53	**200yr**	13.44	15.89	18.08	19.41	20.97	**200yr**
500yr	1.16	1.72	2.21	3.21	4.57	6.07	**500yr**	3.94	5.94	6.96	10.07	12.67	20.50	22.33	**500yr**	18.14	21.48	24.39	25.60	27.40	**500yr**

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HALEY WARD
ENGINEERING | ENVIRONMENTAL | SURVEYING

WETLAND FUNCTIONS AND VALUES ASSESSMENT

For Jenny L. Lang
Map L, Lot 95-1L | 15 Landing Way, Dover, NH

Applicant:
Jenny L. Lang
15 Landing Way, Dover, NH

August 7, 2024
JN: 5010180.3402.25

Prepared By:
Haley Ward, Inc.
200 Griffin Rd., Unit 14 | Portsmouth, New Hampshire 03801

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One Merchants Plaza
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Bangor, ME 04401
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F: 207.989.4881

HALEYWARD.COM

TABLE OF CONTENTS

INTRODUCTION 1
METHODS 1
DATA COLLECTION 1
WETLAND FUNCTIONS AND VALUES ASSESSMENT 1
RESULTS 1
PROPOSED IMPACTS 4
SUMMARY AND CONCLUSIONS 4

APPENDICES

Appendix A Wetland Function-Value Evaluation Form
Appendix B Photo Log
Appendix C NH Natural Heritage Bureau Letter

INTRODUCTION

The applicant is proposing a tidal docking structure installation at 15 Landing Way, Dover, NH 03820. The project site is identified as Dover Tax Map L, Lot 95-1L and is approximately .70 acres in size. As currently designed, the proposed project would require impacts to tidal wetlands and the 100' previously developed Tidal Buffer Zone (TBZ).

The purpose of this report is to present the existing functions and values of the tidal wetlands and to assess any impacts the proposed project may have on their ability to continue to perform these functions and values. The tidal wetlands being impacted were assessed with consideration to their association with the Piscataqua River and the larger marine ecosystem and was not limited to the tidal wetlands immediately on-site.

METHODS

Data Collection

The tidal wetlands associated with this project area were identified and characterized through field surveys and review of existing information. Haley Ward Inc. (HW) conducted site visits in September 2023 to characterize the tidal wetlands and collect the necessary information to complete a functions and values assessment. In addition, HW contacted the New Hampshire Natural Heritage Bureau (NHB) regarding existing information of documented rare species or natural communities within the vicinity of the project site.

Wetland Functions and Values Assessment

HW assessed the ability of the tidal wetlands to provide certain functions and values and analyzed the potential effects the proposed project may have on their ability to continue to provide those functions and values. Wetland functions and values were assessed using the *Highway Methodology Workbook, Wetland Functions and Values: A Descriptive Approach*. This method bases function and value determinations on the presence or absence of specific criteria for each of the 13 wetland functions and values (see definitions below). These criteria are assessed through direct field observations and a review of existing resource maps and databases. As part of the evaluation, the most important functions and values associated with the on-site wetlands are identified. In addition, the ecological integrity of the wetlands is evaluated based on the existing levels of disturbance and the overall significance of the wetlands within the local watershed.

RESULTS

° **Groundwater Interchange (Recharge/Discharge)**
This function considers the potential for the project area wetlands to serve as groundwater recharge and/or discharge areas. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance of either.

Because there is no identified sand and gravel aquifer underlying the project area, and the wetlands are not underlain by sands or gravel, it is unlikely that significant groundwater recharge is occurring within the tidal wetlands.

° **Floodwater Alteration (Storage and Desynchronization)**
This function considers the effectiveness of the wetlands in reducing flood damage by attenuating and gradually releasing floodwaters for prolonged periods following precipitation and snow melt events.

The tidal wetlands associated with the Piscataqua River receive floodwaters from the surrounding watershed and connected waterways; therefore, is considered a principal function considering the large size of the combined waterways.

° **Fish and Shellfish Habitat**
This function considers the effectiveness of seasonally or permanently flooded areas within the subject wetlands for their ability to provide fish and shellfish habitat.

The tidal wetland does provide fish and shellfish habitat, is associated with the Piscataqua River and the Atlantic Ocean; therefore, is considered a principal function.

° **Sediment/Toxicant Retention**
This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland to function as a trap for sediments, toxicants, or pathogens, and is generally related to factors such as the type of soils, the density of vegetation, and the position in the landscape.

The tidal wetland contains areas dense vegetation, specifically species of Spartina grasses, and sources of sediments or toxicants exist upstream of the wetland, therefore, this is considered a principal function.

° **Nutrient Removal/Retention/Transformation**
This wetland function relates to the effectiveness of the wetland to prevent or reduce the adverse effects of excess nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

The greater tidal wetland contains dense vegetation and a significant source of sediments or toxicants; therefore, is considered a principal function.

° **Production Export (Nutrient)**
This function relates to the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

Production export is a wetland function that typically occurs in the form of nutrient or biomass transport via watercourses, foraging by wildlife species, and removal of timber and other natural products. Because the greater tidal wetland provides fish and wildlife

habitat, commercial and recreational fisheries opportunities, and nutrients are transferred over several trophic levels in the marine ecosystem, this is a principal function.

° **Sediment/Shoreline Stabilization**
This function considers the effectiveness of a wetland to stabilize stream banks and shorelines against erosion, primarily through the presence of persistent, well-rooted vegetation.

Due to the tidal nature and wave action at this wetland; sediment/shoreline stabilization is considered a principal function.

° **Wildlife Habitat**
This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered.

The greater tidal wetland and the Piscataqua River provide a variety of coastal and marine habitats, therefore would be a principal function.

° **Recreation (Consumptive and Non-Consumptive)**
This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities.

The greater tidal wetland and the Piscataqua River provide a variety of consumptive and non-consumptive recreational opportunities including hunting, fishing and bird watching; therefore, would be considered a principal value.

° **Educational/Scientific Value**
This value considers the effectiveness of the wetland as a site for an "outdoor classroom" or as a location for scientific study or research.

The Piscataqua River and the associated tidal wetlands are part of a larger marine ecosystem with multiple areas of public access making this a principal value.

° **Uniqueness/Heritage**
This value relates to the effectiveness of the wetland or its associated water bodies to provide certain special values such as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.

The Piscataqua River and the associated tidal wetlands are unique to the seacoast area. Additionally, there are pre and post-colonial historical components associated with the Piscataqua river and the surrounding areas making this a principal value.

° **Visual Quality/Aesthetics**
This value relates to the visual and aesthetic qualities of the wetland.

The Piscataqua River aesthetically pleasing views that are viewable from surrounding uplands as well as from the water, making this a principal value.

° **Endangered Species Habitat**
This value considers the suitability of the wetland to support threatened or endangered species.

An online inquiry with the NHB identified records of Atlantic and short-nosed sturgeon in proximity to the proposed project area. Haley Ward will coordinate with NHF&G and will forward correspondence to NH DES upon receipt.

PROPOSED IMPACTS

This report is accompanying a New Hampshire Department of Environmental Services (NHDES) Major Impact Wetland Permit Application request to permit 900 sq. ft. of permanent impact to tidal wetland, and 96 sq. ft. of permanent impact to the previously developed 100' Tidal Buffer Zone for the construction of a tidal dock on the subject parcel.

SUMMARY AND CONCLUSIONS

The jurisdictional tidal wetland is part of a large marine system and provides eleven principal functions and values when evaluated as a whole. These functions and values include: floodflow alteration, fish and shellfish habitat, production export, sediment/shoreline stabilization, nutrient removal/retention, sediment/toxicant retention, wildlife habitat, recreation, education/scientific value, uniqueness/heritage, and visual quality aesthetics. While the entire marine system provides these principal functions and values, the proposed impacts associated with installation of a tidal dock will not have any effect on its ability to continue to provide them.

The proposed impacts have been minimized to the greatest extent practicable, while allowing reasonable use of the property. The project will not contribute to additional storm water or pollution. It is anticipated that there will be no effect on any fish or wildlife species that currently use the site for food, cover, and/or habitat. The project will not impede tidal flow or alter hydrology, it will not deter use by wildlife species that currently use the wetland area, and it will not impede any migrational fish movement.

Based on our assessment of the current functions and values, the proposed tidal docking design & placement; it is our belief that the proposed project will have no significant impact on the tidal wetlands or greater marine systems ability to continue to provide their current functions and values.

APPENDIX A

WETLAND FUNCTION - VALUE EVALUATION FORM

Wetland Function – Value Evaluation Form

Wetland Description: Wetland A is a tidal wetland associated with the Piscataqua River.	**File number**: 3402.25	
	Wetland identifier: Wetland A	
	Latitude:X:1206187.97	Longitude:Y:236738
	Preparer(s): Haley Ward, Inc.	
	200 Griffin Road	
	Date: September 29, 2023	

Function/Value	Capability Y	Capability N	Summary	Principal Yes/No
Groundwater Recharge/Discharge		X	This wetland does not possess the characteristics needed to provide this function as there are no identified underlying sand or gravel aquifers.	N
Floodwater Alteration	X		The tidal wetland and the Piscataqua River do receive floodwater from the surrounding watershed and connected waterways; therefore, this would be considered a principal function.	Y
Fish and Shellfish Habitat	X		The tidal wetland and the Piscataqua River are part of a larger coastal marine system and provide both fish and shellfish habitat. This is considered a Principal Function.	Y
Sediment/Toxicant Retention	X		The immediate tidal wetland contains dense vegetation and a source of sediments and toxicants, therefore a principal function.	Y
Nutrient Removal	X		The immediate tidal wetland contains dense vegetation and a source of nutrients, therefore a principal function.	Y
Production Export	X		Because the tidal wetland provides fish and wildlife habitat, commercial and recreational fishing opportunities, and nutrients are transferred over several trophic levels in the marine ecosystem, this is considered a principal function.	Y
Sediment/Shoreline Stabilization	X		Due to the tidal nature and wave action of this wetland; sediment/shoreline stabilization is considered a principal function.	Y
Wildlife Habitat	X		The greater tidal wetland and the Piscataqua River provides a variety of coastal and marine habitat, therefore would be considered a principal function.	Y
Recreation	X		The adjacent tidal wetland provides a variety of consumptive and non-consumptive recreational opportunities including hunting, fishing and bird watching; therefore, would be considered a principal value.	Y
Education/Scientific Value	X		The tidal wetland and the Piscataqua River are part of a larger marine ecosystem with multiple areas of public access making this a principal value.	Y
Uniqueness/Heritage	X		The tidal wetland and the Piscataqua River are unique to the seacoast area. Additionally, there are pre and post-colonial historical components associated with the Piscataqua River and the surrounding areas making this a principal value.	Y
Visual Quality/Aesthetics	X		The Piscataqua River provides aesthetically pleasing coastal views that are seeable from surrounding uplands as well as from the water, making this a principal function.	Y
ES Endangered Species Habitat		X	An online inquiry with the NH Natural Heritage Bureau resulted in the occurrences of a sensitive species near the project area. Further consultation ongoing.	Y
Other				

APPENDIX B

PHOTO LOG

15 Landing Way
Dover, NH

Photo No. 1 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing northeasterly toward docking structure on Map L, 95-1P. **Photo By:** SDR	

Photo No. 2 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing easterly toward proposed tidal dock location. **Photo By:** SDR	

Photo No. 3 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing southeasterly toward docking structure on Map L, Lot 95-1M. **Photo By:** SDR	

Photo No. 4 **Photo Date: 9/29/23** **Site Location:** 15 Landing Way, Dover, NH **Description:** Facing easterly toward proposed tidal dock location. **Photo By:** SDR	

Photo No. 5	
Photo Date: 9/29/23	
Site Location: 15 Landing Way, Dover, NH	
Description: Facing northeasterly toward docking structure on Map L, 95-1P.	
Photo By: SDR	

APPENDIX C

NEW HAMPSHIRE NATURAL HERITAGE BUREAU CORRESPONDENCE

NHB DataCheck Results Letter
NH Natural Heritage Bureau
Please note: maps and NHB record pages are **confidential** and shall be redacted from public documents.

To: John Chagnon, Ambit Engineering, Inc.
200 Griffin Road Unit 3
Portsmouth, NH 03801
jrc@ambitengineering.com

From: NHB Review
NH Natural Heritage Bureau
Main Contact: Ashley Litwinenko - nhbreview@dncr.nh.gov

cc: NHFG Review, David Simmons

Date: 06/25/2024 (valid until 06/25/2025)
Re: DataCheck Review by NH Natural Heritage Bureau and NH Fish & Game
Permits: NHDES - Standard Dredge & Fill - Major, USACE - General Permit

NHB ID: NHB24-1881

Town: Dover
Location: 15 Landing Way

Project Description: The project proposes the installation of a tidal docking structure consisting of a 4' x 24' accessway, a 4' x 120' fixed pier, a 3' x 40' gangway and a 10' x 30' float to provide recreational boating access on the Cocheco River.

Next Steps for Applicant:

NHB's database has been searched for records of rare species and exemplary natural communities. Please carefully read the comments and consultation requirements below.

NHB Comments: No comments at this time.

NHFG Comments: Please refer to NHFG consultation requirements below.

NHB Consultation

If this NHB DataCheck letter includes records of rare plants and/or natural communities/systems, please contact NHB and provide any requested supplementary materials by emailing nhbreview@dncr.nh.gov.

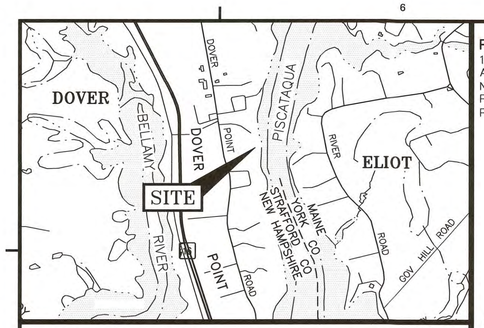
If this NHB DataCheck letter DOES NOT include any records of rare plants and/or natural communities/systems, no further consultation with NHB is required.

NH Fish and Game Department Consultation

If this NHB DataCheck letter DOES NOT include ANY wildlife species records, then, based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

If this NHB DataCheck letter includes a record for a threatened (T) or endangered (E) wildlife species, consultation with the New Hampshire Fish and Game Department under Fis 1004 may be required. To review the Fis 1000 rules (effective February 3, 2022), please go to https://www.wildlife.nh.gov/wildlife-and-habitat/nongame-and-endangered-species/environmental-review. All requests for consultation and submittals should be sent via email to NHFGreview@wildlife.nh.gov or can be sent by mail, and **must include the NHB DataCheck results letter number and "Fis 1004 consultation request" in the subject line**.

If the NHB DataCheck response letter does not include a threatened or endangered wildlife species but includes other wildlife species (e.g., Species of Special Concern), consultation under Fis 1004 is not required; however, some species are protected under other state laws or rules, so coordination with NH Fish & Game is highly recommended or may be required for certain permits. While some permitting processes are exempt from required consultation under Fis 1004 (e.g., *statutory permit by notification, permit by rule, permit by notification, routine roadway registration, docking structure registration, or conditional authorization by rule*), coordination with NH Fish & Game may still be required under the rules governing those specific permitting processes, and it is recommended you contact the applicable permitting agency. For projects not requiring consultation under Fis 1004, but where additional coordination with NH Fish and Game is requested, please email NHFGreview@wildlife.nh.gov, and include the NHB DataCheck results letter number and "review request" in the email subject line.
Contact NH Fish & Game at (603) 271-0467 with questions.



LOCATION MAP SCALE: 1" = 2000'

PLAN REFERENCE:

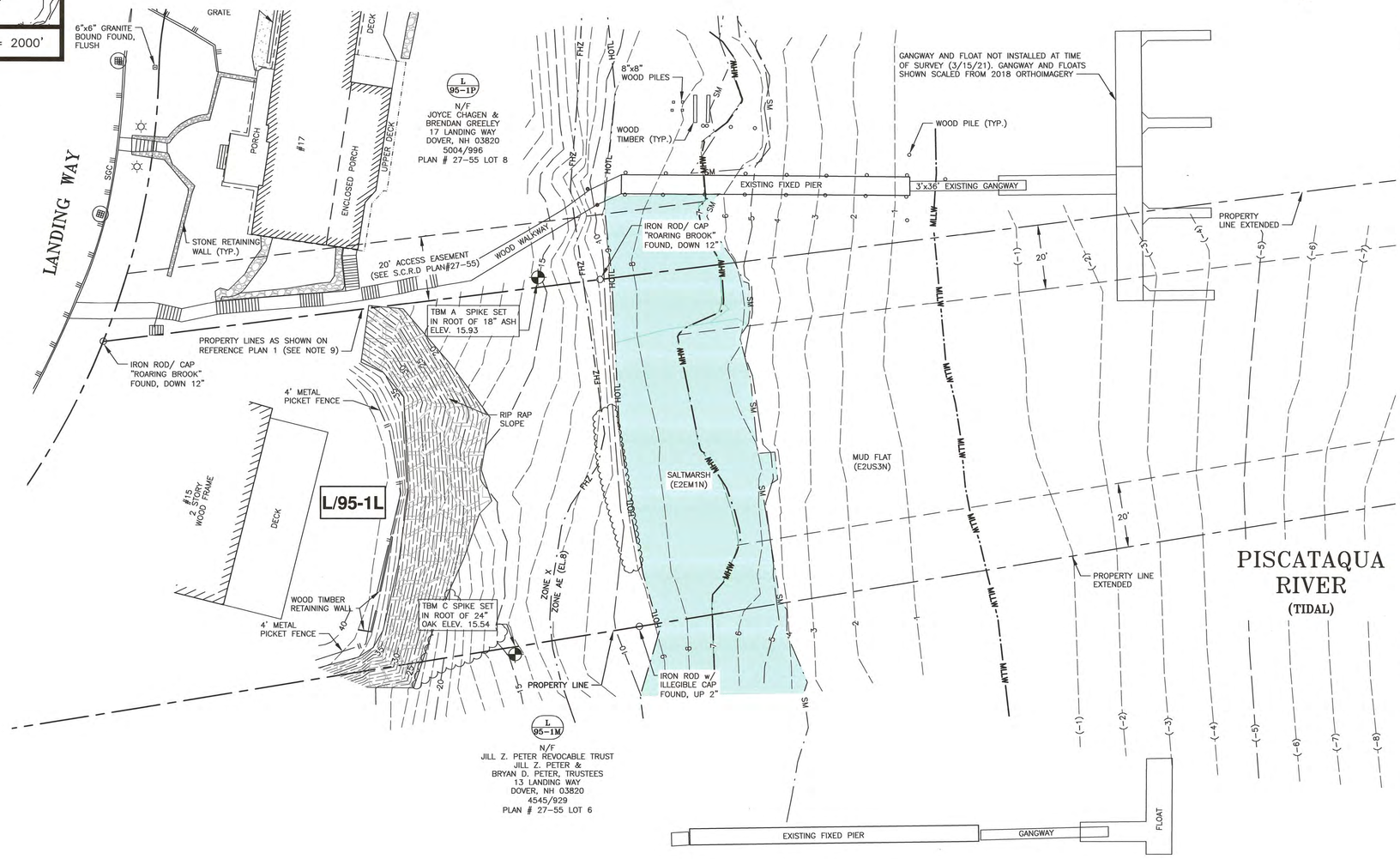
1) PLAN OF LOTS RIVER KNOLL ESTATES, FOR MATT R. AND HELEN WILLIAMS, JR., DOVER POINT ROAD, DOVER, NEW HAMPSHIRE, SCALE 1" = 50', DATED 5/10/85, PREPARED BY ROARING BROOK CONSULTANTS, SCRD PLAN# 27-55

ADDITIONAL ABUTTERS
(ACROSS LANDING WAY)

L 95-1H
N/F
LAURA D. DEVINE & QUINCY P. DEVINE
10 LANDING WAY
DOVER, NH 03820
4772/783
PLAN # 27-55 LOT 12

L 95-1C
N/F
TODD A. QUINTERO
12 LANDING WAY
DOVER, NH 03820
3948/949
PLAN # 27-55 LOT 11

NORTH NAD83(2011)
N
GRID NHSPC



LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
SCRD	STRAFFORD COUNTY REGISTRY OF DEEDS
11/21	MAP 11 / LOT 21
	RAILROAD SPIKE FOUND
	IRON ROD/IRON PIPE FOUND
	IRON PIPE FOUND
	STONE/CONCRETE BOUND FOUND
	RAILROAD SPIKE SET
	IRON ROD SET
	DRILL HOLE SET
	GRANITE BOUND SET
	BOUNDARY
	BUILDING SETBACK
MHW	MEAN HIGH WATER LINE
MLLW	MEAN LOWER LOW WATER LINE
HOTL	NH DES HIGHEST OBSERVABLE TIDE LINE
	FRESHWATER WETLAND LINE
WB	WETLAND BUFFER LINE
	OVERHEAD ELECTRIC/WIRES
100	CONTOUR
97x3	SPOT ELEVATION
	EDGE OF PAVEMENT (EP)
E	ELECTRIC METER
T	TELEPHONE PEDESTAL
E	ELECTRIC PEDESTAL
	LIGHT POLE
EL.	ELEVATION
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
INV.	INVERT
TBM	TEMPORARY BENCHMARK
TYP.	TYPICAL
LSA	LANDSCAPED AREA
SGC	SLOPED GRANITE CURB

WETLAND NOTES:

1) HIGHEST OBSERVABLE TIDE LINE DELINEATED BY STEVEN D. RIKER, CWS ON 9/29/23 IN ACCORDANCE WITH THE FOLLOWING STANDARDS:
   - A) U.S. ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. TECHNICAL REPORT Y-87-1 (JAN. 1987). AND REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012.
   - B) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2, USDA-NRCS, 2018 AND (FOR DISTURBED SITES) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4. NEIWPCC WETLANDS WORK GROUP (2019).
   - C) NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: NORTHEAST (REGION 1). USFWS (MAY 1988).
   - D) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. USFW MANUAL FWS/OBS-79/31 (1997).
   - E) "IDENTIFICATION AND DOCUMENTATION OF VERNAL POOLS IN NEW HAMPSHIRE" (1997). NEW HAMPSHIRE FISH AND GAME DEPARTMENT.

2) WETLAND FLAGS WERE FIELD LOCATED BY AMBIT ENGINEERING, INC.

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

JOHN R. CHAGNON, LLS — DATE 10.27.23

GRAPHIC SCALE
10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

STATE OF NEW HAMPSHIRE STEVEN D. RIKER 10/30/23 No. 219 CERTIFIED WETLAND SCIENTIST

RIVERSIDE & PICKERING MARINE CONTRACTORS

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF DOVER ASSESSOR'S MAP L AS LOT 95-1L.

2) OWNERS OF RECORD:
JENNY L. LANG
15 LANDING WAY
DOVER. NH 03820
3648/120
SCRD PLAN #27-55 LOT 7

3) PARCEL IS PARTIALLY IN A SPECIAL FLOOD HAZARD AREA ZONE AE (EL.8) AS SHOWN ON FIRM PANEL 33017C0340E. EFFECTIVE DATE SEPTEMBER 30, 2015.

4) EXISTING LOT AREA:
30,400 S.F. ± (PER PLAN REFERENCE 1)
0.70 ACRES ± (PER PLAN REFERENCE 1)

5) PARCEL IS LOCATED IN LOW DENSITY RESIDENTIAL (R-20) ZONING DISTRICT AND RIVERFRONT RESIDENTIAL OVERLAY DISTRICT.

6) DIMENSIONAL REQUIREMENTS:

LOW DENSITY RESIDENTIAL (R-20)		
MIN. LOT AREA:		20,000 S.F.
FRONTAGE:		125 FEET
SETBACKS:	FRONT	20' MIN/35'MAX
	SIDE	20 FEET
	REAR	30 FEET
MAXIMUM STRUCTURE HEIGHT:		35 FEET
MAXIMUM LOT COVERAGE:		30%

RIVERFRONT RESIDENTIAL OVERLAY DISTRICT	
MIN. LOT AREA:	3 TIMES THE MINIMUM REQUIRED IN THE UNDERLYING ZONE.
MIN. SHORE FRONTAGE:	150 FT. FOR LOTS SERVICED BY SEPTIC. 100 FT. FOR LOTS SERVICES BY MUNICIPAL SEWER.

7) THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITION ON A PORTION OF ASSESSOR'S MAP L LOT 95-1L IN THE CITY OF DOVER.

8) VERTICAL DATUM IS MEAN LOWER LOW WATER (MLLW). MLLW REFERENCED ON NOAA STATION 8423005 ATLANTIC TERMINALS T14A PORTSMOUTH, MLLW BEING 3.99 FEET LOWER THAN ELEVATION 0.0 NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS.

9) BOUNDARY LINES SHOWN HEREON ARE BASED SOLELY ON PLAN REFERENCE 1. EASEMENTS, RIGHTS OF OTHRS ETC., HAVE NOT BEEN RESEARCHED OR NOTED HEREON.

No.	DATE	DESCRIPTION	BY	CHK.
0	2023.10.27	ISSUED FOR COMMENT	CSA	JRC

DRAWING ISSUE STATUS
NOT FOR CONSTRUCTION

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.430.9282
WWW.HALEYWARD.COM

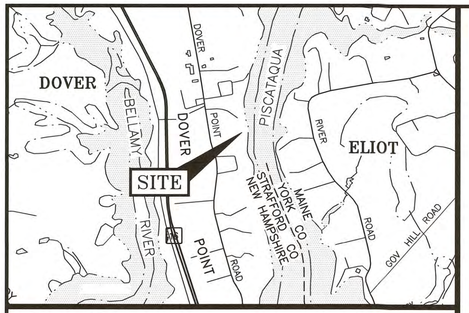
PROJECT
LANG RESIDENCE
15 LANDING WAY DOVER, NEW HAMPSHIRE 03820

TITLE
EXISTING CONDITIONS PLAN

STATE OF NEW HAMPSHIRE JOHN R. CHAGNON No. 738 LICENSED LAND SURVEYOR SIGNATURE

DATE	SCALE
OCTOBER 2023	1" = 20'
DRAWN BY: CSA	DESIGNED BY: ---	CHECKED BY: JRC
PROJECT No.	5010180.3402.25 FB 381 PG 30
DRAWING No.	REV.
SHEET 1	C1

P:\NH\5010180.Riverside_&_Pickering\3402.25 Landing Way (Lang)-SDR\3402.25 Lang 15 Landing Way, Dover, NH\Plans & Specs\Site\3402.25 Survey 2022.dwg, C1 EXISTING CONDITIONS, 10/30/2023 6:14:31 AM



LOCATION MAP SCALE: 1" = 2000'

LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
SCRD	STRAFFORD COUNTY REGISTRY OF DEEDS
11/21	MAP 11 / LOT 21
	RAILROAD SPIKE FOUND
	IRON ROD/IRON PIPE FOUND
	IRON PIPE FOUND
	STONE/CONCRETE BOUND FOUND
	RAILROAD SPIKE SET
	IRON ROD SET
	DRILL HOLE SET
	GRANITE BOUND SET
	BOUNDARY
	BUILDING SETBACK
MHW	MEAN HIGH WATER LINE
MLLW	MEAN LOWER LOW WATER LINE
HOTL	NH DES HIGHEST OBSERVABLE TIDE LINE
	FRESHWATER WETLAND LINE
WB	WETLAND BUFFER LINE
	OVERHEAD ELECTRIC/WIRES
100	CONTOUR
97x3	SPOT ELEVATION
	EDGE OF PAVEMENT (EP)
E	ELECTRIC METER
T	TELEPHONE PEDESTAL
E	ELECTRIC PEDESTAL
	LIGHT POLE
EL.	ELEVATION
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
INV.	INVERT
TBM	TEMPORARY BENCHMARK
TYP.	TYPICAL
LSA	LANDSCAPED AREA
SGC	SLOPED GRANITE CURB

WETLAND NOTES:

1) HIGHEST OBSERVABLE TIDE LINE DELINEATED BY STEVEN D. RIKER, CWS ON 9/29/23 IN ACCORDANCE WITH THE FOLLOWING STANDARDS:

A) U.S. ARMY CORPS OF ENGINEERS WETLANDS DELINEATION MANUAL. TECHNICAL REPORT Y-87-1 (JAN. 1987). AND REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, VERSION 2.0, JANUARY 2012.

B) FIELD INDICATORS OF HYDRIC SOILS IN THE UNITED STATES, VERSION 8.2, USDA-NRCS, 2018 AND (FOR DISTURBED SITES) FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND, VERSION 4. NEIWPCC WETLANDS WORK GROUP (2019).

C) NATIONAL LIST OF PLANT SPECIES THAT OCCUR IN WETLANDS: NORTHEAST (REGION 1). USFWS (MAY 1988).

D) CLASSIFICATION OF WETLANDS AND DEEPWATER HABITATS OF THE UNITED STATES. USFW MANUAL FWS/OBS-79/31 (1997).

E) "IDENTIFICATION AND DOCUMENTATION OF VERNAL POOLS IN NEW HAMPSHIRE" (1997). NEW HAMPSHIRE FISH AND GAME DEPARTMENT.

2) WETLAND FLAGS WERE FIELD LOCATED BY AMBIT ENGINEERING, INC.

STATE OF NEW HAMPSHIRE STEVEN D. RIKER No. 219 CERTIFIED WETLAND SCIENTIST

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

7.17.24

JOHN R. CHAGNON, LLS — DATE

STATE OF NEW HAMPSHIRE No. 738 JOHN R. CHAGNON LICENSED LAND SURVEYOR SIGNATURE

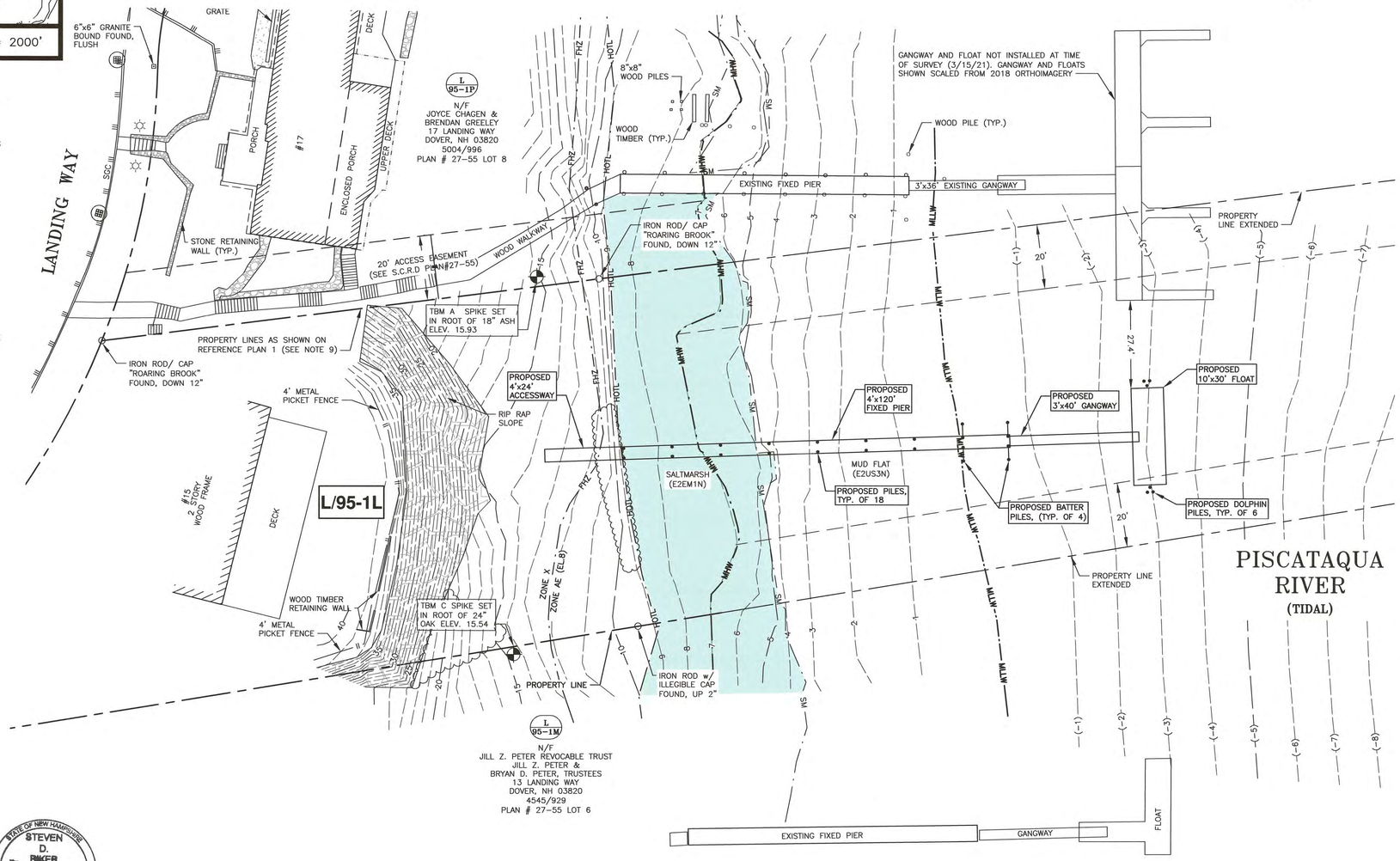
ADDITIONAL ABUTTERS
(ACROSS LANDING WAY)

L 95-1H
N/F
LAURA D. DEVINE & QUINCY P. DEVINE
10 LANDING WAY
DOVER, NH 03820
4772/783
PLAN # 27-55 LOT 12

L 95-1C
N/F
TODD A. QUINTERO
12 LANDING WAY
DOVER, NH 03820
3948/949
PLAN # 27-55 LOT 11

L 95-1P
N/F
JOYCE CHAGEN & BRENDAN GREELEY
17 LANDING WAY
DOVER, NH 03820
5004/996
PLAN # 27-55 LOT 8

L 95-1M
N/F
JILL Z. PETER REVOCABLE TRUST
JILL Z. PETER & BRYAN D. PETER, TRUSTEES
13 LANDING WAY
DOVER, NH 03820
4545/929
PLAN # 27-55 LOT 6



GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

RIVERSIDE & PICKERING MARINE CONTRACTORS

NOTES:

1) PARCEL IS SHOWN ON THE CITY OF DOVER ASSESSOR'S MAP L AS LOT 95-1L.

2) OWNERS OF RECORD:
JENNY L. LANG
15 LANDING WAY
DOVER, NH 03820
3648/120
SCRD PLAN #27-55 LOT 7

3) PARCEL IS PARTIALLY IN A SPECIAL FLOOD HAZARD AREA ZONE AE (EL.8) AS SHOWN ON FIRM PANEL 33017C0340E. EFFECTIVE DATE SEPTEMBER 30, 2015.

4) EXISTING LOT AREA:
30,400 S.F. ± (PER PLAN REFERENCE 1)
0.70 ACRES ± (PER PLAN REFERENCE 1)

5) PARCEL IS LOCATED IN LOW DENSITY RESIDENTIAL (R-20) ZONING DISTRICT AND RIVERFRONT RESIDENTIAL OVERLAY DISTRICT.

6) DIMENSIONAL REQUIREMENTS:

LOW DENSITY RESIDENTIAL (R-20)		
MIN. LOT AREA:		20,000 S.F.
FRONTAGE:		125 FEET
SETBACKS:	FRONT	20' MIN/35'MAX
	SIDE	20 FEET
	REAR	30 FEET
MAXIMUM STRUCTURE HEIGHT:		35 FEET
MAXIMUM LOT COVERAGE:		30%

RIVERFRONT RESIDENTIAL OVERLAY DISTRICT	
MIN. LOT AREA:	3 TIMES THE MINIMUM REQUIRED IN THE UNDERLYING ZONE.
MIN. SHORE FRONTAGE:	150 FT. FOR LOTS SERVICED BY SEPTIC. 100 FT. FOR LOTS SERVICES BY MUNICIPAL SEWER.

7) THE PURPOSE OF THIS PLAN IS TO SHOW A PROPOSED DOCKING STRUCTURE ON A PORTION OF ASSESSOR'S MAP L LOT 95-1L IN THE CITY OF DOVER.

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9) BOUNDARY LINES SHOWN HEREON ARE BASED SOLELY ON PLAN REFERENCE 1. EASEMENTS, RIGHTS OF OTHRS ETC., HAVE NOT BEEN RESEARCHED OR NOTED HEREON.

No.	DATE	DESCRIPTION	BY	CHK.
0	2024/7/17	ISSUED FOR COMMENT	SJR	JRC

DRAWING ISSUE STATUS
PERMIT PLANS

HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
200 Griffin Rd. Unit 14
Portsmouth, New Hampshire 03801
603.430.9282
WWW.HALEYWARD.COM

PROJECT
LANG RESIDENCE
15 LANDING WAY DOVER, NEW HAMPSHIRE

TITLE
NHDES PERMIT PLAN

STATE OF NEW HAMPSHIRE JOHN R. CHAGNON No. 7851 LICENSED PROFESSIONAL ENGINEER

DATE	SCALE
APRIL 2024	1" = 20'

DRAWN BY	DESIGNED BY	CHECKED BY
SJR	---	JRC

PROJECT No. 5010180.3402.25 FB 381 PG 30

DRAWING No. SHEET 2 REV. C2

P:\NH\5010180-Riverside_&_Pickering\3402.25-Landing Way (Lang)-SDR\3402.25 Lang 15 Landing Way, Dover, NH\Plans & Specs\Site\3402.25 Survey 2022.dwg
7/17/2024 2:14:41 PM, \\SVRPSNH-FS01\Portsmouth Plotter Canon TX3000

SEQUENCE OF CONSTRUCTION

1) MOBILIZATION OF A CRANE BARGE, PUSH BOAT, WORK SKIFF, MATERIALS AND PREFABRICATED COMPONENTS SUCH AS THE GANGWAY AND FLOAT TO THE SITE VIA APPROVED ACCESS.
2) MOBILZATION OF EQUIPMENT TRUCKS TO THE SITE.
3) THE BARGE WILL BE POSITIONED ALONGSIDE THE PROPOSED LOCATION OF THE NEW DOCK AND WATERWARD OF ANY EMERGENT VEGETATION TO MINIMIZE IMPACTS
4) INSTALLATION OF THE SUB STRUCTURE WILL BE PERFORMED FROM A CRANE BARGE OR SKIFF TO REDUCE THE AMOUNT OF FOOT TRAFFIC IN THE INTERTIDAL AREA.
5) ALL WORK WILL BE PERFORMED AT LOW TIDE TO MINIMIZE SEDIMENTATION.
6) PILINGS WILL BE MECHANICALLY DRIVEN BY A CRANE ELIMINATING ANY EXCAVATION FOR INSTALLATION OF THE PILINGS. PILING ARE DRIVEN TO REFUSAL.
7) PILINGS ARE CUT AND BEAM CAPS ARE INSTALLED AND THE SUPER STRUCTURE OF THE PIER IS BUILT. MATERIALS ARE LIFTED FROM THE BARGE AND SET INTO POSITION BY THE CRANE.
8) ONCE THE PIER IS COMPLETE, THE GANGWAY AND FLOAT ARE BROUGHT INTO POSITION AND INSTALLED.

DISCHARGES, AVOIDANCE, MINIMIZATION AND MITIGATION

DISCHARGES OF DREDGED OR FILL MATERIAL INTO WATERS OF THE U.S. AND ANY SECONDARY IMPACTS SHALL BE AVOIDED AND MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE. PERMITTEES MAY ONLY FILL THOSE JURISDICTIONAL WETLANDS AND WATERWAYS THAT THE CORP AND NHDES AUTHORIZES TO BE FILLED AND IMPACT THOSE AREAS THAT THE CORPS AND AND NHDES AUTHORIZES AS SECONDARY IMPACTS. IF NOT SPECIFICALLY AUTHORIZED BY USACOE AND AND NHDES, ANY UNAUTHORIZED FILL OR SECONDARY IMPACT TO WETLANDS MAY BE CONSIDERED AS A VIOLATION OF THE CWA.

- UNLESS SPECIFICALLY AUTHORIZED USACOE AND AND NHDES, NO WORK SHALL DRAIN A WATER OF THE U.S. BY PROVIDING A CONDUIT FOR WATER ON OR BELOW THE SURFACE.

HEAVY EQUIPMENT IN FRESH WATER WETLANDS

HEAVY EQUIPMENT OTHER THAN FIXED EQUIPMENT (DRILL RIGS, FIXED CRANES, ETC.) WORKING IN WETLANDS SHALL NOT BE STORED, MAINTAINED OR REPAIRED IN WETLANDS, UNLESS IT IS LESS ENVIRONMENTALLY DAMAGING OTHERWISE, AND AS MUCH AS POSSIBLE SHALL NOT BE OPERATED WITHIN THE INTERTIDAL ZONE. WHERE CONSTRUCTION REQUIRES HEAVY EQUIPMENT OPERATION IN WETLANDS, THE EQUIPMENT SHALL EITHER HAVE LOW GROUND PRESSURE (<3 PSI), OR SHALL NOT BE LOCATED DIRECTLY ON WETLAND SOILS AND VEGETATION; IT SHALL BE PLACED ON SWAMP MATS THAT ARE ADEQUATE TO SUPPORT THE EQUIPMENT IN SUCH A WAY AS TO MINIMIZE DISTURBANCE OF WETLAND SOIL AND VEGETATION. SWAMP MATS ARE TO BE PLACED IN THE WETLAND FROM THE UPLAND OR FROM EQUIPMENT POSITIONED ON SWAMP MATS IF WORKING WITHIN A WETLAND. DRAGGING SWAMP MATS INTO POSITION IS PROHIBITED. OTHER SUPPORT STRUCTURES THAT ARE LESS IMPACTING AND ARE CAPABLE OF SAFELY SUPPORTING EQUIPMENT MAY BE USED WITH WRITTEN CORPS AND NHDES AUTHORIZATION. SIMILARLY, NOT USING MATS DURING FROZEN, DRY OR OTHER CONDITIONS MAY BE ALLOWED WITH WRITTEN CORPS AND NHDES AUTHORIZATION. AN ADEQUATE SUPPLY OF SPILL CONTAINMENT EQUIPMENT SHALL BE MAINTAINED ON SITE. CORDUROY ROADS AND SWAMP/CONSTRUCTION MATS ARE CONSIDERED AS FILL WHETHER THEY'RE INSTALLED TEMPORARILY OR PERMANENTLY.

TIME OF YEAR WORK WINDOW AND NOISE RESTRICTIONS

I. PILES INSTALLED IN-THE-DRY DURING LOW WATER OR IN-WATER BETWEEN NOV. 15TH – MARCH 15TH, OR
II. MUST BE DRILLED AND PINNED TO LEDGE, OR
III. VIBRATORY HAMMERS USED TO INSTALL ANY SIZE AND QUANTITY OF WOOD, CONCRETE OR STEEL PILES, OR
IV. IMPACT HAMMERS LIMITED TO ONE HAMMER AND <50 PILES INSTALLED/DAY WITH THE FOLLOWING: WOOD PILES OF ANY SIZE, CONCRETE PILES ≤18-INCHES DIAMETER, STEEL PILES 12-INCHES DIAMETER IF THE HAMMER IS ≤3000 LBS. AND A WOOD CUSHION IS USED BETWEEN THE HAMMER AND STEEL PILE.

FOR II-IV ABOVE:

I. IN-WATER NOISE LEVELS SHALL NOT >187dB SEL RE $I_\mu Pa$ OR 206dB PEAK RE $I_\mu Pa$ AT A DISTANCE >10M FROM THE PILE BEING INSTALLED, AND
II. IN-WATER NOISE LEVELS >155dB PEAK RE $I_\mu Pa$ SHALL NOT EXCEED 12 CONSECUTIVE HOURS ON ANY GIVEN DAY AND A 12 HOUR RECOVERY PERIOD (I.E., IN-WATER NOISE BELOW 155dB PEAK RE $I_\mu Pa$) MUST BE PROVIDED BETWEEN WORK DAYS.

WORK SITE RESTORATION

1. UPON COMPLETION OF CONSTRUCTION, ALL DISTURBED WETLAND AREAS SHALL BE PROPERLY STABILIZED. ANY SEED MIX SHALL CONTAIN ONLY PLANT SPECIES NATIVE TO NEW ENGLAND.
2. THE INTRODUCTION OR SPREAD OF INVASIVE PLANT SPECIES IN DISTURBED AREAS IS PROHIBITED.
3. IN AREAS OF AUTHORIZED TEMPORARY DISTURBANCE, IF TREES ARE CUT THEY SHALL BE CUT AT GROUND LEVEL AND NOT UPROOTED IN ORDER TO PREVENT DISRUPTION TO THE WETLAND SOIL STRUCTURE AND TO ALLOW STUMP SPROUTS TO REVEGETATE THE WORK AREA, UNLESS OTHERWISE AUTHORIZED.
4. WETLAND AREAS WHERE PERMANENT DISTURBANCE IS NOT AUTHORIZED SHALL BE RESTORED TO THEIR ORIGINAL CONDITION AND ELEVATION, WHICH UNDER NO CIRCUMSTANCES SHALL BE HIGHER THAN THE PRE-CONSTRUCTION ELEVATION. ORIGINAL CONDITION MEANS CAREFUL PROTECTION AND/OR REMOVAL OF EXISTING SOIL AND VEGETATION, AND REPLACEMENT BACK TO THE ORIGINAL LOCATION SUCH THAT THE ORIGINAL SOIL LAYERING AND VEGETATION SCHEMES ARE APPROXIMATELY THE SAME, UNLESS AUTHORIZED.

SEDIMENTATION AND EROSION CONTROL

ADEQUATE SEDIMENTATION AND EROSION CONTROL MANAGEMENT MEASURES, PRACTICES AND DEVICES, SUCH AS PHASED CONSTRUCTION, VEGETATED FILTER STRIPS, GEOTEXTILE SILT FENCES, STORMWATER DETENTION AND INFILTRATION SYSTEMS, SEDIMENT DETENTION BASINS, OR OTHER DEVICES SHALL BE INSTALLED AND PROPERLY MAINTAINED TO REDUCE EROSION AND RETAIN SEDIMENT ON-SITE DURING AND AFTER CONSTRUCTION. THEY SHALL BE CAPABLE OF PREVENTING EROSION, OF COLLECTING SEDIMENT, SUSPENDED AND FLOATING MATERIALS, AND OF FILTERING FINE SEDIMENT. THE DISTURBED AREAS SHALL BE STABILIZED AND THESE DEVICES SHALL BE REMOVED UPON COMPLETION OF WORK. THE SEDIMENT COLLECTED BY THESE DEVICES SHALL BE REMOVED AND PLACED AT AN UPLAND LOCATION, IN A MANNER THAT WILL PREVENT ITS LATER EROSION INTO A WATERWAY OR WETLAND. ALL EXPOSED SOIL AND OTHER FILLS SHALL BE PERMANENTLY STABILIZED AT THE EARLIEST PRACTICABLE DATE.

SPAWNING AREAS.

DISCHARGES OF DREDGED OR FILL MATERIAL, AND/OR SUSPENDED SEDIMENT PRODUCING ACTIVITIES IN FISH AND SHELLFISH SPAWNING OR NURSERY AREAS, OR AMPHIBIAN AND MIGRATORY BIRD BREEDING AREAS, DURING SPAWNING OR BREEDING SEASONS SHALL BE AVOIDED. IMPACTS TO THESE AREAS SHALL BE MINIMIZED TO THE MAXIMUM EXTENT PRACTICABLE DURING ALL TIMES OF THE YEAR. INFORMATION ON SPAWNING HABITAT FOR SPECIES MANAGED UNDER THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (I.E., EFH FOR SPAWNING ADULTS) CAN BE OBTAINED FROM THE NMFS WEBSITE AT: WWW.NERO.NOAA.GOV/HCD.

STORAGE OF SEASONAL STRUCTURES.

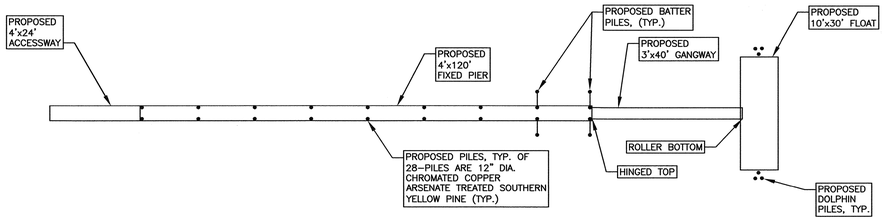
COASTAL STRUCTURES SUCH AS PIER SECTIONS, FLOATS, ETC., THAT ARE REMOVED FROM THE WATERWAY FOR A PORTION OF THE YEAR (OFTEN REFERRED TO AS SEASONAL STRUCTURES) SHALL BE STORED IN AN UPLAND LOCATION, LOCATED ABOVE HIGHEST OBSERVABLE TIDE LINE (HOTL) AND NOT IN TIDAL WETLANDS. THESE SEASONAL STRUCTURES MAY BE STORED ON THE FIXED, PILE-SUPPORTED PORTION OF THE STRUCTURE THAT IS SEAWARD OF HOTL. THIS IS INTENDED TO PREVENT STRUCTURES FROM BEING STORED ON THE MARSH SUBSTRATE AND THE SUBSTRATE SEAWARD OF MHW.

ENVIRONMENTAL FUNCTIONS AND VALUES

THE PERMITTEE SHALL MAKE EVERY REASONABLE EFFORT TO 1) CARRY OUT THE CONSTRUCTION OR OPERATION OF THE WORK AUTHORIZED BY USACOE AND NHDES HEREIN IN A MANNER THAT MINIMIZES ADVERSE IMPACTS ON FISH, WILDLIFE AND NATURAL ENVIRONMENTAL VALUES, AND 2) PROHIBIT THE ESTABLISHMENT OR SPREAD OF PLANT SPECIES IDENTIFIED AS NON-NATIVE INVASIVE SPECIES BY ANY FEDERAL OR STATE AGENCY. SEE THE SECTION ON INVASIVE SPECIES AT HTTP://WWW.NAE.USACE.ARMY.MIL/REGULATORY/ FOR CONTROL METHODS.

INSPECTIONS

THE PERMITTEE SHALL ALLOW THE CORPS AND NHDES TO MAKE PERIODIC INSPECTIONS AT ANY TIME DEEMED NECESSARY IN ORDER TO ENSURE THAT THE WORK IS BEING OR HAS BEEN PERFORMED IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF THIS PERMIT. THE CORPS AND NHDES MAY ALSO REQUIRE POST-CONSTRUCTION ENGINEERING DRAWINGS FOR COMPLETED WORK, AND POST-DREDGING SURVEY DRAWINGS FOR ANY DREDGING WORK.



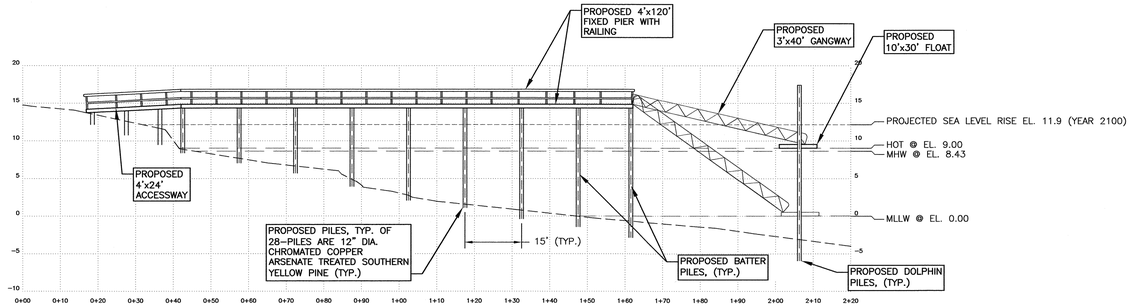
NORTH
NAD83(2011)
N
GRID
NHSPC

PROPOSED DOCK PLAN

SCALE: 1" = 20'

GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS



PROPOSED DOCK ELEVATION

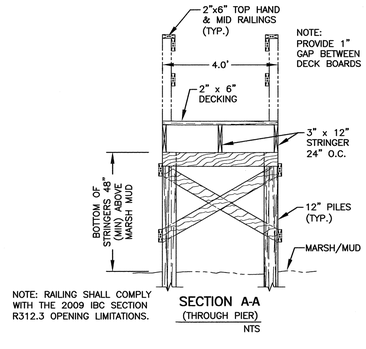
SCALE: VERTICAL-1" = 10' / HORIZONTAL-1" = 20'

PROPOSED PIER, GANGWAY & FLOAT

GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

SCALE: HORIZONTAL-1" = 20'



PROPOSED PIER DETAIL

NTS

RIVERSIDE & PICKERING MARINE CONTRACTORS

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.
2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.
3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "NEW HAMPSHIRE STORMWATER MANUAL, VOLUME 3, EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION. (NHDES DECEMBER 2008).
4) NUMBER OF PILES TO BE DRIVEN FOR DOCKING STRUCTURE NOT TO EXCEED 28 AS DEPICTED ON PROPOSED DOCK ELEVATION. ALSO NOTE TIME OF YEAR AND NOISE RESTRICTIONS FOR DRIVING OF PILES.

No.	DATE	DESCRIPTION	BY	CHK.
0	2024/7/17	ISSUED FOR COMMENT	SJR	JRC

DRAWING ISSUE STATUS

PERMIT PLANS

HALEYWARD
ENGINEERING | ENVIRONMENTAL | SURVEYING
WWW.HALEYWARD.COM
200 Griffin Rd. Unit 14
Portsmouth, New Hampshire 03801
603.430.9282

PROJECT

LANG RESIDENCE
15 LANDING WAY DOVER, NEW HAMPSHIRE

TITLE

DOCK DETAILS

STATE OF NEW HAMPSHIRE STEVEN D. PIKER No. 219 CERTIFIED WETLAND SCIENTIST

STATE OF NEW HAMPSHIRE JOHN R. CHANNON No. 7951 LICENSED PROFESSIONAL ENGINEER

DATE	SCALE
APRIL 2024	AS NOTED

DRAWN BY	DESIGNED BY	CHECKED BY
SJR	---	JRC

PROJECT No. 5010180.3402.25 FB 381 PG 30

DRAWING No. SHEET 3 REV. D1

P:\NHV\5010180 Riverside & Pickering\3402.25 Landing Way Lang\5DR\3402.25 Lang 15 Landing Way, Dover, NH\Plans & Specs\Sht\3402_25 Survey 2022.dwg, 7/17/2024 1:05:19 PM, \\SVR5\PSH-FS5\Portsmouth Plotter Center\7-2400

MEMORANDUM | NEW MEADOWS RAPID ECOLOGICAL ASSESSMENT

TO: Kyle Pimental, Strafford Regional Planning Commission
Jackson Kaspari, City of Dover
FROM: Sarah Large and Tim Kirsten, FB Environmental Associates
SUBJECT: **Dover Natural Resources Inventory – Supplemental Study**
DATE: August 19, 2024
CC: Forrest Bell & Kevin Ryan, FB Environmental Associates
Attachments: 1) Site Map; 2) Field Map; 3) Natural Community & Cover Type Map; 4) Site photographs

As part of the City of Dover's Natural Resources Inventory (NRI) developed by the Strafford Regional Planning Commission (SRPC), FB Environmental Associates (FBE) conducted a rapid ecological assessment of the New Meadows conservation easement. The Survey Area encompasses approximately 46 acres located off Knox Marsh Road and Lilac Lane adjacent to the Bellamy River (Attachment 1).

The purpose of this assessment was to provide a detailed, field-based examination of an area or resource of interest to supplement the NRI report. The Dover Conservation Commission selected the New Meadows property and conservation easement area since the City plans to formalize a proposed trail system for the property and connect it with the Dover Community Trail.

FBE conducted the field investigation on 7 June 2024, focusing on characterizing and photo-documenting existing natural communities, in addition to noting features specific to the site's character or environmental significance. Additionally, FBE geolocated the general path/route of the proposed trail system and the existing groundwater monitoring wells.

RAPID ECOLOGICAL ASSESSMENT METHODOLOGY

Prior to the field investigation, FBE reviewed baseline information regarding the site including current and historic aerial imagery, USGS topographic maps, National Hydrography Dataset (NHD) data, and National Wetland Inventory (NWI) data. These data were used to create an electronic map for use in the field.

A team of two field scientists conducted the field investigation using a systematic yet flexible meander approach, designed to traverse and document all the natural communities within the Survey Area. The Cowardin Classification system[1] was used to classify wetlands and watercourses, and the Natural Communities of New Hampshire[2] was used to classify the natural communities encountered. Field observations facilitated further refinement of search areas, with additional emphasis on areas in proximity to the proposed trail route. A list of plant species was created, and digital photographs were taken of documented resources.

FBE used an Eos Arrow 100 GPS unit capable of submeter accuracy, and a handheld Garmin GPSMAP 78 unit typically accurate to within 30 feet, to record unique or representative locations. These spatial data were overlayed on aerial imagery to produce maps summarizing the field findings.

SITE DESCRIPTION, RESULTS, AND DISCUSSION

FBE Project Manager and Wetland Scientist Sarah Large, CWS along with Project Scientist II Tim Kirsten conducted the field investigation on 7 June 2024. Jackson Kaspari, City of Dover Resilience Manager, and UNHSI Fellow John DesRoches met FBE staff on site for the morning portion of the site visit. Together, they walked the general trail route through the easement area, noting the location of existing groundwater monitoring wells and other notable features. A GPS path for

[1] Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131pp.
[2] Sperduto, D. and Nichols, W. (2012). *The Natural Communities of New Hampshire Technical Manual*. Accessible from: https://www.nhdfl.dncr.nh.gov/sites/g/files/ehbemt866/files/inline-documents/natural-communities-technical-manual.pdf

the trail route was collected, using the handheld unit. Point features for the monitoring wells were collected utilizing the Eos Arrow 100 GPS unit. Data collected and field findings were post processed and summarized in the attached Field Map and Natural Community & Cover Type Map (Attachment 2 and 3, respectively). Representative photographs for key resources and features are included in Attachment 4.

Extent: The Survey Area encompasses approximately 46 acres of the New Meadows Property (Tax Map H-35, Lot D-0), located off NH Route 155/Knox Marsh Road and Lilac Lane in Dover, New Hampshire. The New Meadows parcel includes the Lilac Garden Apartments in its eastern extent and is bounded by the Bellamy River along its southern border. A significant proportion of the Survey Area is located within a conservation easement (Attachment 1).

General Site Description: The topography of the Survey Area is generally flat, draining to the Bellamy River. Knox Marsh Brook flows beneath Route 155/Knox Marsh Road and enters the Survey Area along the northern boundary, where it meanders south until it joins the Bellamy River. Kelly Brook also briefly passes through the Survey Area in its westernmost portions, before flowing into the Bellamy River.

The remainder of the Survey Area is a combination of wetland and upland (i.e. non-wetland) natural community types, with much of the wetland area associated with the streams. Examination of historic and current aerial imagery reveals that the utility corridor which passes through the Survey Area has been in place since at least 2003, in addition to the majority of the developed area at the parcel. Forest canopy cover has not changed significantly since then. The site shows varying degrees of human influence both currently and historically. Examples of human influence include complete conversion of natural communities into developed land, the transformation of forested areas into open habitats like the utility corridor, and more minor impacts such as small trails and shifts in forest species composition due to past logging.

Wetlands and Watercourses:

Wetland A (PFO1E) & Wetland A-2 (PUB3F)

Wetland A is a large wetland complex associated with the Bellamy River and Knox Marsh Brook. It is a palustrine forested wetland with broad-leaved deciduous vegetation and a seasonally flooded/saturated hydrologic regime (PFO1E). Dominant canopy tree species include red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), shagbark hickory (*Carya ovata*) American basswood (*Tilia americana*), and American beech (*Fagus grandifolia*). The shrub understory predominantly features green ash saplings, nannyberry *(Viburnum lentago)* silky dogwood (*Swida amomum*), and smooth arrowwood (*Viburnum dentatum*). The herb stratum is characterized by sensitive fern (*Onoclea sensibilis*), northern lady fern (*Athyrium angustum*), royal fern (*Osmunda regalis*), tall meadow-rue (*Thalictrum pubescens*), pointed broom sedge (*Carex scoparia*), cinnamon fern (*Osmundastrum cinnamomeum*), poison ivy (*Toxicodendron radicans*), New York fern (*Parathelypteris noveboracensis*), jack-in-the-pulpit (*Arisaema triphyllum*), reed canary grass (*Phalaris arundinacea*), and a trillium species (*Trillium* sp.). A variety of non-native, invasive plant species are heavily prevalent in Wetland A, specifically purple loosestrife (*Lythrum salicaria*), glossy false buckthorn (*Frangula alnus*), autumn olive (*Elaeagnus umbellata*), multiflora rose (*Rosa multiflora*), Japanese barberry (*Berberis thunbergii*), Asiatic bittersweet (*Celastrus orbiculatus*), and burning bush (*Euonymus alatus*).

The forested areas of Wetland A meet the classification of Sperduto and Nichol's (2012) Red Maple Floodplain Forest natural community. This S2S3-ranked community type occurs on low floodplains of minor rivers and along tributaries of major rivers in southern and central New Hampshire and is generally relatively flat compared to other swamp types. Sperduto & Nichols (2012) note that this community type has previously been recorded in floodplains along the Bellamy River.

Sections of Wetland A in the vicinity of Knox Marsh Brook also display some characteristics of the Red Maple – Elm – Lady Fern Silt Forest natural community. This is a rarer S1S2 community type and is known to occur further down the Bellamy River, close to Great Bay. Further investigation is recommended to confirm whether this section of Wetland A should be classified differently from the sections in closer proximity to the Bellamy River. Given the Dover Community Trail is unlikely to traverse this part of Wetland A, it was decided to classify the entire wetland as Red Maple Floodplain Forest until subsequent field investigation concludes otherwise.

A small backwater pond off the Bellamy River that partially falls within the Survey Area was denoted separately as Wetland A-2, a semi-permanently flooded palustrine unconsolidated bottom wetland with a mud substrate (PUB3F). This area of wetland meets the Sperduto and Nichols (2012) natural community classification of Aquatic Bed (S5) and is characterized by deep muck, quiet waters, and the presence of yellow pond-lily (*Nuphar variegata*).

Wetland B (PFO1E)

Wetland B is associated with the floodplain of Knox Marsh Brook north of the utility corridor and south of Knox Marsh Road. This wetland was also classified as Red Maple Floodplain Forest, showing similar characteristics to Wetland A. Dominant canopy species included red maple, green ash, and shagbark hickory. Recorded shrubs include smooth arrowwood and American elm saplings, as well as nannyberry and invasive barberry, burning bush, glossy false buckthorn, and autumn olive. The herb layer consists of tall meadow-rue, poison ivy, sensitive fern, New York fern, and cinnamon fern.

Wetland C (PEM1E)

Wetland C occurs at the intersection of Knox Marsh Road and Lilac Lane. It is a seasonally flooded/saturated palustrine emergent wetland with persistent emergent vegetation (PEM1E). A mowed grass strip separates this wetland into two sections with powerline infrastructure traversing the wetland. The wetland complex meets a combination of natural community classifications including Cattail Marsh (S4), located south of the grass strip, and Tall Graminoid Meadow Marsh (S4), north of the grass strip.

It is possible that the southern portion of the wetland complex was man-made for stormwater treatment. Species observed in the complex include broad-leaved cattail (*Typha latifolia*), white meadowsweet (*Spiraea alba* var. *latifolia*), sensitive fern, woolgrass (*Scirpus cyperinus*), steeplebush (*Spiraea tomentosa*), sedge species (*Carex* spp.), sheep laurel (*Kalmia angustifolia*) and invasive purple loosestrife, glossy false buckthorn, and multiflora rose.

Wetland D (PEM1/PSS1E)

Wetland D is a small wetland near the start of the existing trail system. The interior of the wetland is dominated by emergent vegetation and shrubs surround the wetland's perimeter. The complex is a combination of the Cattail Marsh (S4) and Mixed Tall Graminoid – Scrub-Shrub Marsh (S4S5) natural communities. Observed vegetation includes broad-leaved cattail, white meadowsweet, sensitive fern, red-osier dogwood (*Swida sericea*), steeplebush, speckled alder (*Alnus incana*), and the invasives purple loosestrife and glossy false buckthorn.

Stream 1 (R2UB2) – Bellamy River

Stream 1, the Bellamy River, is a lower perennial river with an unconsolidated, sandy bottom. It is a meandering watercourse with wide reaches, and natural undercut banks. Large woody material was observed crossing the channel in several places.

Stream 2 (R4SB5)

Stream 2 is a narrow stream mapped using the handheld GPS unit and subsequently corroborated with aerial imagery. This intermittent stream has a narrow channel and a muddy substrate. The stream dissipates into Wetland A before flowing into the Bellamy River.

Stream 3 (R3UB2)

Stream 3, Knox Marsh Brook, is an upper perennial river with a sandy bottom. The width of the stream channel varies considerably, ranging from 7 to 20 ft. Water depth was at least 6 inches during the field investigation, and its wetted width was approximately 4 to 8 ft. The channel is deeply incised, and poison ivy is prevalent along its banks. Large, downed woody material crossed the stream at multiple locations.

Uplands (Non-Wetland):

Forests

FBE classified upland forest portions of the Survey Area Sperduto and Nichols (2012) Hemlock – Beech – Oak – Pine Forest natural community (S5). This is a very common community found throughout southern and central New Hampshire. Trees making up the canopy include American beech, red oak (*Quercus rubra*), white ash (*Fraxinus americana*), white pine (*Pinus strobus*), red maple, and black cherry (*Prunus serotina*). The understory is more densely vegetated in the area around the existing trail system, where invasive species dominate.

The remainder of the upland forest west of the power line and behind the storage facility along Lilac Lane has sparser understory cover, however invasive species still occur throughout the community. Native understory species include smooth arrowwood, Canada mayflower (*Maianthemum canadense*), starflower (*Lysimachia borealis*), poison ivy, Virginia creeper (*Parthenocissus quinquefolia*), and swamp dewberry (*Rubus hispidus*). Observed invasive species include glossy false buckthorn, autumn olive, multiflora rose, barberry, and burning bush. Invasive bittersweet vines were also seen to be climbing the trees in the upland forest. FBE noted signs of disturbance within the upland forest within the vicinity of the existing trail and assumed that the area had likely been clear cut and/or logged in the past, as numerous large tree stumps were observed, and most trees were of a similar size and therefore age.

Disturbed Area

An open, disturbed area is located between Lilac Lane and Wetland B. The area is an open clearing with a gravelly dirt lot, surrounded by an open field and some sparse areas of early successional forest, where quaking aspen (*Populus tremuloides)*, paper birch, autumn olive and glossy false buckthorn are present. The field area is characterized by reed canary grass, milkweed (*Asclepias* sp.), ox-eye daisy (*Leucanthemum vulgare*), and bird's-foot trefoil (*Lotus corniculatus*). This area was classified as a 'Disturbed Area' cover type but was not classified as a natural community as it is man-made and showed signs of continually being under anthropogenic influence.

Utility Corridor

A powerline corridor extends from Wetland A in the south-east of the Survey Area to Lilac Lane in the north, passing between the upland forest and developed area. Another segment of utility corridor takes a 90-degree turn to the west, passing through Knox Marsh Brook and heading outside the Survey Area. Plants growing in this area are typical of powerline corridors, with a mix of ferns, grasses and shrubs. Species recorded include staghorn sumac (*Rhus hirta*), meadowsweet, red raspberry (*Rubus idaeus*), red-osier dogwood, silky dogwood, reed canary grass, milkweed, hay-scented fern (*Dennstaedtia punctilobula*), cow vetch (*Vicia cracca*), and the invasive glossy false buckthorn and barberry. Due to its anthropogenic nature, this area was not given a natural community classification.

Developed Area

Developed sections of the Survey Area include parking lots, playgrounds, apartment buildings, paved roads, and a storage facility.

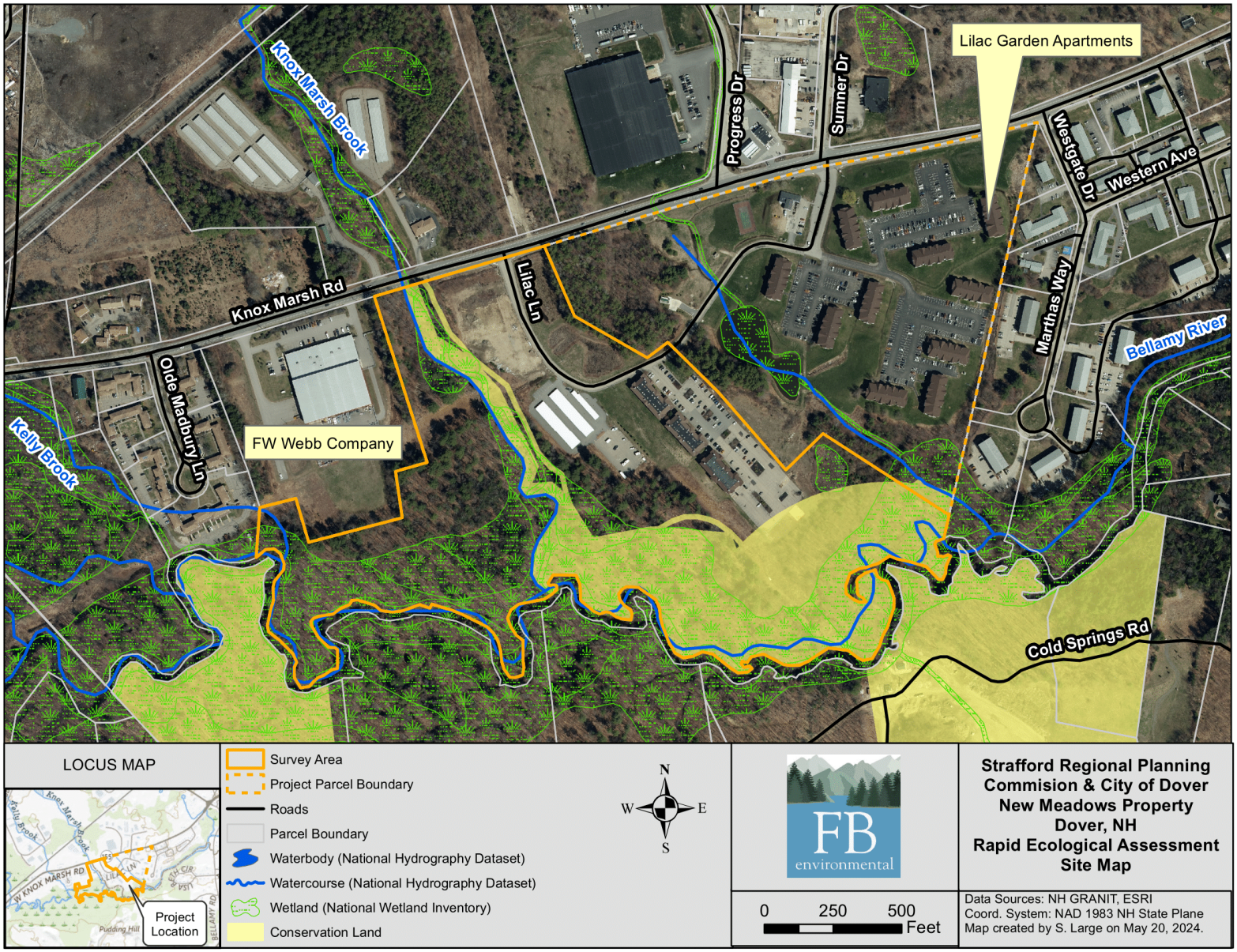
Recommendations

Much of the proposed trail system at the New Meadows property and conservation easement crosses Wetland A. Due to this, construction will likely require permitting, which will heavily depend on the methods used and the level of disturbance necessary to establish the trail. Given the saturated nature of the soils, boardwalks and/or bog bridges will be essential to make the trail passable and to minimize disturbance to the wetland.

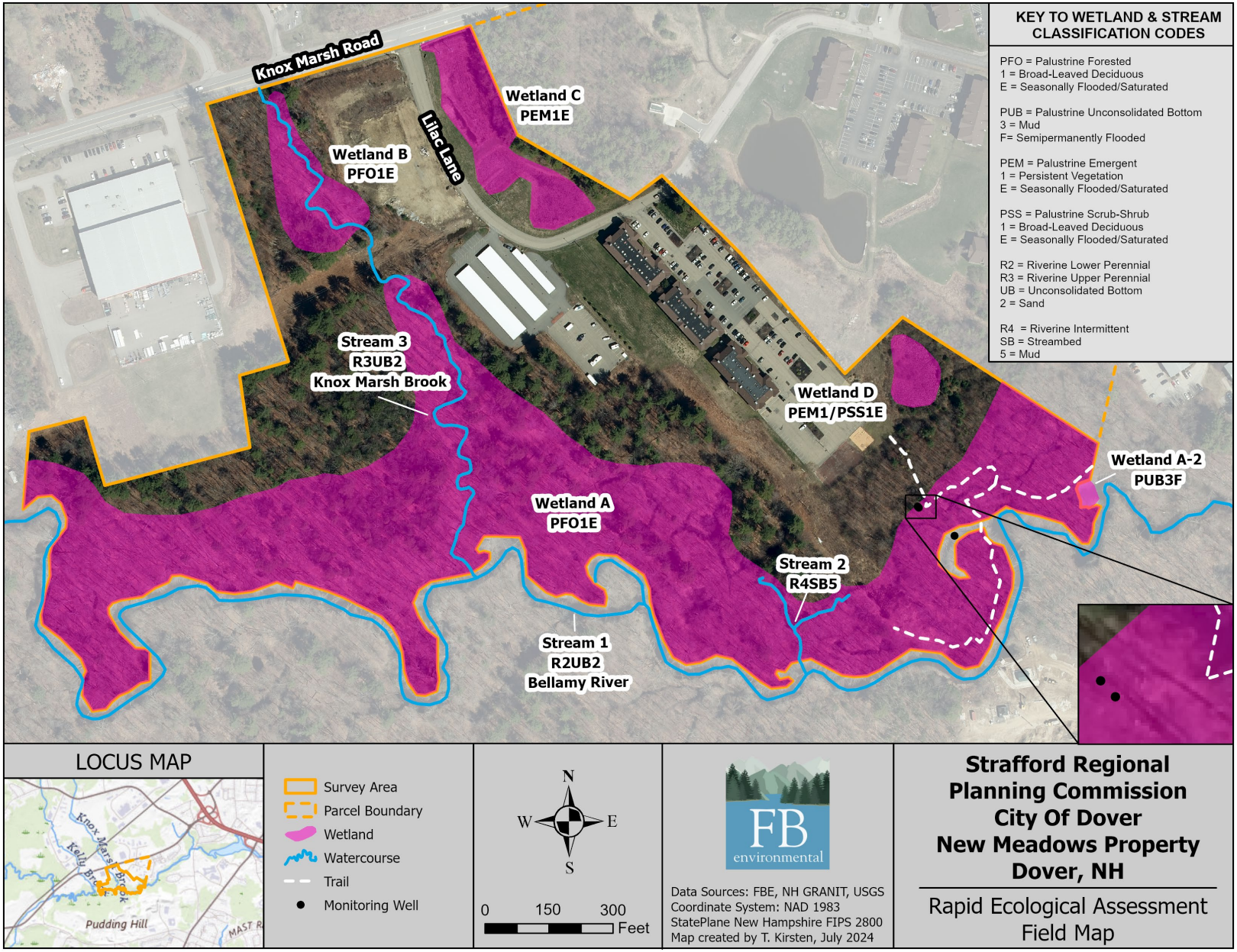
If feasible, FBE recommends routing the trail through upland forest and utility corridor areas as much as possible. The site is also heavily infested with invasive species, so it's crucial to follow best practices during construction to limit the spread of invasive seeds, including proper disposal of vegetative material and soils, and thorough inspection and cleaning of any machinery used.

Additionally, the aquatic bed natural community in a backwater channel of the Bellamy River, located near the proposed trail, is a unique and scenic feature that visitors will likely appreciate passing by on the trail. Care should be taken to avoid direct impacts to this area during the planning and design phases of the trail expansion project.

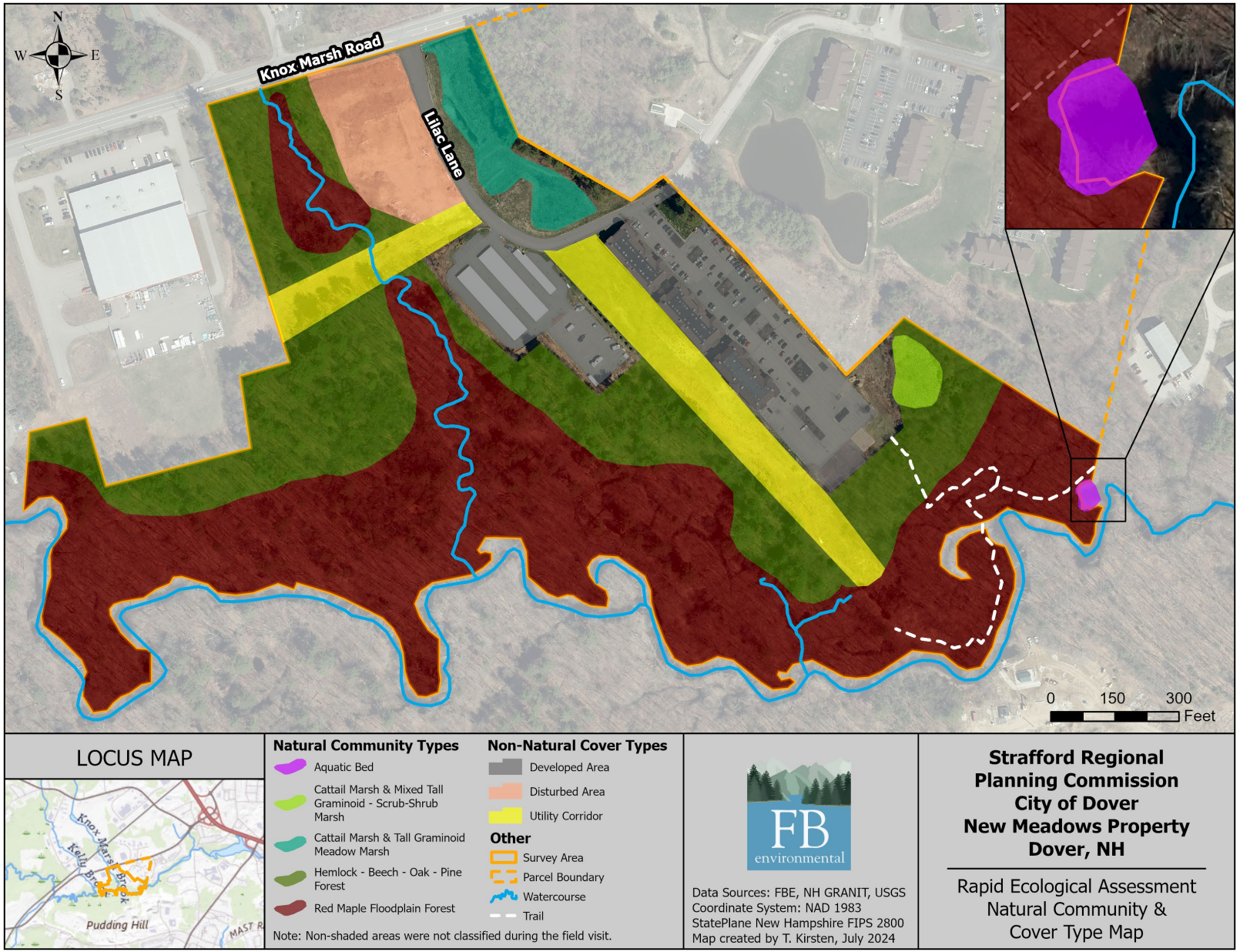
ATTACHMENT 1. SITE MAP



ATTACHMENT 2. FIELD MAP



ATTACHMENT 3. NATURAL COMMUNITY & COVER TYPE MAP



ATTACHMENT 4. SITE PHOTOGRAPHS

Photo 1. Wetland A has a canopy dominated by deciduous species and a dense understory.

Photo 2. Wetland A is a Red Maple Floodplain Forest (S2S3) natural community.

Photo 3. Wetland A-2, a small aquatic bed habitat occurring in a backwater channel/pond of the Bellamy River.

Photo 4. A representative view of Wetland B, which is similar in composition to Wetland A. Sensitive fern is a dominant species of the understory.

Photo 5. A view of Wetland C, north of the mowed grass strip, which meets the classification of a Tall Graminoid Meadow Marsh natural community.

Photo 6. A view of the Cattail Marsh portion of Wetland C, south of the grass strip. Broad-leaved cattail (*Typha latifolia*) dominates the emergent vegetation in this section of the wetland complex.

Photo 7. Wetland D supports scrub-shrub vegetation on its periphery, with emergent vegetation becoming dominant within the interior.

Photo 8. Stream 1, the Bellamy River, meanders along the southern boundary of the Survey Area and is relatively wide in sections.

Photo 9. Large woody material lies across Stream 1 (Bellamy River) at multiple locations.

Photo 10. Stream 2 is a narrow, shallow intermittent watercourse that flows through Wetland A to the Bellamy River.

Photo 11. Stream 3 (Knox Marsh Brook) meanders through Wetland A towards the Bellamy River.

Photo 12. The banks of Stream 3 (Knox Marsh Brook) are deeply incised at points.

Photo 13. The upland forest near the existing trail system located in the south-east of the Survey Area is characterized by relatively young hardwood trees and a sparse understory.

Photo 14. The upland forest community contains a higher proportion of American beech (*Fagus grandifolia*) and white pine (*Pinus strobus*) further north and west in the Survey Area.

Photo 15. A view of the southern leg of the utility corridor, which is characterized by scrub-shrub and herb species typical of disturbed meadow habitats.

Photo 16. A view from the northern leg of the utility corridor, which is invaded by large glossy false buckthorn (*Frangula alnus*) shrubs.

Photo 17. A view of the disturbed area near Knox Marsh Road. This area contains a dirt pile, vegetation characteristic of disturbed fields, and early successional upland forest.

Photo 18. One of the three monitoring wells present within the Survey Area.

Photo 19. A view of the existing trail within the Survey Area in the upland forest community, near its entrance from the parking lot in the New Meadows property.

Photo 20. The proposed trail path meanders throughout the dense herbaceous vegetation of Wetland A in proximity to the Bellamy River.